



AUSTRALIAN OLIVE INDUSTRY
OliveCare®
**HACCP Style Food Safety / Quality
Plan Template**
For the Production of
Australian Table Olive Products
Third Edition (3.1) (Revised December 2020)



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INTRODUCTION

About this *OliveCare®* HACCP Style Food Quality Plan Template for Australian Table Olive Products

This HACCP Style Food Quality Plan Template for table olive (TO) products has a focus on product quality meeting the needs of olive growers / processors / bottlers / distributors, whilst remaining consistent with Hazard Analysis Critical Control Point (HACCP) system requirements.

PART 1 - THE GROVE:

Intro	Introduction – About this Plan; Copyright and Acknowledgements; Terms and Abbreviations; Glossary; <i>OliveCare®</i> and AOA Certification Trade Marks; References; The Voluntary Standard for Table Olives in Australia, and product quality parameters; AIOA Table Olive Competition; Tastebook; Signatory Compliance Checklist; <i>OliveCare®</i> Training Program; Food Standards Australia New Zealand and the Food Standards Code.	Pg 2
Section 1	Risk Management – This section explains risk management and the principles and practices of HACCP; including what is covered and what is outside the terms of reference of this module; <i>OliveCare®</i> Best Practice Checklists.	Pg 33
Section 2	On farm – This module is aimed at olive growers. It covers product quality and food safety at the most basic level. It is not a full farm safety program, but takes the process through to the picking stage where fruit leaves the grove ready for processing.	Pg 58

PART 2 – PROCESSING, PACKAGING & PRODUCT DISTRIBUTION:

Section 3	Primary processing: natural olives – This module covers operations once the fruit arrives at the processing plant from the farm. In many instances we have included issues that are food quality related.	Pg 71
Section 4	Primary processing: treated olives – This is a widely used technique for processing green olives using alkali to speed up the process. There are both large and small scale versions of this process.	Pg 83
Section 5	Post processing – This section follows the olives from storage after processing to preparation for sale, including product testing.	Pg 103
Section 6	Secondary processing & packaging – Once the olives have been prepared and are edible, there are a number of alternative methods of presenting them for sale.	Pg 109
Section 7	Olive paste and tapenade – Production of olive paste from the flesh of processed olives, and a simple olive tapenade recipe.	Pg 122
Section 8	Product distribution – This section details the processes involved in getting the finished product to the consumer.	Pg 131

PART 3 – RECORD KEEPING AND DOCUMENTATION:

Section 9	Record keeping – These are “HACCP –style” protocols and are referred to by several sections of the hazard analysis / flowcharts / hazard table. They are also useful management tools for both food safety and food quality.	Pg 137
Section 10	Related program documents – These are “HACCP-style” forms generated to make implementation simple as well as some standard forms to aid the production process. These forms are not mandatory, but suggest ways to control operations.	Pg 155

Note: Full HACCP ‘third party’ audited accreditation is mandatory in various jurisdictions for contract processors and packaging enterprises, and is also required by major buyers including supermarkets. Many *OliveCare*® Signatories have third party accreditation, and is encouraged for other larger producers.

This accreditation can be achieved through a range of Australian and International food safety and quality accreditation programs delivered by various providers; programs include: Freshcare® (Food Safety & Quality), SQF (Safe Quality Food), Sci-HACCP, GLOBAL G.A.P. (Global Good Agricultural Practice), BRC (BRC Global Standard for Food Safety), ISO9001 Standard (Quality Management System), and several others.

The Australian government has a **National Standard for Organic & Bio-dynamic Produce**¹ and gives authority to certification bodies in Australia² to administer certification to the national organic standard. Certifying organisations which have been accredited by the Australian competent authority apply this Standard as a minimum requirement to all products produced by operators certified under this system. Many olive producers also have **organic certification** through: NASAA Certified Organic, Australian Certified Organic, Aus-Qual Organic, Organic Food Chain or Demeter bio-dynamic.

Note: As part of *OliveCare*® compliance requirements (see pg 22), all Signatories are required to complete the following food quality / food safety systems declaration to benchmark their current quality systems: [#Declaration of food quality & food safety systems](#)

Not all Sections of this template will apply to all olive production enterprises, therefore please select those sections that are relevant to your enterprise, implement in stages and revisit as part of a continuous improvement program.

This HACCP Style Food Quality Plan template will assist olive industry participants to:

- Identify and manage risks that could potentially impact on product quality and food safety and hence on business reputation.
- Establish a managed supply chain to ensure all inputs to a food business are ‘food safe’, whether inputs are supplied by the grower themselves or sourced externally.
- Produce and supply estate grown olive fruit of a standard likely to produce premium quality table olives.
- Harvest and transport olives to a processing plant without compromising product quality.
- Turn premium olive fruit into premium table olives, and related products.

¹ The National Standard for Organic and Bio-Dynamic Produce:

<https://www.agriculture.gov.au/export/controlled-goods/organic-bio-dynamic/national-standard>

² Department of Agriculture, Water and the Environment Organic Approved Certifying Organisations:

<https://www.agriculture.gov.au/about/contact/phone/approved-certifying-organisations#aco-certification-ltd-aco>

- Store, package and transport table olives to market.
- Eliminate work practices and processes that may compromise the quality or safety of the product.
- Ensure complaints and problems are dealt with effectively and efficiently.
- Ensure all statutory workplace health and safety requirements are current and met.
- Ensure all staff are trained and capable of doing the work required.
- Provide a documented production process capable of being audited.
- Regularly review production and processing systems.

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Acknowledgements:

The Australian Olive Association Ltd. is a membership driven and funded national peak industry body representing Australian olive producers and their supply chain partners. The AOA is responsible for setting and maintaining industry quality standards for Australian products which is achieved through members participating in the OliveCare® Code of Best Practice program that promotes and facilitates compliance with the Voluntary Standard for Table Olives in Australia (RIRDC 2012 – Revised January 2020), as well as regulatory compliance requirements.

The Australian Olive Association would like to thank Olives South Australia for its support for the initial development of this helpful guide for Australian olive producers, and to acknowledge Mike Wilson for his considerable input to developing the original document, and to Professor Stan Kailis and Peter McFarlane for their ongoing revision and updating of this document.

Terms and Abbreviations:

ACCC: Australian Competition and Consumer Commission

ACL: Australian Consumer Law

AEV®: Australian Extra Virgin Trade Mark

Agrifutures Australia (formerly RIRDC)

AIOA: Australian International Olive Awards

AOA: Australian Olive Association Ltd

APVMA: Australian Pesticide and Veterinary Medicines Authority

AS: Australian Standard®

a_w : Water activity

BBD: Best Before Date

CAR: Corrective Action Request

CFU: Colony Forming Unit

CP: Control Point

CCPs: Critical Control Points

CO: Carbon Monoxide

COP: *OliveCare*® Code of Best Practice

CTMs: Certification Trade Marks

FSANZ: Food Standards Australia New Zealand

GAP: Good Agricultural Practice

GHP: Good Hygiene Practice

GMP: Good Manufacturing Practice (as per standards or guidance from a food technologist)

HACCP: Hazard Analysis Critical Control Points

Hort Innovation: Horticulture Innovation Australia Ltd

HSRS: Health Star Rating System

IOC: International Olive Council

IPDM: Integrated Pest and Disease Management

MAT: modified atmosphere – carbon dioxide/nitrogen

MeD: Median of Defects – Rancid, Winey-vinegary, Musty, Muddy Sediment, Fusty

MeF: Median of Fruitiness

MPN: Most Probable Number

MRLs: Maximum Residue Limits

MSDS: Material Safety Data Sheet

MUP: Minor Use Permit

NATA: National Association of Testing Authorities

NIP: Nutrition Information Panel

OBP: Olive Biosecurity Plan

OH&S: Occupational Health and Safety

P: Pasteurisation – indicative organisms – propionic or lactic acid bacteria

PPE: Personal Protection Equipment

ppm: Parts per Million

PR: addition of preservatives sodium benzoate, potassium sorbate

PVC: Poly Vinyl Chloride

QCP: Quality Control Point

R: refrigeration 0°C to 4°C

S: Sterilisation – at conditions that will kill *Clostridium botulinum* spores

SARP: Strategic Agrichemical Review Process

SCC: specific chemical characteristics

SOP: Standard Operating Procedure

Glossary:

The following terms used in this document may require additional explanation:

Benchmark: Compare performance against an industry standard

Biological Hazard: An identified threat to food safety or product quality posed by living organisms.

Biosecurity Hazard: Any pest, disease or weed incursion that potentially impacts on grove productivity.

Certification: Meeting industry standards or product specifications

Chemical Hazard: An identified threat to food safety or product quality posed by chemical contamination.

Chemical Residue: Presence of any chemical or its metabolites used in crop production or food processing that is present in the finished product above permitted levels.

Compliance: Meeting product standards or specifications

Contaminant: Traces of any physical, chemical or biological agent present in a raw or finished product.

Critical Control Point (CCP): is a step in the food production process where preventative measures can be applied to prevent, reduce or eliminate a food safety hazard, such as bacterial growth or chemical contamination.

De-bittering: Processes by which natural bitter compounds found in raw olives such as polyphenols are removed or degraded from table olives, such as through fermentation, sodium hydroxide and dehydration (salt curing or by heat).

Food Quality Plan: Document(s) that specify **quality** standards, practices, resources, specifications, and the sequence of activities relevant to a particular product, service, project, or contract.

Food Safety Hazard: Any chemical, physical or biological risk factor that has potential to render a food product unsafe to consume.

Food Safety Plan: A Food Safety Plan is a plan based on the concepts of Hazard Analysis and Critical Control Point (HACCP).

Food Safety Program: Is a documented plan that shows what a business does to ensure that the food it produces and sells is safe for people to eat.

Food Safety Management System: Is a systematic approach to controlling food safety hazards within a food business in order to ensure that food is safe to eat. Regulators may require certain businesses to put in place, implement and maintain a FSMS based on the principles of Hazard Analysis Critical Control Point (HACCP).

Food Standards Code: The Australia New Zealand Food Standards Code sets legal requirements for the labelling, composition, safety, handling, and primary production and processing of food in Australia. The Code applies to any business or activity that involves the handling of food for sale, or the sale of food in Australia.

Fungi: Includes both yeast and moulds but not bacteria.

Good Agricultural Practice (GAP): as defined by FAO, are a “collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agriculture products, while taking into account economic, social and environmental sustainability”.

Good Hygiene Practice (GHP): **GHP** compliance covers the minimum sanitary and **hygiene practices** for food processors, to ensure that food is safe and suitable for human consumption.

Good Manufacturing Practice (GMP): **is** a system for ensuring that products **are** consistently produced and controlled according to quality standards. It **is** designed to minimize the risks involved in any production that cannot be eliminated through testing the final product.

Hazard Analysis Critical Control Point (HACCP): is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.

Lye (Caustic soda): Sodium Hydroxide

Maximum Residue Limits (MRLs): is the highest amount of an agricultural or veterinary (agvet) chemical residue that is legally allowed in a food product sold in Australia whether it is produced domestically or imported.

Microbes (microorganisms): Microorganisms encompass bacteria, yeast and moulds; all can potentially produce spores. Unless there is mass growth, the microorganisms and their spores are not visible to the naked eye. Microscopy must be used to confirm such presence.

Microbiological Criteria: are limits for specific or general groups of microorganisms that can be applied in order to ensure that foods do not present a potential health hazard to the consumer and/or that foods are of a satisfactory quality for use in commerce (units CFU or MPN).

Minor Use Permit (MUP): are issued by APVMA for uses where no relevant registered products or use patterns exist because registering the use pattern would not produce an economic return for the registrant.

Natural Olives: Raw olives placed directly in brine in which they undergo complete or partial fermentation (anaerobic or aerobic), preserved or not by the addition of acidifying agents as per the Voluntary Standard for Table Olives.

Occupational Health & Safety (OH&S): is concerned with protecting the safety, health and welfare of people engaged in work or employment.

Organoleptic (Sensory): properties of food, water or other substances that an individual experiences via the **senses**—including taste, sight, smell, and touch

Pasteurise: a process in which packaged and non-packaged foods are treated with mild heat, usually to less than 100 °C, to eliminate pathogens and extend shelf life.

Physical Hazard: are either foreign materials unintentionally introduced to **food** products (eg: metal fragments) or naturally occurring objects (eg: olive stones) that are **hazardous** to the consumer.

Physico-chemical parameters: include temperature, pH, water activity, salinity.

Potable Water: Water that meets the test parameters set by health authorities as being suitable for drinking.

Primary Processing: various methods for de-bittering raw table olives – eg sodium hydroxide treatment, fermentation, brining and dehydration (salt curing or by heat).

Product Recall: Action taken to remove from sale, distribution and consumption *foods* which may pose a safety risk to consumers'. A *food recall* may be initiated as a result of a report or complaint from a variety of sources – manufacturers, wholesalers, retailers, government agencies and consumers.

Quality Control Point (QCP): is a step in the food production process where preventative measures can be applied to prevent, reduce or eliminate a product quality hazard, such as exposure to heat or oxygen.

Raw Olives: Olives that have not undergone any processing treatment

Salinometers : An instrument for measuring the concentration of a salt solution

Sanitise: the process of killing food poisoning bacteria by using heat and/or chemicals.

Secondary Processing: various methods of value adding table olives eg destoning, slicing, stuffing, flavouring as well as other products pastes and tapenades.

Standard Operating Procedure (SOP): Any document that is a “how to” instruction.

Sterilise: The process of decontamination by utilising a combination of chemical application, heat, and/or pressure to eliminate all pathogenic microbes on a surface.

Treated Olives: Raw olives that have undergone alkaline treatment, are packed in brine in which they undergo complete or partial fermentation, then preserved or not by the addition of acidifying agents and/or cold (refrigeration) or heat treatment.

Water Activity (a_w): is a ratio of vapour pressures and thus has no units. It ranges from 0.0 a_w (bone dry) to 1.0 a_w (pure water). It is an important property that is used to predict the stability and safety of food with respect to microbial growth, rates of deteriorative reactions and chemical/physical properties.

Table Olive Production References:

The following references will assist operators in designing and implementing a Food Quality and Food Safety Plan for table olive production and processing:

- The *Voluntary Standard for Table Olives in Australia* (RIRDC Publication 12-111, October 2012-Revised January 2020)³
- *'Australian Product Label Guide: Table Olives'* (AOA August 2020)⁴.
- *'Table Olive Production Manual'* (RIRDC Publication 12-100, October 2012)⁵.
- *Producing Table Olives* edited by Stanley Kailis and David Harris 2007 (CSIRO Publishing)⁶
- *'Olive Growing'* manual (*El Cultivo Del Olivo*) Ch 18 'Processing Olives' (RIRDC Publication 09-067, October 2010).⁷
- Links to other RIRDC (now Agrifutures Australia) technical reports can be found on the AOA website⁸.

³ *Voluntary Industry Standard for Table Olives in Australia (RIRDC 12-111 – Revised January 2020)*: <https://australianolives.com.au/wp-content/uploads/2020/02/RIRDC-12-111-Australian-Table-Olive-Standard-Kailis-Final.pdf>

⁴ Australian Product Label Guide: Table Olives (AOA August 2020): <https://australianolives.com.au/labelling-information/>

⁵ Table Olive Production Manual (RIRDC 2012): <https://www.agrifutures.com.au/wp-content/uploads/publications/12-100.pdf>

⁶ *Producing Table Olives* edited by Stanley Kailis and David Harris 2007 (CSIRO Publishing): <https://ebooks.publish.csiro.au/content/producing-table-olives>

⁷ *'Olive Growing'* manual (*El Cultivo Del Olivo*) Ch 18 'Processing Olives' RIRDC 2010: <https://australianolives.com.au/olive-growing-manual/>

⁸ Links to RIRDC (now Agrifutures Australia) technical reports: <https://australianolives.com.au/review-of-agrifutures-rirdc-olive-rd-publications/>

The Voluntary Standard for Table Olives in Australia:

Signatories to OliveCare® Code of Best Practice for table olives are required to undertake specified physical, chemical, microbiological, organoleptic and visual assessment of a sample taken from each batch identified on table olive product labels to establish eligibility to apply the Certified Australian Table Olives™ Trademark, in accordance with The Voluntary Industry Standard for Table Olives in Australia (RIRDC 2012 – Revised January 2020)⁹:

- Ref Section 3, Table 2: Physico-chemical characteristics of packing brine or juice after osmotic balance.

Table 2: Physico-chemical characteristics of packing brine or juice after osmotic balance

Preparation	Minimum sodium chloride content*			Maximum pH limit			Minimum lactic acidity % lactic acid		
	SCC, MAT	PR, R	P, S	SCC, MAT	PR, R	P, S	SCC, MAT	PR, R	P, S
Treated olives	5	4	GMP	4.0	4.0	4.3	0.5	0.4	GMP
Natural olives	6	6	GMP	4.3	4.3	4.3	0.3	0.3	GMP
Dehydrated and or shrivelled olives	8	8	GMP	GMP	GMP	GMP	GMP	GMP	GMP
Olives darkened by oxidation	GMP	GMP	GMP	GMP	GMP	GMP	GMP	GMP	GMP

*Minimum sodium chloride content (% weight per volume)

Explanation of abbreviations in Table 2:

- **SCC:** specific chemical characteristics
- **MAT:** modified atmosphere – carbon dioxide/nitrogen
- **PR:** addition of preservatives sodium benzoate, potassium sorbate
- **R:** refrigeration 0°C to 4°C
- **P:** pasteurisation – indicative organisms – propionic or lactic acid bacteria
- **S:** sterilisation – at conditions that will kill *Clostridium botulinum* spores
- **GMP:** good manufacturing practice (as per guidance from a food technologist)

Note: The relationship between %NaCl and water activity (a_w) is set out in the following table:

NaCl (g)	Water (g)	% NaCl	A_w
0.9	99.1	0.9	0.995
1.7	98.3	1.7	0.99
3.5	96.5	3.5	0.98
7.0	93.0	7.0	0.96
10.0	90.0	10.0	0.94
13.0	87.0	13.0	0.92
16.0	84.0	16.0	0.90
22.0	78.0	22.0	0.86

- Water Activity (a_w): is a ratio of vapour pressures and thus has no units. It ranges from 0.0 a_w (bone dry) to 1.0 a_w (pure water). It is an important property that is used to predict the stability and safety of food with respect to microbial growth, rates of deteriorative reactions and chemical/physical properties.

⁹ The Voluntary Industry Standard for Table Olives in Australia (NTOC, October 2012) RIRDC 12/111(Revised January 2020): <https://australianolives.com.au/wp-content/uploads/2020/02/RIRDC-12-111-Australian-Table-Olive-Standard-Kailis-Final.pdf>

- **Ref Section 9** of the Standard for microbiological criteria for table olives offered for retail sale to the public.
Industry microbiological testing requirements is *Escherichia coli* as an indicator organism for faecal contamination, *Clostridium perfringens* as an indicator for contamination by soil born spore forming pathogens, and *Lactobacillus* as an indicator for effectiveness of Pasteurisation.
- All testing must be undertaken by a NATA accredited laboratory.
- The following minimum testing requirements have been incorporated into the Australian International Olive Awards (AIOA) testing of table olive exhibits:

Minimum Standards: Physico-chemical and microbiological test parameters¹⁰

Test Package 1. Table Olives in brine - natural (unpasteurised): Brine tested

- Minimum sodium chloride (NaCl): **6% ($a_w < 0.975$)**
- Maximum pH: **4.3**
- Microbiological Criteria - *Escherichia coli*: **Not detectable (<3 cfu/g)**
- Microbiological Criteria - *Clostridium perfringens*: **Not detectable (<10 cfu/g)**

Test Package 1. Table Olives in brine - treated with sodium hydroxide (NaOH) (unpasteurised): Brine tested

- Minimum sodium chloride (NaCl): **5% ($a_w < 0.970$)**
- Maximum pH: **4.0**
- Microbiological Criteria - *Escherichia coli*: **Not detectable (<3 cfu/g)**
- Microbiological Criteria - *Clostridium perfringens*: **Not detectable (<10 cfu/g)**

Test Package 2. Table Olives in brine (Pasteurised): Brine tested

- Maximum pH: **4.3**
- Microbiological Criteria - *Escherichia coli*: **Not detectable (<3 cfu/g)**
- Microbiological Criteria - *Lactobacillus*: **Not detectable (<10 cfu/g)**
- Microbiological Criteria - *Clostridium perfringens*: **Not detectable (<10 cfu/g)**

Test Package 3. Table Olives not in brine - Dehydrated / Shrivelled (pasteurised or unpasteurised): Olives tested

- Water activity $a_w < 0.950$ (8% NaCl)
- Microbiological Criteria - *Escherichia coli*: **Not detectable (<3 cfu/g)**
- Microbiological Criteria - *Clostridium perfringens*: **Not detectable (<10 cfu/g)**

Test Package 4. Table Olives not in brine - Dehydrated / Shrivelled / Tapenade (Pasteurised): Olives tested

- Maximum pH: **4.3**
- Water activity $a_w < 0.950$ (8% NaCl)
- Microbiological Criteria - *Lactobacillus*: **Not detectable (<10 cfu/g)**
- Microbiological Criteria - *Escherichia coli*: **Not detectable (<3 cfu/g)**
- Microbiological Criteria - *Clostridium perfringens*: **Not detectable (<10 cfu/g)**

Note: In the OliveCare® microbiological standard the units are 'CFU'

¹⁰ Minimum Standards: Physico-chemical and microbiological test parameters:
<https://australianolives.com.au/aoa-certified-table-olive-compliance/>

CFU refers to “colony forming units”, whereas an alternative measure of MPN refers to “most probable number”.

The difference is that CFU/g is the actual count from the surface of a plate, and MPN/g is a statistical probability of the number of organisms.

Regulatory agencies sometimes prefer MPN rather than CFU “because a colony in a CFU test might have originated from a clump of bacteria instead of an individual, the count is not necessarily a count of separate individuals.” (US EPA 2003).

Table Olive Sensory Assessment:

All table olives must pass sensory and visual assessment undertaken by an approved laboratory (or through participation in an AOA recognised table olive competition).

In accordance with *Section 5.1 IOC Method Sensory Analysis of Table Olives COI/OT/MO No 1/Rev.2, November 2011¹¹*.

Sensory attributes:

Bitterness: The olive shouldn't be bitter to taste but some bitterness can be balanced by the amount of saltiness and olive flavour.

Saltiness: The level of salt governs the flavour of the olive and must be balanced with the bitterness and acidity.

Flavour: the olive should have an appealing fruit flavour, which for green olives often is a typical fermentation taste but retaining ‘olive’ character, and for black olives is a stronger olive flavour.

No negative attributes: There should be no taste or aroma faults that would render the product unmarketable: Abnormal fermentation (faecal, putrid, butyric, zapatera), musty, rancid, ‘cooked’, soapy, metallic, earthy, **winey-vinegary***, or as reflected in achieving a score of 15 or more out of 30 points.

Abnormal fermentation Olfactory sensation perceived directly or retro nasally, characteristic of abnormal fermentations. Such fermentation may be:

- **Putrid:** sensation reminiscent of the odour of decomposing organic matter.

- **Butyric:** sensation reminiscent of butter or cheese.

- **Zapateria:** sensation caused by the combination of volatile fatty acids reminiscent of rotten leather.

Musty: Olfactory-gustatory sensation perceived directly or retronasally, characteristic of olives attacked by mould.

Rancid: Olfactory sensation perceived directly or retro nasally, characteristic of olives that have undergone a process of oxidation.

Cooked: Olfactory sensation perceived directly or retro nasally, characteristic of olives that have undergone excessive heating in terms of temperature and/or duration during pasteurisation or sterilisation.

Soapy: Olfactory–gustatory sensation reminiscent of soap.

Metallic: Olfactory–gustatory sensation reminiscent of metals.

Earthy: Olfactory-gustatory sensation reminiscent of soil or dust.

¹¹ IOC Method Sensory Analysis of Table Olives COI/OT/MO No 1/Rev.2, November 2011:
<http://www.internationaloliveoil.org/documents/viewfile/4130-met-ot-org-eng>

Winey-vinegary: Olfactory-gustatory sensation reminiscent of wine or vinegar. *except for table olives pickled using red wine vinegar (eg traditional Kalamata method) or other preparations where red or white vinegar has been as per GMP.

Note: The IOC Trade Standard states that olives may not be sold as table olives where the defect predominantly perceived (DPP) ≥ 7.0 (which is astounding given these olives would be inedible!)

Textural attributes:

Hardness: The olive should have a firm flesh texture, without a tough skin.

Mouth feel: The olive should have a smooth flesh texture with some crunchiness.

Flesh-to-stone ratio: The olive should have a generous flesh that easily bites away from the stone.

Visual and other attributes:

Samples must be visually appealing:

SKIN: Except for sun and/or dry salt dried wrinkled table olives, the skin of the fruit should be fine, smooth (but not tough), with no injuries, yet elastic and resistant to handling damage.

FLESH: Should be firm but not woody or granular. Green olives should have firm, crisp flesh, ripe or black olives will have softer flesh due to the fruit being more mature than green olives, however it shouldn't be soggy, mushy or flabby.

BLEMISHES: Blemishes should be absent however some white spots on green olives are natural. Others such as gas pockets or blistering are caused by processing and organisms and will reduce the point score.

COLOUR: Green olives should be bright green to straw green colour. Some dulling may occur after several months in brine. Sodium hydroxide treated green olives followed by fermentation are a straw yellow colour, whereas unfermented sodium hydroxide treated green olives are very bright green. Olives turning colour should be pale pink, and black olives vary from dark brown to black in colour.

Note: Whilst the addition of ferrous gluconate (INS No. 579) used in the 'California ripe process' as a colour retention agent, is permitted for table olives under the *Australia New Zealand Food Standards Code*, addition of ferrous gluconate is not approved under the *OliveCare® Code of Best Practice*, nor in the Australian International Olive Awards as a method to darken black olives. Naturally black ripe olives can be darkened by exposing them to atmospheric air for one to two days under hygienic conditions.

Types of olives:

Table olives are classified in one of the following types according to the degree of ripeness of the fresh (raw) fruits:

a. Green olives: Fruits harvested during the ripening period, prior to colouring and when they have reached a size typical of the olive cultivar. Colour may vary from green to straw yellow.

b. Olives turning colour: Fruits harvested before the stage of complete ripeness is attained. The skin may be partly pigmented rose to purple or brown.

c. Black olives: Fruits harvested when fully ripe or slightly before full ripeness is reached. The skin may be glossy or matt, having acquired a black, purple black or dark brown colour, not only on the skin but not more than three quarters through the flesh. (Note: The riper the olive, the softer the processed olive). The colour of black olives may also range from reddish

black to violet black, deep violet, greenish black and deep chestnut brown with pigment in the flesh. Fully ripe naturally black olives can be used for olives (processed by dehydration). The features of each type, use of certain processes, addition of various aromatic herbs and trade styles all allow for diversity in table olive preparation.

A description example

	Things to look for	Comments
Appearance	Blemish (does the olive appear blemished?)	Clean unblemished fruit characteristic of the Kalamata olive
	Colour (is the olive colour appealing?)	Appealing purple colour
Aroma	First impression - appealing or unappealing aroma? Aromatic, floral? Intense or subdued?	Appealing intense floral aroma
	Malodourous - abnormal fermentation – putrid, butyric, Zapateria (rotten leather) Winey-vinegary, nail polish solvent	No abnormal aroma
Flavour	Evidence of off flavours – rancid, musty, cooked, soapy, metallic, earthy, acidic	No off flavours
	Does the exhibit have any specific olive flavours? What are the levels of bitterness (minor to overpowering)? Evidence of other flavours including varietal, preservation (vinegar, oil), added flavourings (citrus, garlic, chili, herbs)	Pronounced olive flavour, with well-balanced bitterness.
	Flavour balance, Flavour transference - does the aroma match the flavour? Length of flavour (short to lingering)	Well balanced flavours and aroma with lingering flavours
	Saltiness, slight, just right, too salty Acidity - slight, just right, high	Saltiness and acidity just right
Texture	Hardness - finger squeeze test – soft, firm, hard? Bite test – skin thickness – tough, resistant, fine	Firm texture, good skin thickness
	Chewing test - flesh texture– smooth, mushy, granular, lumpy, fibrous Crunchiness – low, moderate, high?	Smooth even mouthfeel with moderate crunchiness
	Ease of flesh removal? Flesh-to-pip ratio, lean, fleshy?	Generous fleshy olive that easily bites away from the pip
Final tasting comment: Attractive purple coloured fruit with no blemishes. Clean floral aroma flowing onto the palate with intense olive flavour and balanced saltiness. Well balanced flavours and aroma with lingering flavours. A firm texture with good skin thickness, moderately crunchiness and generous flesh. The lingering mouthfeel is smooth with balanced bitterness and acidity.		

Further explanation of table olive product quality parameters and testing is provided in presentations posted on the AOA website in the *OliveCare*® Members Area¹².

¹² *OliveCare*® presentations: <https://australianolives.com.au/olivecare-workshop-presentations/>

The Australian International Olive Awards (AIOA)

The Australian International Olive Awards, promoting and celebrating quality, is one of the newest and most comprehensive olive oil and table olive competitions in the world. Its aim is to professionally judge extra virgin olive oil (EVOO), flavoured olive oils and table olives from around the globe, uncover those with the highest quality and flavour and then award them medals and trophies in recognition of excellence. Exhibits are welcome from both Australian and overseas producers and brand owners.

This competition is a national industry organisation-owned event. It is run by the industry for the industry. Its purpose is simply to promote and celebrate quality extra virgin olive oil, flavoured olive oil and table olive production, and to nurture growers and producers to improve and further develop that quality.

This attention to detail during judging enables the provision of comprehensive quality feedback for EVERY entry, providing producers with the opportunity to learn from their results and refine or improve their practices in future production.

For further information see: <https://internationaloliveawardsaustralia.com.au/>

For table olive competition purposes the following styles are recognised for the Australian International Olive Awards AIOA:

	CLASS 11: GREEN OLIVES Treated or Natural, Plain, whole olives only, no added flavours. In Brine.		CLASS 15: WILD OLIVES Small in size, variations in colour permitted, whole olives only. In Brine.
	CLASS 12: MEDLEY OF OLIVES Plain, whole olives only, no added flavours. In Brine.		CLASS 16: DRIED OLIVES Sun, salt and heat dried olives, including spiced and pitted.
	CLASS 13: OLIVES TURNING COLOUR & BLACK OLIVES All varieties EXCEPT KALAMATA and California ripe processed. Plain whole olives only, no added flavours. In Brine.		CLASS 17: Stuffed Olives Olives stuffed with declared country of origin grown product.
	CLASS 14: KALAMATA OLIVES Plain whole olives only, no added flavours. In Brine.		CLASS 18: SPECIALITY OLIVES Spiced and specially treated olives with declared Country of Origin ingredients. Either: CLASS 18(a): – Flavoured WITHOUT garlic and/or chilli or CLASS 18(b): – Flavoured WITH garlic and/or chilli.

Olive oil competitions are a great way to benchmark your products with those of your peers, and be able to use the competition lab reports and judges scores to achieve *OliveCare®* product certification.

Other Australian competitions that include table olives:

- [Sydney Royal Fine Food Show](#)
- [Australian Fine Food Awards \(RASV\)](#)
- [Adelaide Royal EVOO Awards](#)
- [Hunter Valley Olive Show - NSW](#)
- [Fleurieu Olive Awards – SA](#)

Tastebook®¹³

OliveCare® Members are encouraged to participate in the Tastebook® sensory training program in appreciating, describing and understanding how to improve the quality of EVOO and table olives. It includes tasting of olive oils and table olives, assessing their characteristics, and providing feedback on the style, quality and uses of the sample products that aims to expose industry participants to regular sensory experiences and palate calibration for olive products, and to assist in gaining an understanding of how to achieve product excellence.

The TasteBook® program is developed and owned by the AOA. Further information and resources are available on the AOA website at: <https://australianolives.com.au/tastebook/>

¹³ TasteBook®: <https://australianolives.com.au/tastebook/>



What makes a gold medal table olive?

On first impression a gold medal table olive will have an attractive fresh-looking appearance with an absence of skin blemishes, pock marks, dents and bruises. The olive's colour, size and shape will be consistent and in line with the class entered. The olive's aroma (and brine) will be fresh, clean (fault free) and appealing. On the palate the olive's skin will be firm but easy to bite (not tough) and the flesh is firm but not woody for green olives, and for black olives reduced levels of firmness (ie softer) but not flabby. The olive has excellent olive flavour. Any added flavourings or fillings (herb, EVOO, garlic, chilli) are good quality and compliment the olive flavour – not overwhelm it. Bitterness and acidity and salt levels are in balance and neither are overpowering. A gold medal table olive will be balanced, have great texture and be complex with a long flavourful finish. You will want to eat the whole bowl full.

***OliveCare®* and AOA Certification Trade Marks:**

In a high cost producing country such as Australia it is essential that producers are able to compete on product quality rather than on price.

The Australian Olive Industry's Voluntary Code of Best Practice (the Code) was developed in 2005 in the context of discussions with the Australian Government regarding a proposed new Australian standard for olive oil. The Code was launched in 2008 to underpin and enhance the high quality of Australian olive products and associated production processes.

The Australian Olive Industry's Voluntary Code of Best Practice (The Code) was launched in 2008 to underpin and enhance the high quality of Australian olive products and associated production processes.

This is an Australian Competition and Consumer Commission (ACCC)¹⁴: non-prescribed voluntary industry code of conduct¹⁵ that sets out specific standards of conduct for an industry in relation to the manner in which it deals with its members as well as its customers; these standards are voluntarily agreed to by its signatories.

In July 2011, Standards Australia published a standard for olive oil sold in Australia (*Australian Standard AS5264-2011® Olive oils and olive-pomace oils*)¹⁶. This standard is now referenced in The Code.

In October 2013 the Code was revised to incorporate labelling guidelines for EVOO, and certification of flavoured olive oils and other products made from olives aiming to achieve consistency with AS5264-2011®.

The *Voluntary Industry Standard for Table Olives in Australia (RIRDC 12-111 – Revised January 2020)*¹⁷, was developed and referenced in the Code from 2012.

In November 2016 provision was made for certification of imported olive products under the Code.

The Code was relaunched and rebranded in 2017 as the *OliveCare®* Code of Best Practice program, providing a systems approach to managing risk and underpin product quality.

OliveCare® certification now encompasses EVOO, flavoured olive oils, table olives with other olive products in the pipeline.

OliveCare® covers the entire olive supply chain from growers to the market place, including consideration of grove management, olive processing, product storage, retail sales and export supply chains.

OliveCare® establishes a framework that encompasses good business practice, Good Agricultural Practice (GAP) & Good Manufacturing Practice (GMP) and Good Hygiene Practice (GHP), with Hazard Analysis Critical Control Point (HACCP) style production controls.

OliveCare® fosters a compliance culture within the industry in relation to industry voluntary standards, Australian Consumer Law (ACL), and the FSANZ Food Standards Code.

The *OliveCare®* program also provides the necessary tools to:

- Establish authenticity and quality of Australian olive products;
- Build olive industry skills and capacity;

¹⁴ ACCC: <http://www.accc.gov.au/content/index.phtml/itemId/142>

¹⁵ Voluntary Industry Codes of Conduct: <http://www.accc.gov.au/content/index.phtml/itemId/783116>

¹⁶ AS5264-2011: <http://www.australianolives.com.au/content/as5264-2011-olive-oils-and-pomace-oils>

¹⁷ *Voluntary Industry Standard for Table Olives in Australia (RIRDC 12-111 – Revised January 2020)*: <https://australianolives.com.au/wp-content/uploads/2020/02/RIRDC-12-111-Australian-Table-Olive-Standard-Kailis-Final.pdf>

- Build consumer confidence in Australian olive products; and
- Deal promptly and effectively with any complaints.

The *OliveCare*® Code of Best Practice manual¹⁸ can be accessed from the *OliveCare*® Members area on the AOA website: <https://australianolives.com.au/olivecare-members-area/>

AOA members who are *OliveCare*® Signatories are authorised to apply the following AOA Trade Mark to certified table olive products, point of sale materials and websites, in accordance with the rules governing the use of this Trade Mark which are regulated under Section 173 the *Trade Marks Act 1995*¹⁹, and also subject to approval by the ACCC:



This Trade Mark is for the exclusive use of *OliveCare*® signatories, and indicates that a product bearing this logo is compliant with the *Voluntary Industry Standard for Table Olives in Australia (RIRDC 12-111 – Revised January 2020)*.

A listing of *OliveCare*® certified brands is provided on the Australian Extra Virgin website: <http://australianextravirgin.com.au/brands/>

Note: AOA vigorously defends its Intellectual Property (IP), including unauthorised use and misuse of its Trade Marks and will seek rectification and legal remedy where this occurs.

Management of *OliveCare*®

The Code Administrator is appointed by the AOA, reporting to the AOA CEO and is responsible for the day to day operation of the Code.

¹⁸ The *OliveCare*® Code of Best Practice manual: https://australianolives.com.au/wp-content/uploads/2020/05/COP-MANUAL-Draft-3rd-Edition-3.0- April-2020_Final.pdf

¹⁹Trade Marks Act 1995: http://www.austlii.edu.au/au/legis/cth/consol_act/tma1995121/

OliveCare® Signatory Compliance Checklist:

For desk audit purposes, all OliveCare® signatories are required to provide documentary evidence to the OliveCare® Administrator of:

- Having a **Product Risk Assurance** or HACCP style food safety / food quality plan - either 'in-house' or as part of a proprietary third party certification arrangement, (templates available), this should include:
 - Use of **retained representative samples** for each batch prepared for sale should be kept by the producer / merchant for re-testing purposes should the need arise;
 - Documented **product recall system in place**, including product traceability records maintained involving unique batch codes and a record of where each batch of oil is sold.
- Undertaking **annual product testing** at a NATA accredited laboratory, meeting the requirements of *The Voluntary Industry Standard for Table Olives in Australia (RIRDC 2012-Revised January 2020)* for each product to be certified under the OliveCare® Code of Best Practice (further details at AOA Certified Australian Table Olive Compliance)²⁰, including:
 - **Physico-chemical** parameters (eg for natural olives - pH < 4.3, salt > 6.0 g/100ml);
 - **Microbiological** testing for *E coli* (below level of detection < 3 cfu); *Clostridium perfringens* (below level of detection < 10 cfu; for pasteurised products the laboratory also tests for *Lactobacillus*, to measure effectiveness of pasteurisation (below level of detection < 10 cfu); plus
 - **Sensory assessment** undertaken by Modern Olives (or through participation in the AIOA or other recognised table olive competition).
- Providing a **declaration of table olive storage conditions**²¹, including control of Heat, Light and Oxygen;
- Using product **Best Before Dates (BBD)**, not exceeding 2 years from the date of packaging, as determined by the producer. The use of retained product samples will assist in determining a realistic BBD after which time undesirable changes to the odour, colour, texture or flavour of the product may occur. (Ref: FSANZ – Food Standards Code Part 1.2.5);
- Compliance with Food Standards Australia New Zealand (FSANZ) - Food Standards Code, **Schedule 20 – Maximum residue limits**, including use of a spray diary, correct storage of chemicals and completion of a **Grower declaration of agri-chemical use**²².
- Have **product labels compliant** with the relevant product standard, Australian Consumer Law (ACL) and OliveCare® (*copies of all product labels to be certified must be provided*); Providing a **Declaration of product labelling**²³, Ref: Further information on olive product labelling²⁴.
- Complete an on-farm biosecurity check list, and are encouraged to implement an **on-farm biosecurity plan** using the *Farm Biosecurity Action Planner template for Olive Growers*.²⁵

²⁰ AOA Certified Australian Table Olive Compliance: <https://australianolives.com.au/aoa-certified-table-olive-compliance/>

²¹ Declaration of table olive storage conditions: <https://australianolives.com.au/wp-content/uploads/2019/11/OliveCare-Table-Olive-Storage-Declaration.pdf>

²² Grower declaration of agri-chemical use: <https://australianolives.com.au/wp-content/uploads/2019/08/OliveCare-Chemical-Use-Declaration.pdf>

²³ Declaration of product labelling: <https://australianolives.com.au/wp-content/uploads/2020/08/Signatory-declaration-of-product-labelling.pdf>

²⁴ Further information on product labelling: <https://australianolives.com.au/labelling-information/>

²⁵ *Farm Biosecurity Action Planner for Olive Growers*: <https://australianolives.com.au/wp-content/uploads/2018/12/Farm-Biosecurity-Action-Plan-for-Olive-Growers-Version-2.0-December-2019.pdf>

OliveCare® Training Program:

AOA has developed a series of e-learning modules, comprising a total of 10 interactive on-line presentations, with the aim of building industry skills and facilitating implementation of the OliveCare® Code of Best Practice.

This work is funded from the Olive Levy R&D through Hort Innovation, Project OL13007: *Australian Olive Industry OliveCare® Implementation*.

Modules include Food Safety & Quality, Export Readiness and Sensory Training aimed at both EVOO and table olive producers; these modules are also designed to link to selected national training competency standards that fit within the requirements of Certificate III in [Food Processing](#) (FDF30111) or [Certificate IV in Production Horticulture](#). (AHC40310).

Industry participants may choose to be formally assessed in the above Units of Competencies through River Murray Training.

To access the OliveCare® e-learning modules:

Step 1: Participants need to firstly register with River Murray Training gillian.ireland@r-m-t.com.au or admin@r-m-t.com.au

For sustainability of the on-line training program a nominal enrolment fee of \$68 will be charged for participants accessing modules.

Participants will be issued with a username and password to log onto website that hosts the AOA on-line training program: <http://www.r-m-t-online.com>

Step 2: Use your web browser to access the RMT site: <http://www.r-m-t-online.com>

River Murray Training: Login to the site

River Murray Training You are not logged in. (Login)

RMT Login to the site English (en)

Returning to this web site?

Login here using your username and password
(Cookies must be enabled in your browser)

?

Username

Password Login

Some courses may allow guest access

Login as a guest

Forgotten your username or password?

Yes, help me log in

You are not logged in. (Login)

Home

Step 3: Enter your allocated username and password and login:

You will see this screen:

Overview of my courses

RMT: Overview of my courses

You are logged in as xyz (Logout)

English (en)

RMT ► Overview of my courses

Edit this page

TAE40110 Certificate IV in Training and Assessment

Australian Olive Association - Modules 1-6

Assignment: Upload your Workbooks and other evidence here.

Due date: Tuesday, 31 December 2019,
11:15 AM

You are logged in as xyz (Logout)

Home

Step 4: On the overview screen select "Australian Olive Association Modules 1-6":

Australian Olive Association - Modules 1-6

You are logged in as xyz (Logout)

The screenshot shows the website interface for the Australian Olive Association. The main content area is titled "Topic outline" and contains the following information:

- AUSTRALIAN OLIVE ASSOCIATION**
- Welcome
You have arrived at the AOA site and the starting point for implementing the AOA Code of Practice. Follow through the Topics as they appear in order and it will guide you through the steps to implement the Code. For now, the following modules are available:
- Module 1 - Introduction to the Code of Practice and Market Surveys**
 - Outlines what the Code of Practice is, and why it is of benefit
 - Discusses the contents of the Australian Standard
 - Explains labelling requirements
 - Covers the purpose and extent of Market Surveys
 - Introduces various Trademarks held by the Association for use by members
- Module 2 - Quality and Food Safety Plans** is split into 3 parts:
 - 2a) explains Food Safety & HACCP
 - 2b) explains Quality systems and related procedures
 - 2c) describes the implementation of a Food safety/HACCP and Quality Plan
- Module 3 - Managing Quality Along the Supply Chain**
 - Provides an outline of major Quality Assurance processes associated with olive and olive oil production
 - Highlights areas of potential improvement in your business
 - Prepares your organization's operations for participation in the AOA Olive Route project

The left sidebar contains navigation menus for "People", "Activities", "Administration", and "My courses". The right sidebar contains "Latest News", "Upcoming Events", and "Recent Activity".

Step 5: Read the topic outline, scroll down then click on the start button for the self-paced e-learning modules that you are interested in. The website includes workbooks and lots of support materials.

5

Module 2C - Implementation of a Quality & Food Safety Plan



This module outlines the Association's approach to implementing a Quality and Food Safety Plan. It steps you through the process of using template forms to develop a HACCP-Style Food Safety Plan, with additional focus on Quality.

The implementation of this plan is a critical component in ensuring compliance with the Australian Olive Association Code of Practice, and ongoing access to the use of the Association's Trademarks.

Learning Materials

 [Click here to start Module 2C](#)

 [Module 2C Notes](#)

 [Download the Workbook](#)

Module 2C References

 [CoP - HACCP Style Food Safety Plan - EVOO](#)

Links: http://www.r-m-t-online.com/file.php/201/Module_2C/story_html5.html
<http://www.r-m-t-online.com/mod/resource/view.php?id=5002>

6

Module 3 - Managing Quality Along the Supply Chain



This module provides further insight into Quality Management processes, primarily from the production and distribution perspectives. The content has been designed to assist you with areas of consideration for potential improvement in your business, as well as preparing your processing methods for participation in the AOA's Olive Route export program.

Learning Materials

 [Click here to start Module 3](#)

 [Module 3 Notes](#)

Link: http://www.r-m-t-online.com/file.php/201/Module_3/story_html5.html



Module 6 - Sensory Assessment and Judging of Table Olives

This module discusses the processes involved in the sensory assessment of table olives. Topics include:

- The Voluntary Standard for Table Olives in Australia
- Table Olive Production Methods and Styles
- Interpreting Laboratory Test Results
- IOC Organoleptic Assessment of Table Olives
 - Preparing and Tasting Samples
 - Gustatory Attributes & Kinaesthetic Sensations
- Table Olive Competition Classes and Scoring Criteria
- Tastebook Initiative & National Training Framework

Learning Resources

 [Click here to start Module 6](#)

 [Module 6 Notes](#)

Link: http://www.r-m-t-online.com/file.php/201/Module_6/story_html5.html



Australian
Industry and
Skills Committee

Artisanal Food and Beverage Project:²⁶

Skills Impact is a Skills Service Organisation (SSO), contracted by the Commonwealth. As part of this role, *Skills Impact* supports 12 Industry Reference Committees (IRCs) covering more than 120 sectors, and maintains more than 3000 units of competency and 400 qualifications.

The Australian Industry and Skills Committee (AISC) appoint members of IRCs which are made up of people with experience, skills and knowledge of their industry sector.

OliveCare® is working with Skills Impact on the “Artisanal Food and Beverage Project”, with the aim of including production of table olives units of competency in a new *Certificate IV in Artisan Fermented Products* training package.

What is a training package?

A training package is comprised of



Industry Reference Committees (IRCs) guide and direct our work with industry to ensure training packages (i.e. units of competency, skill sets and qualifications) reflect their existing and emerging workforce development needs.

The relevant IRCs for the Australian Olive Industry are:

The Food, Beverage and Pharmaceutical Industry Reference Committee (IRC) – includes:

- Food Processing and Manufacturing

The Agriculture and Production Horticulture Industry Reference Committee (IRC), includes:

- Horticulture production
- Agricultural support services
- Agricultural irrigation
- Agricultural chemicals

²⁶ Artisanal Food and Beverage Project: <https://www.skillsimpact.com.au/food-beverage-and-pharmaceutical/training-package-projects/artisanal-food-beverage-project/>

Certificate IV in Artisan Fermented Products:

This new qualification reflects the role of those using artisanal methods to produce fermented food and/or beverage products, such as beer, spirits, miso, **table olives** and fermented meat products. In this role, makers analyse materials and products, exercising judgement to guide the fermentation process and the work of others.

To achieve this qualification, competency must be demonstrated in a total of 22 units of competency comprising:

- 10 core units plus
- 12 elective units

This qualification also offers specialisations in Brewing, Distilling, and Food and non-alcoholic beverages.

Artisan Olive Producer Skill Set:

This new skill set is designed to cover the knowledge and skills required to produce fermented olives for a retail market, it includes the following units of competency:

- FBPFST4XX2 (new core unit) Apply sensory analysis in fermented food and/or beverage production
- FBPFST4XX1 (new core unit) Interpret and respond to test results
- FBPFST4009 (core unit) Label foods according to legislative requirements
- FBPFST4006 (core unit) Apply an understanding of legal requirements of food production
- FBPFST4003 (core unit) Control food contamination and spoilage
- FBPFST4002 (elective unit) Apply principles of food packaging
- FBPFST4XX10 (new elective unit) Control and monitor fermentation

Core Units of Competency:

When the above Skill Set is taken in combination with the following 6 designated Core Units of Competency:

- FBPFST4XX1 (new core unit) Interpret and respond to test results
- FBPFST4XX2 (new core unit) Apply sensory analysis in fermented food and/or beverage production
- FBPFST4009 (core unit) Label foods according to legislative requirements
- FBPFST4006 (core unit) Apply an understanding of legal requirements of food production
- FBPFST4002 (core unit) Maintain work health and safety processes
- MSL973013 (core unit) Perform basic tests

Together with 10 other elective units of competency from the *Food, Beverage and Pharmaceutical Industry* sectors, this **training package** will meet assessment requirements of the new *Certificate IV in Artisan Fermented Products*.

Subject to demand and available resources, it is anticipated that these units of competency and skill sets will be rolled out by **RTOs** during 2021.

These new units of competency also provide a useful framework for the delivery of *OliveCare*® table olive production training and certification programs.

Food Standards Australia New Zealand (FSANZ):

Food Standards Australia New Zealand (FSANZ) is a statutory authority in the Australian Government Health portfolio. FSANZ develops food standards for Australia and New Zealand.

Developing a Food Safety Culture:

Food safety culture²⁷ in a food business is how everyone (owners, managers, employees) thinks and acts in their daily job to make sure the food they make or serve is safe. It's about having pride in producing safe food every time, recognising that a good quality product must be safe to eat. Food safety should be your top priority.

A strong food safety culture comes from people understanding the importance of making safe food and committing to do whatever it takes, every time. It starts at the top but needs everyone's support across the business.

Why it's important

A good food safety culture can protect:

- consumers from foodborne illness
- your brand's reputation
- your business from financial loss.

Resources

These resources are designed to help food businesses shape and improve their food safety culture.

- Step 1: Know - Food safety questionnaire  ([PDF 218 kb](#))
This short questionnaire will help you do a quick 'health check' of your business's food safety culture
- Step 2: Do - Checklists for change  ([PDF 239 kb](#))
These checklists take you through the key steps in developing a good food safety culture in your food business
- Step 3: Follow through (draft only)  ([PDF 965 kb](#))
This is a draft document including a 'culture maturity matrix' to help you self-assess your business's food safety culture, identify strengths and weaknesses and track progress overtime
- Read more on characteristics of a strong culture in this poster  ([PDF 85 kb](#)).

²⁷ Food safety culture: <https://www.foodstandards.gov.au/foodsafety/culture/Pages/default.aspx>

The Australian New Zealand Food Standards Code:

Chapter 1: Introduction:

The Australian New Zealand Food Standards Code²⁸ is enforced by state and territory departments, agencies and local councils in Australia; the Ministry for Primary Industries in New Zealand and the Australian Department of Agriculture, Water and the Environment for food imported into Australia.

Note: Food Safety Standard 1.6.1: Microbiological limits in foods – currently does not apply to olive products (rather it is aimed at high risk ready to eat foods such as dairy or meat products)

Note: *The Voluntary standard for table olives in Australia (RIRDC 2012 – Revised January 2020)* incorporates microbiological limits so in this respect we are well ahead of the game.

Chapter 3: Food safety standards

All **food businesses** in Australia are required to comply with the Australia New Zealand Food Standards Code including:

Food Safety Standard 3.1.1: Interpretation and Application,

Food Safety Standard 3.2.2: Food Safety Practices and General Requirements, and

Food Safety Standard 3.2.3: Food Premises and Equipment.

Any business that processes or packs olive products in Australia is deemed a ‘food business’. In addition:

Food Safety Standard 3.2.1: Food Safety Programs, sets out the requirements for the control of food safety hazards during the production, manufacture and handling of food, however this is not mandatory for all food businesses. It applies only to 4 industry sectors that have been identified as being high risk, being food service to vulnerable populations, raw oysters and other bivalves, manufactured and fermented meat, and catering operations to the general public. The latter group appears to be the target of the review including general food service and retailers of ready to eat products.

In some state jurisdictions such as Victoria all food businesses (including olive processors) are required to have a food safety program (except for retail businesses selling low-risk pre-packaged food). This requires food safety supervisor arrangements, mandatory training of food handlers and evidence of management of key activities and control processes.

Other jurisdictions may also require businesses to have HACCP-based food safety systems in place. Therefore, all food businesses need to check with their local authority for the requirements that apply in the state or territory where the business is located.

Note: This is also covered by AOA’s Hazard Analysis Critical Control Point (HACCP) style Food

Food Safety Standard 3.3.1: Food safety programs for food service to vulnerable persons – only applies to food service in hospitals, aged care and child care and similar situations where vulnerable people are involved

Further details on specific standards under the Australia New Zealand Food Standards Code are available on the Australian Government ComLaw website¹.

²⁸ The Australian New Zealand Food Standards Code:
<http://www.foodstandards.gov.au/code/Pages/default.aspx>

Table olives as a fermented product is regarded as a medium food-safety risk; however, should there be a serious food-safety incident with table olives in Australia, regulation may be imposed on the industry.

This could include mandating Standard 3.2.1: Food Safety Programs, and Food Safety Standard 1.6.1: Microbiological limits in foods

Chapter 4: Primary production standards

Currently these only apply to high risk products – meat, seafood, dairy, eggs and seed sprouts.

FSANZ will consider a proposal to develop a Primary Production and Processing Standard for high-risk horticulture.

Proposed high-risk horticulture includes leafy green vegetables, melons, berries, sprouts and ready-to-eat minimally processed fruits and vegetables.

In summary:

The three areas under review are:

Chapter 3 –Food Safety Standards (Australia only) – implemented in some jurisdictions / states

Proposed national implementation of:

- Food safety supervisor arrangements
- requirements for evidence to be provided by food businesses to demonstrate that key activities or control processes are being managed
- mandatory training for all food handlers

This will mean more olive producers will have to comply with food safety training requirements – not such a bad thing!

Chapter 4 –Primary Production and Processing Standards (Australia only) - It is unlikely that olive products will be caught up in new PPP standards

Standard 1.6.1 –Microbiological Limits for Food – already addressed in the Voluntary standard for table olives in Australia (RIRDC 2012 – Revised January 2020).

To assist in implementing Good Agricultural Practice (GAP), and Good Manufacturing Practice (GMP), AOA has developed a Hazard Analysis Critical Control Point (HACCP) style Food Quality Plan template for Table Olives for use by *OliveCare*® Signatories.

SECTION 1 – Managing Risk:

Producing high quality award winning table olives involves attention to detail from grove practices, through to timely harvest, control of field heat, sorting, best practice table olive primary and secondary processing and storage conditions:



1.1. Kinds of risk:

Olive producers face many kinds of risk that need to be managed at an enterprise level, including:

- **Product Quality:** defective products – resulting in loss of consumer confidence, and reputational damage.
- **Food Safety:** exceeding pesticide MRL's; physical, chemical and biological contamination; product adulteration – requiring product recall.
- **Biosecurity:** incursion of endemic and exotic pests diseases and weeds – resulting in higher production costs, reduced yields and profitability, or worse!
- **Environmental:** managing waste including processing discharge, adapting to increasing climate variability – resulting in higher production costs, reduced yields and profitability.
- **Regulatory:** Occupational Health & Safety (OH&S) - unsafe workplaces, employment of illegal workers, - resulting in prosecution and reputational damage.

Whilst this plan template focusses on managing **Product Quality and Food Safety Risks**, other risk factors can readily be incorporated into the plan, eg having a COVID-19 management plan.

Further information on undertaking a COVID-19 risk assessment can be found on the Safe Work Australia website²⁹.

²⁹ Safe Work Australia - Risk Assessment: <https://www.safeworkaustralia.gov.au/covid-19-information-workplaces/industry-information/agriculture/risk-assessment>

1.2. The major risks / hazards to table olive quality:

1.2.1. Factors that affect table olive quality are well established:

- **Fruit damage in the grove** – poor quality olives – diseased, damaged by insect pests, drought or frost, (fusty, rancid, dried, frosted and textural defects).
- **Failure to synchronise harvest and processing** – harvested fruit that sits around for too long in warm conditions starts to ferment. The quicker you can process your fruit or the cooler you can keep it prior to processing, the better quality table olives you will make, (Musty & winey-vinegary organoleptic defects).
- **Poor processing technique**
 - Off flavours caused by poor processing methods or poor hygiene: Faecal, putrid and '**Zapatería**' organoleptic defects – failed fermentation, failure to properly clean vats / barrels prior to use for fermentation.
 - **Fermentation defects (further detail at 1.2.2.)**
 - Soapy defect: Residual sodium hydroxide in treated olives – excessive sodium hydroxide treatment, insufficient rinsing.
 - Cooked defect: Characteristic of olives that have undergone excessive heating in terms of temperature and/or duration during pasteurisation or sterilisation.
- **Poor table olive storage** – failure to monitor and adjust pH and salinity, exposure to warm temperatures and air, (mould growth, rancid organoleptic defect, soft defect, food safety issues).
- **Poor supply chain handling** – including displaying product near heat and light sources, and failure to efficiently manage stock rotation, (colour and soft defects).

1.2.2. The 'big 5' table olive fermentation defects – are you able to identify these?

- **Bloater spoilage.** Formation of cracks on the exterior of the olives and internal holes in the flesh. At times, gas is formed that produces blisters below the skin. This is avoided by adjusting the initial pH value.
- **Butyric acid.** This is due to the development of different species of Clostridium in the first phase of fermentation. The butyric acid produced alters the flavour; its formation may be prevented by maintaining a suitable level of salt (never below 5%) and by following good hygienic manufacturing practices.
- **'Zapatería' spoilage.** This is caused by the development of propionic bacteria and Clostridium during bulk storage when pH values are not kept below 4.2. A series of volatile compounds are identified in the brine (Montaño et al., 1992), different from normal olives. This may be prevented by inhibiting the development of the responsible microorganisms and thus stabilising pH values during bulk storage.
- **Softening.** This is due to the excessive development of pectinolytic microorganisms, Bacilli, yeasts and moulds. Their development should be avoided, particularly during bulk storage, by ensuring anaerobic sealing of the fermenters.
- **Sediment and gas.** These occur when the packed product is unstable either because of the development of various bacteria or yeasts where there remains some fermentable matter, or because of the development of propionic bacteria that consume lactic acid. Sediment and gas are prevented by using a well-fermented product and by adjusting a low pH value in the packaging—below 4.3—or by pasteurisation.

1.3. Risk level matrix: The analysis & evaluation of risk

Hort Innovation: Biologic January 2018

The risk level matrix evaluates risk as the likelihood of an event occurring, multiplied by the severity of the consequences should that event take place:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

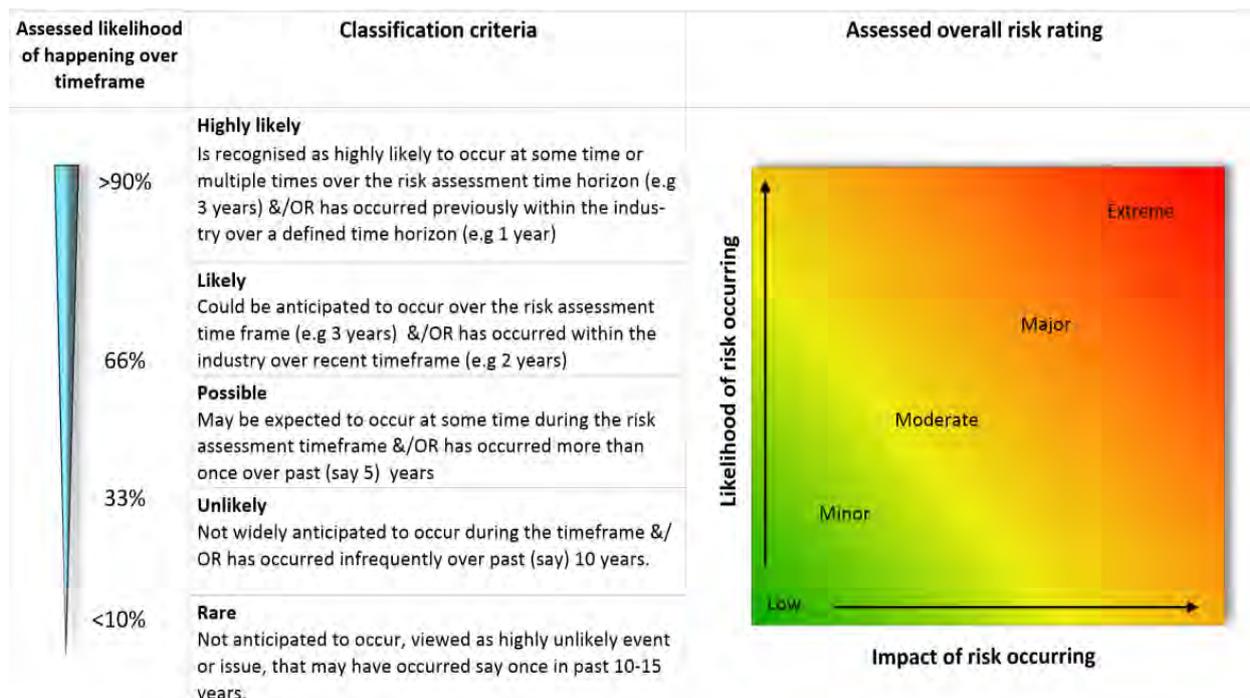
R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)



Severity of threat risk	
 Insignificant	Minimal disruptions to operations. No lost time due to injuries and no significant health implications from risk. Minimal business continuity issues or reputational damage.
Minor	Some manageable disruptions to operations. Minor injuries that may require external intervention and may result in some lost work hours and minor health implications from risk. Minimal business continuity issues or reputational damage.
Moderate	Material disruptions to operations and reputation damage. Significant quality impact and unforeseen material costs. Substantial injuries or health risk that requires external intervention and result in some lost work hours and health implications from risk. Business continuity issues or reputational damage.
Major	Major disruptions to operations and reputation damage. Major quality impact and challenging unforeseen material costs. Substantial personal injuries or health risk that requires urgent external intervention and major business continuity issues.
Extreme	Existential threat to operations and reputation damage. Failure of major operations with resulting irreparable impact and material costs. Serious personal injuries, death or serious health risk that requires urgent external intervention and results in crippling staff losses or disruption.

Risk mitigation strategies to reduce the likelihood and seriousness of an incident should be identified and implemented as a priority for all significant and critical level risk factors.

1.4. What is HACCP?

1.4.1. Introduction:

The most widely accepted Food Safety System in the world is based on principles developed in the 1960s and known as **HACCP (Hazard Analysis Critical Control Points)**.

Olive producers may be required by law or by buyers to have an audited HACCP plan including contract processors and bottlers as well as those supplying major supermarkets.

This *OliveCare®* Food Quality Plan template is based on HACCP principles and uses the same methodology as HACCP to assist growers to develop effective food safety and food quality systems, but does not require an external ('third party') audit.

This Plan is not designed to replace a full HACCP program, rather it is a business tool designed to start growers working towards implementing their own independent and audited HACCP program at some point.

1.4.2. Food Quality Plan for Signatories to *OliveCare®*

In order to comply with the *OliveCare®* Code of Best Practice for the production and sale of Australian Table Olives, it is a requirement that each *Olivecare®* Signatory has a 'Food Quality Plan' for their business. This document will assist in achieving this goal.

Note: In some state jurisdictions Regulators may require olive producers to have an approved food safety plan audited by approved auditors. It is recommended that olive producers in these jurisdictions prepare separate food safety and food quality plans to facilitate compliance with regulatory requirements.

1.4.3. The 7 Principles and 12 Steps of HACCP

HACCP is based on Seven Principles which outline how to establish, implement and maintain a practical food safety plan for your business. The Seven Principles and Twelve Steps to fulfilling the Principles are:

Seven Principles	
Principle 1	Hazard Analysis
Principle 2	Critical Control Points (CCPs)
Principle 3	Critical Limits
Principle 4	Monitor Control of the CCPs
Principle 5	Corrective Actions
Principle 6	Record Keeping
Principle 7	Verify the HACCP Plan

The *OliveCare®* Food Quality Plan template is based on the 12 step methodology of HACCP, with one crucial difference. Whilst HACCP only concerns itself with food

safety and makes no mention of food quality; this simplified 8 step *OliveCare*® plan is primarily concerned with product quality.

The tables below spell out the differences between the established methodology of HACCP and the variations AOA has implemented. If an olive grower / marketer adopts this Food Quality Plan and uses the AOA Plan methodology, a further step to an externally (third party) audited and certified HACCP plan should be relatively simple, but would involve additional costs.

1.4.4. HACCP Procedures

Twelve Steps of HACCP	
Step 1	Assemble a team
Step 2	Describe the product
Step 3	Identify the intended use
Step 4	Construct a flow-chart
Step 5	On-site confirmation of the flow-chart
Step 6	Conduct a hazard analysis (Principle 1)
Step 7	Determine Critical Control Points (CCPs) (Principle 2)
Step 8	Establish critical limits for these CCPs (Principle 3).
Step 9	Establish monitoring systems for each CCP (Principle 4)
Step 10	Establish corrective actions (Principle 5)
Step 11	Establish verification Procedures (Principle 6)
Step 12	Establish documentation and record keeping (Principle 7)

Eight Steps of AOA <i>OliveCare</i> ®	
Step 1	Assemble a team
Step 2	Describe the product and its use
Step 3	Define the processes to be used
Step 4	Construct a flow-chart and confirm the viability of the plan
Step 5	Conduct a hazard analysis
Step 6	Determine Critical Control Points (CCPs) and their limits

Step 7	Establish monitoring systems, verification procedures and corrective actions
Step 8	Establish documentation and record keeping

1.4.5. Limitations

The following sections of this plan relate to discrete aspects of table olive production:

Section Two – On Farm – deals only with the process of growing and harvesting olives to the stage where they are ready for processing into table olives. This is pertinent to all olive growers including those who do not process their own olives.

Note: Olive growers who contract out processing, oil storage and packaging operations but market under their own brand(s), will need to obtain documentary evidence of HACCP Food Quality Plan(s) / Accreditation from their contract processor and packer.

Section Three – Primary processing – natural olives – takes over from Stage Two, covering operations once the fruit arrives from the farm at the processing plant from the farm.

Section Four – Primary processing – treated olives – takes over from Stage Two, covering a widely used technique for processing green olives using alkali to speed up the process. There are both large and small scale versions of this process.

Section Five – Post processing – this section follows the olives from bulk storage after processing to preparation for sale.

Section Six – Secondary processing & packaging – Once the olives have been prepared and are edible, there are a number of alternate methods of presenting them for sale.

Section Seven - Olive paste and tapenade – covers the production of olive paste from the flesh of processed olives, and provides a simple olive tapenade recipe.

Section Eight – Product distribution – deals with the processes involved in transportation of finished products to the marketplace.

Note: Olive product marketers need to obtain documentary evidence of HACCP Food Quality Plan(s), and product test reports meeting specifications from their suppliers.

OliveCare® Signatories need to decide which of these Sections apply to their own circumstances.

The other two sections of the Plan relate to business management best practices:

Section Nine – has a suite of pre-designed forms that will be useful in establishing a Food Quality Plan. They are based very closely on the standard style of form used in a fully audited HACCP program and would generally be accepted by HACCP auditors.

Section Ten – this is a further set of forms which are more oriented towards business management rather than food safety. Again they are modelled on HACCP principles.

OliveCare® Signatories are invited to customise and design their own forms, but these forms provide a good starting point.

1.5. Eight Steps of *OliveCare®* HACCP & the AOA Food Quality Plan

OliveCare® is designed to produce premium quality olives and premium quality processed table olives and related products. The following Eight Steps should be seen as a management tool to achieve this premium objective.

Step One: Assemble a team to compile and control the process.

The first step in creating your Quality and Food Safety Plan is to identify the personnel required for your Quality and Food Safety Team, and their area of responsibility & expertise within the business. You may consider using an external HACCP/Food Quality Consultant. The team ideally will include:

- The Business Owner – responsible for all major decisions and for signing off on the project once completed.
- The Production Manager – responsible for the day-to-day activities and implementation of the Food Quality Plan.
- A HACCP consultant – somebody trained and experienced in designing and implementing HACCP based food safety programs and responsible for compiling the paperwork and layout of the Plan.

Step one is not limited to three people, but three is generally the minimum number required to successfully implement a HACCP-style Food Safety / Food Quality Plan. A person can have more than one role.

- See 9.1 Assemble a Team

Step Two: Describe the product itself, its use and its packaging.

Compliance with the *OliveCare®* only applies to Australian produced table olives.

- See 2.2 Product Description – ON FARM
- See 3.2 Product Description - Primary Processing Natural Olives
- See 4.2 Product Description - Primary Processing Treated Olives
- See 5.2 Product Description - Post Production Processing
- See 6.2 Product Description - Secondary Processing & Packaging
- See 7.2 Product Description - Olive Paste & Tapenade
- See 8.2 Product Description – Table Olive Distribution

Step Three: Describe in detail the steps involved in producing the product.

This step is an overview of the business – it requires the producer to define exactly what is going to happen in the operations.

- See 2.3 Procedure – ON FARM (up to the fresh fruit stage)
- See 3.3 Procedure – Primary Processing of Natural Olives (up to the bulk stage)
- See 4.3 Procedure – Processing Treated Olives (Commercial large Scale)
- See 4.4 Procedure – Processing Treated Olives (Medium / Boutique Scale)

- See 5.3 Procedure - Post Processing (Final Packaging)
- See 6.3 Procedure –Secondary Processing and Table Olive Packaging.
- See 7.3 Procedure – Olive Paste and Tapenade
- See 8.3 Procedure – Table Olive Distribution

Step Four: Construct a flowchart of the operation

Step four requires a diagrammatic flow chart of the production process covering all the standard operation procedures describing the production process in detail, taking the steps outlined in Procedures and breaking this into describable processes for analysis.

- See 2.4 FLOW CHART - On Farm Including Harvesting
- See 3.4 FLOW CHART - Table Olives Processing Natural Olives
- See 4.5 FLOW CHART - Commercial Scale Processing
- See 4.6 FLOW CHART – Boutique Scale production
- See 5.4 FLOW CHART - Post Processing
- See 6.4 FLOW CHART - Secondary Processing and Packaging
- See 7.4 FLOW CHART - Olive Paste and Tapenade
- See 8.4 FLOW CHART – Table Olive Distribution

Once a flowchart is established, the Team should walk through the operations to ensure that the description and flowcharts accurately describe the processes.

Step Five: Conduct an analysis of the potential hazards at each of the processes outlined on the flowchart and rate the danger involved (HACCP Principles One Two and Three).

This is a standard HACCP formula which examines each step for potential food safety hazards from biological, chemical or physical contaminants. Various food safety hazard analysis tables have been developed.

This Plan also covers aspects of Quality Control. This step will enable the signatory to identify the potential for problems.

- See 2.6 & 2.7 Hazard Analysis – ON FARM
- See 3.5 Hazard Analysis – NATURAL OLIVES
- See 4.7 Hazard Analysis – TREATED OLIVES (Commercial Scale)
- See 4.8 Hazard Analysis – TREATED OLIVES (Boutique Scale)
- See 5.5 Hazard Analysis – POST PRODUCTION PROCESSING
- See 6.5 Hazard Analysis – SECONDARY PROCESSING & PACKAGING
- See 7.5 Hazard Analysis – OLIVE PASTE & TAPENADE
- See 8.5 Hazard Analysis – Product Distribution

Step Six: Determine the Critical Control Points (CCPs) and limits for the potential hazards identified in Step Five (HACCP Principles Four and Five).

Step Six is a standard HACCP formula to help design and operate a process where the risks are minimised or eliminated.

- See 2.8 Hazard Management – ON FARM
- See 3.6 Hazard Management – NATURAL OLIVES
- See 4.9 Hazard Management – TREATED OLIVES – Commercial Scale
- See 4.10- Hazard Management – TREATED OLIVES – Boutique Scale
- See 5.6 Hazard Management – POST PRODUCTION PROCESSING
- See 6.6 Hazard Management – SECONDARY PROCESSING & PACKAGING
- See 7.6 Hazard Management – OLIVE PASTE AND TAPENADE

Step Seven: Establish monitoring and verification procedures and corrective measures to ensure the Food Safety Plan is working correctly (HACCP Principle Six).

Having identified the potential for problems and a procedure to eliminate the risk, checks need to be carried out to ensure the system is sufficiently robust.

- See Section 9.10 Verification Table / Section 9.11 Corrective Action Report Form

Step Eight: Create documentation to allow the entire system to be checked (Principle Seven).

Much of this documentation is already prepared in checklist or spreadsheet format within this module. In **Section 9**. Care needs to be taken to differentiate between issues of Food Safety and Food Quality. Poor quality food can still be safe to eat.

1.6. Standard Operating Procedures (SOPs)

SOPs are **procedures** specific to your operation that describes the activities necessary to complete tasks in accordance with regulations, or just your own **standards** for running your business. Any document that is a “how to” falls into the category of **procedures**.

The following topics are not essential parts of a Food Safety Plan and do not relate directly to food safety, but they are issues that *OliveCare*® Signatories will need to address.

1.6.1 Staff Training

All staff involved in olive growing, harvesting, primary and secondary processing should have read and signed an acknowledgement document (see **Section 9.7 Personal Hygiene Program**) prior to starting work.

A site induction for all employees and contractors must be carried out before a new employee is permitted to start work.

All statutory food-handling standards are to be maintained.

The Production Supervisor needs to instruct all operators in their roles, and to rotate jobs if fatigue is likely to be an issue.

1.6.2 Occupational Health & Safety

A Food Safety / Food Quality Plan does not have any specific requirements in regard to Occupational Health & Safety; however business owners have responsibilities regarding health and safety in the workplace.

There are both Commonwealth & State legislation covering OH&S.

For links to information on: OH&S obligations; OH&S Acts, Regulations and Codes of Practice; getting started with OH&S; accidents and injuries and workers compensation requirements.

www.business.gov.au

www.safeworkaustralia.gov.au

www.workcover.nsw.gov.au

(Also refer to your own State OH&S Regulations)

1.6.2.1. COVID-19 Risk Management Plan:

All operating businesses must assess the [risks](#) associated with exposure to COVID-19 and implement [control measures](#) to manage those [risks](#). They must also assess any other new or changed [risks](#) arising from COVID-19, for example, customer interaction, high work demand or working in isolation.

Employers must also undertake a risk assessment with response to risks to any vulnerable workers working in your business. Risk needs to be assessed and mitigated with consideration of the characteristics of the worker, the workplace and the work. This includes ensuring vulnerable people are redeployed to roles that don't involve physical contact with customers, where possible. Where risk cannot be appropriately mitigated, employers and workers should consider alternate arrangements to accommodate a workplace absence.

Like SARS and MERS, COVID-19 is spread via person-to-person transmission (coughing, contaminated surfaces and fomites*, and close contact with an infected individual). More information for businesses can be found on the NSW Health website³⁰.

**Fomites are inanimate objects that can carry and spread the infectious agents. Common fomites found inside premises include: countertops, handrails, doorknobs, light switches, mobile phones and clothing.*

At a minimum, businesses must adhere to existing requirements of food laws, specifically:

- Maintain and practice frequent hand washing when preparing foods, after going to the bathroom, and after touching the face or hair.
- Maintain thorough cleaning and sanitising of facilities, equipment, and transport vehicles (including food contact surfaces and equipment, but also door handles, light switches, floors, walls, and other areas)

³⁰ NSW Health website: <https://www.nsw.gov.au/covid-19/covid-safe-businesses>

- Maintain strict requirements around worker health and hygiene. Any worker with a suspected communicable disease (such as coughing, sneezing, flu-like symptoms, gastrointestinal illness) MUST be excluded from the workplace.
- All clients arriving with olives for processing should be treated the same as other visitors including a requirement to provide a **Health & Travel Declaration Form** together with compliance with general rules for sanitation and social distancing:
- No visitors allowed on site within 14 days of returning from interstate or overseas travel (this is a requirement as of August 2020 subject to change , consideration to be given to guidelines at the time).
- All approved visitors to complete a [Health & Travel Declaration Form](#) prior to their visit.
- Any staff member, worker or visitor who appears visibly ill to be requested to leave immediately.
- Promote strictest hygiene among food preparation staff and their close contacts.
- Promotion of good hand and sneeze/cough hygiene, and provision of hand sanitiser and hand wash stations for all staff and workers
- Regular cleaning and disinfecting of high touch surfaces.
- Stopping handshaking as a greeting.
- Clearly mark visitor and work spaces to assist keeping a minimum distance of 1.5 metres between people whenever possible.
- Holding meetings via video conferencing or phone call.
- Taking lunch at desks or outside rather than in the lunchroom.
- Opening of windows and doors for more ventilation in the workplace.
- Limit food handling and sharing of food in the workplace.
- Defer all non-essential business travel.

Some state jurisdictions now require all businesses to have a COVID Safe Plan, accredited staff training, and appointment of accredited COVID Marshals³¹.

Use the following COVID Safe Plan template and guidance to create your COVID Safe Plan.

- [COVID Safe Plan guidance](#)
- [COVID Safe Plan template](#)

1.6.2.2. Chemical use:

Read the product label or permit for information about how the chemical can affect your health, and what you should do to protect yourself from exposure to the chemical. The product label should list the safety procedure you should follow when handling the chemical. You should read the safety directions before opening the container or using the product.

More detailed safety information can often be found in the **Material Safety Data Sheet (MSDS)**, which can be obtained from the company that made the chemical. Most MSDS can be downloaded from company websites. There are also other web sites that provide this information.

A summary of APVMA Minor Use Permits (MUPs)³² and label registrations for agri-chemicals approved for use on olives is available on the AOA website; with permit and label registration details available on the APVMA website³³.

³¹ COVID Marshals: <https://www.covid-19.sa.gov.au/recovery/covid-marshals>

1.6.2.3. Machinery operation:

Farm and olive processing machinery is potentially dangerous equipment which utilises mechanical or electrical power. Care must be taken when operating and cleaning all farm, harvesting and olive oil production equipment.

Carry out a check to ensure all parts removed for cleaning have been put back correctly and that all nuts and bolts are secured in accordance with operation manuals.

All faulty equipment should be tagged and the tag only removed, once the specific fault has been fixed and the equipment cleared for use.

1.6.2.4. Spillage:

Olives, brine, sodium hydroxide or water may be spilt during processing and make the floor slippery. A spill kit and a neutralising kit should be nearby at all times, and spills should be cleaned up immediately.

1.6.2.5. Personal protection:

Full personal protective equipment must be readily available and in full working order at all times – this is especially critical when dealing with sodium hydroxide (lye or caustic soda).

A container of dilute vinegar or acetic acid needs to be on hand to deal with accidental splashes. A first aid kit must be readily available.

An employee must wear clothing and equipment provided by the farm or processing plant where required:

- Ear protection may be required when operating farm machinery and in the olive processing plant room during the operation of processing plant equipment generating in excess of 85Db *National Code of Practice for Noise Management and Protection of Hearing at Work (2004)*³⁴
- Rubber gauntlets, a plastic waterproof apron and eye protection will be required while handling, preparing or using cleaning chemicals such as sodium hydroxide or acids.
- Disposable plastic gloves, hair net and waterproof aprons should be worn during olive sorting.
- Enclosed footwear with a slip-resistant sole should be worn in any circumstance where water or brine is present.
- Enclosed footwear, long trousers, long sleeved shirts and hats should be worn in all olive grove operations. Sunscreen should be applied at every break in work.
- Some of the processes require electrical or electronic equipment to be used. Great care needs to be taken while operating electrical equipment in the vicinity of brine or water.

³² AOA website Olive MUPs: <https://australianolives.com.au/chemical-permits/>

³³ APVMA website: <https://portal.apvma.gov.au/pubcris>

³⁴ National Code of practice for Noise Management and Protection of Hearing at Work (2004): https://www.safeworkaustralia.gov.au/system/files/documents/1702/nationalcodeofpractice_noisemanagementandprotectionofhearingatwork_3rd_edition_nohsc2009-2004_pdf.pdf

1.7. Food Safety

Care must be taken to ensure that:

- Containers from suppliers to be certified as contaminant free or otherwise a cleaning procedure must be in place.
- The olives do not become contaminated with non-potable water, industrial oil, soil, chemical residues or any other material during harvesting, transport, processing and bottling.
- No metal filings, glass, objects, insects or other contaminants enter the bottles during the packaging process.
- All containers are correctly identified and labelled. This will also assist with management of your traceability and product recall obligations.

1.8. Food Quality:

1.8.1. Growing and harvesting

Olive product quality starts with grove establishment with suitable cultivars of high plant health status, appropriate grove design and tree architecture to meet harvesting requirements, to achieve productivity targets.

Olive trees are susceptible to a variety of pests and diseases that have the potential to compromise the quality of the olives: to reduce the quantity of harvestable olives and to reduce the vigour of the trees. Poor quality olives will not produce premium quality table olives.

Major olive pests in Australia include Olive Lace Bug, Black Olive Scale and Apple Weevil.

Major olive diseases in Australia include, Anthracnose, Cercospora and Peacock Spot each of which reduce olive yield. In addition, Anthracnose infested fruit may result in olives with organoleptic defects.

Implementation of IPDM principles and best practice grove biosecurity management, tree nutrition and soil moisture management will assist in reducing pests and diseases.

Olives in bulk storage will deteriorate with heat. All bins and crates should preferably be vented and need to be stored in the shade or cool room until they are processed. Bins should not be more than half filled with olive fruit.

Any delays with processing can cause degradation of the fruit and may result in poor quality table olives being produced, and a higher level of fruit rejection being required.

The ideal core temperature (measured at 40 cm into the fruit bin/pile) should be < 5°C higher than air temperature with an absolute limit of <10°C higher than air temperature.

Storage of olives in temperatures higher than 25 °C is to be closely monitored due to the potential risk of negative impact on fruit quality.

References: OliveCare® Signatories are encouraged to read the following Agrifutures reports on olive production, available for downloading from the Research & Development section of the AOA website www.australianolives.com.au or at <https://www.agrifutures.com.au/> :

- *Field Guide to Olive Pests, Diseases and Disorders in Australia (RIRDC 07-153)*³⁵ by **Robert Spooner-Hart, Len Tesoriero, Barbara Hall**
- *Management of Black Scale and Apple Weevil in Olives (RIRDC 12-019)*³⁶ reviewed November 2019 by **Sonya Broughton, Stewart Learmonth**³⁷
- *Improving the Efficiency of Mechanical Olive Harvest: Evaluation of fruit loosening agents (RIRDC 08-052)*³⁸ by **Leandro Ravetti and Brigid McClelland**
- *Guide to Efficient Olive Harvesting (RIRDC 08-157)*³⁹ by **Leandro Ravetti**

1.8.2. Processing

As stipulated in Section 6 of the *Voluntary Industry Standard for Table Olives in Australia*, approved food additives including acidity regulators; antioxidants; firming agents; flavour enhancers; flavouring agents; preservatives, colour retention agents; processing aides, and colourings must be of food grade quality, be used in accordance with GMP and comply with the *Australia New Zealand Food Standards Code*.

1.8.3. Product storage, packaging and distribution

Table olives may become contaminated during the packaging process unless care is taken to ensure that all equipment is cleaned, set up and operated properly.

Many of the potential hazards identified in this module are related to the quality of the finished product and not to food safety. Producers should consider the requirements and restrictions of the markets they plan to supply.

Once the goods have left the packaging line there is still the potential for spoilage of perfectly well made products by inappropriate transport and warehouse storage.

Distributors should ensure their products avoid being exposed to excessive temperatures or time sitting in in transport vehicles, shipping containers and warehouses. Storage aids such as thermal blankets may prove useful. The use of temperature loggers is also recommended to monitor transport and storage conditions.

Samples should be taken at random along the production and distribution supply chain and retained in case you need to resolve customer complaints or validate the need for product recall. Distributors should also monitor best before dates (BBD) rotate stock accordingly.

1.8.5. Control Points & Testing

Grove soil samples should be sent for chemical analysis if there is any suspicion that the soil was contaminated with heavy metals, organo-chlorides or organophosphates. A NATA registered laboratory should conduct the testing.

³⁵ *Field Guide to Olive Pests, Diseases and Disorders in Australia (RIRDC 07-153)*:

<https://www.agrifutures.com.au/wp-content/uploads/publications/07-153.pdf>

³⁶ *Management of Black Scale and Apple Weevil in Olives (RIRDC 12-019)*: <https://www.agrifutures.com.au/wp-content/uploads/publications/12-019.pdf>

³⁷ RIRDC 12-019 Reviewed November 2019 by Sonya Broughton, Stewart Learmonth:

<https://australianolives.com.au/wp-content/uploads/2020/07/Management-of-Black-Scale-and-Apple-Weevil-in-Olives-a-review-Dec2019.pdf>

³⁸ *Improving the Efficiency of Mechanical Olive Harvest: Evaluation of fruit loosening agents (RIRDC 08-052)*:

<https://www.agrifutures.com.au/wp-content/uploads/publications/08-052.pdf>

³⁹ *Guide to Efficient Olive Harvesting (RIRDC 08-157)*: <https://www.agrifutures.com.au/wp-content/uploads/publications/08-157.pdf>

Adherence to spraying protocols, withholding periods and correct storage of chemicals will minimise the chance of chemical contamination. The AOA Website has a list of the chemicals approved by the APVMA for use in olive groves; noting some chemicals are not approved for use on olive fruit grown for processing into table olives.

If there is any suspicion of chemical contamination in the grove, samples of fruit should be sent for testing to detect the presence of contamination. This should be done at harvest time and the batch details recorded in case any residues are identified in test results. Any fruit suspected of being contaminated must be isolated for further testing, or disposal.

If there is any chance that the table olive products could be contaminated during production or storage then it must be isolated for further testing or disposal.

Refer to the FSANZ Schedule 20 for further details of testing requirements.



1.9. OliveCare® Best Practice Checklists:

The following OliveCare® “best practice” management strategies listed below aim to increase table olive enterprise productivity and profitability:

- **Grove Establishment Best Practice Checklist**, 8 items including nursery plant health status; olive cultivar selection and grove design.
- **Biosecurity Best Practice Checklist**, 19 items including nursery plant health status; managing biosecurity risk on-farm, good grove hygiene and monitoring.
- **Enterprise Sustainability Best Practice Checklist**, 11 items, including managing enterprise risk and benchmarking grove productivity.
- **Regulatory Compliance Best Practice Checklist**, 18 items including being a good employer, COVID-19 compliance, responsible chemical use, food safety and food quality, and Australian consumer law.
- **Environmental Responsibility Best Practice Checklist**, 13 items including minimising farm waste, maintaining biodiversity, and contributing to regional communities.
- **Grove Care Best Practice Checklist**, 24 items including soil health and tree nutrition, soil moisture, managing soil salinity, chemical use strategies, canopy management, and harvest management.
- **Integrated Pest and Disease Management (IPDM) Best Practice Checklist**, 21 items including IPDM, cultural management, biological control, physical and mechanical control, use of selective pesticides, and stages of IPDM.
- **Processing Best Practice Checklist**, 12 items including EVOO and table olive production.
- **Product Quality, Storage & Blending Best Practice Checklist**, 2 items including EVOO and table olives.
- **Product Packaging, Labelling & Distribution Best Practice Checklist**, 11 items including labelling requirements, transportation, product specifications, retailing and product recall.

Note items coded **violet** are tagged for OliveCare® compliance. All other items are highly recommended, each will contribute to improving the enterprise ‘bottom line’.

The OliveCare® checklists total 140 best practice items may appear to be daunting, however we will guide industry participants through each of these considerations and encourage their implementation. How about undertaking a preliminary self-assessment to see how you fare? Then repeat after 12 months to measure your best practice implementation progress:

1.9.1. Grove Establishment Best Practice Checklist: 8 Items

Grove establishment:

Important considerations for deciding where to establish an olive grove:

- Determine if the local climatic conditions are suitable for olives – range of winter temperatures, danger of spring frosts damaging buds and wood, long warm and dry summers, danger of autumn frosts damaging fruit
- Research site history, chemical use, avoid previous crops with risk of Verticillium Wilt – cotton, cucurbits, eggplant, peppers, potato and tomato

- Analyse soil profile for limiting factors for water penetration (hydrophobic soils) and drainage (perched water tables)
- Test soil chemistry – pH, sodium, chloride and boron that may limit productivity
- Determine water availability and quality for proposed irrigation methods – inadequate water supply is the most common limiting factor for grove productivity
- Assess critical infrastructure needs – potable water, electricity, transport, labour

Grove design and olive cultivar selection:

These factors will determine potential grove productivity, and will be expensive to change:

- Consider tree planting density (low density, high density, super high density) and canopy architecture, proposed harvest method, frost control, soil moisture management (berms and drainage channels), wind breaks and staking of young trees.
- Consider olive cultivar selection, regional environment, agronomic (pollination, tree vigour, precocity, alternate bearing), pest and disease resistance, market attributes (Oil: oil content, extraction efficiency, flavour profile, oxidative stability; Table Olives: flesh:stone ratio, fruit size, flesh quality (resistance to bruising, sensory profile for the intended processing method).

1.9.2. Biosecurity Best Practice Checklist: 19 Items

Nursery plant health status:

Essential questions to ask your nursery supplier:

- Are the nursery trees ‘true to type’? – The olive cultivar authenticity of mother trees should be established by DNA analysis.
- Are the nursery trees ‘proven olive cultivars’? It is important to how selected cultivars will perform in your region.
- Are the nursery trees propagated from fruiting wood? Trees propagated from juvenile wood will take longer to produce fruit.
- Are the nursery trees supplied with thick trunks and with dynamic ‘root trained’ systems? This will increase tree survival and earlier fruit production. Seedlings with poorly formed root systems such as with root spiralling will underperform and be more susceptible to damage from wind and harvesters.
- Are the nursery trees supplied ‘soil free’ and with heat sterilised potting mix? It is important for tree health to eliminate soil borne pathogens.
- Are the nursery trees propagated under appropriate climatic conditions and supplied ‘sun hardened’? Growing nursery trees outside for at least 6 months before delivery in a similar environment to that of the purchaser will minimise transplanting shock, and improve tree performance.
- Are the nursery trees provided graded and ‘colour coded’? This will avoid any mix up of cultivars in the grove while planting.
- Are the trees trained to a ‘single leader’? Removal of lower laterals to establish a strong central leader is the first step in training the tree canopy.
- Are the nursery trees supplied with optimal nutrition balance? Using leaf analysis to ensure optimal nutritional status will reduce risk of damage from cold air and attack by soil pathogens.
- Are the nursery trees supplied without staking? Seedlings should be self-supporting, however staking after planting out is essential.
- Does the nursery have plant health / hygiene / quarantine accreditation?

On-farm biosecurity:

Managing biosecurity risks to safeguard Australia's horticultural production from pest and disease incursions, and associated eradication / management costs:

- Prepare an on-farm biosecurity plan to identify and manage risks
- Plant / replant disease resistant cultivars and avoid planting in infected soils.
- Know your high priority biosecurity pests – induct your employees
- Monitor your grove regularly – report anything unusual to the exotic pest hotline (application of remote sensing)
- Implement good grove hygiene – keep it clean, removal or composting of pruning wood, disinfection of pruning tools
- Enforce visitor movement requirements – people and vehicles
- Use grove biosecurity signage
- Provide access to vehicle and fruit bin wash down facilities – arrive clean / leave clean

1.9.3. Enterprise Sustainability Best Practice Checklist: 11 Items

Productive & profitable farms:

Implement world best practice management:

- Participate in the *OliveCare*® Best Practice Program
- Build skills, capacity, knowledge, leadership and professionalism in the industry
 - Train staff to lift productivity, OH&S practices , food safety and food quality
- Benchmark grove performance – set KPIs for grove productivity and profitability
 - Grove productivity KPIs: kg / tree, tonnes / ha ;
 - Cost of production - cost \$/tonne;
 - Gross margin - \$/ha
- Benchmark processing performance – set KPIs for processing productivity
 - Processing efficiency KPIs: Lit oil / tonne;
 - Cost of production - cost \$/lit or \$/kg
- Ensure commercial service and supply contractual arrangements are in place
- Understand cybersecurity – keep your business safe
- Deploy innovative technologies to increase competitive advantage and profitability for olive growers, including plant breeding, tree physiology and best practice management
- Explore value-adding opportunities – olive crop and by-products
- Understand markets and explore market opportunities for olive products including digital marketing
- Prepare business development and succession plans, and explore alternative business models for small producers

Trade and industry growth:

The olive industry is contributing to the growth in Australia's domestic and export markets:

- Grow demand for and consumption of Australian olive products in domestic and export markets

1.9.4. Regulatory Compliance Best Practice Checklist: 18 Items

Be a good employer:

Fair farms - provide ethical, safe and fair work conditions that attract and retain motivated workers:

- Fairwork Australia – understand workplace rights and responsibilities
- OH&S Compliance – prepare and regularly review your enterprise safety plan
- Create a healthy workplace including:
 - Implementing a workplace health and wellbeing program by providing leadership, consultation and communication with staff, supporting healthy habits in the workplace, including good mental health
 - Prioritise personal health and well-being for increased effectiveness – implement healthy eating, regular exercise, work/life balance

Infectious diseases management:

Implement infectious diseases transmission controls to protect staff and ensure continuing business operation:

- Undertake a COVID-19 Risk Assessment and prepare a COVID Safe Plan if required
- Follow all health directives to implement COVID Safe workplace practices, including:
 - Staff training on safe workplace practices
 - Monitoring – health declarations and temperature screening of workers and customers
 - Hygiene arrangements – airflow, access to PPE and sanitiser stations, remove communal use items
 - Cleaning program – frequency especially of high touch areas
 - Physical distancing – limit entry of workers and visitors, review delivery arrangements, option to work from home, reduce movement between multiple workplaces, staggered shifts, modify configuration of work stations and visitor areas to increase distancing, use of floor markings and maximum occupancy notices
 - Record keeping – staff and customer attendance, declarations, OHS incidents

Pest and agricultural chemical management:

Practice responsible agri-chemical use to minimise chemical use while also protecting the industry from pests and diseases:

- Be aware of relevant national and state government legislative requirements for the use of agri-chemicals
- Mitigate agrichemical risks and safety hazards:
 - Ensure persons applying chemicals use protective clothing and are trained and licensed as required by national and state legislation (Agri-chemical use training is mandatory in NSW – EPA jurisdiction)
 - Ensure agri-chemicals are safely and securely stored on farm
 - Ensure correct disposal of used chemical containers, and unwanted chemicals
- Read the label - always use chemicals in accordance with label and permit approvals – target pests, spray dilution, application rates and withholding periods (to meet MRL requirements)
- Maintain a chemical use inventory / spray diary record (paper or electronic)

- Maintain an up-to-date file of APVMA Permits / Product Labels / Material Safety Data Sheets (MSDS) for all agri-chemicals used in your grove(s).
- Minimise off-target impact - avoid spraying in unsuitable weather conditions, observe buffer zones around sensitive crops, water courses and nature reserves
- Ensure spray application equipment is regularly calibrated for optimal droplet size and delivery rate, observe spray buffer zones and wind speed restrictions

Food safety and traceability:

Enhance Australia's reputation for production of reliable, nutritious and safe food:

- Implement Good Hygiene Practice (GHP) and develop a food safety culture in the workplace
- Prepare a Food Quality Plan based on HACCP principles to manage enterprise risks including product quality, biological, chemical, physical and environmental hazards:
 - Recommend using the *OliveCare*® template for a HACCP style food quality plan for EVOO production
 - Recommend using the *OliveCare*® template for a HACCP style food quality plan for table olive production
- Ensure soil is free from contamination – soil testing for heavy metals, persistent pesticides and contaminants
- Ensure olive products comply with pesticide MRLs

Australian Consumer Law (ACL):

Maintain a consumer focus:

- Compliance with Australian Consumer Law including product labelling requirements, and substantiation of credence claims including product quality, provenance and certification.
- Compliance with APVMA, FSANZ, State and Local Government requirements for producing safe food.

1.9.5. Environmental Responsibility Best Practice Check List: 13 Items

Farm waste:

Aim to minimise farm waste:

- Ensure appropriate use / recovery / disposal of processing waste
- Convert organic waste to value added products eg compost
- Aim for zero organic waste to landfill

Preserving 'natural capital':

Support and improve 'natural capital' (soil, water, flora and fauna), and minimise off-site impacts on environmental assets associated with soil, nutrient, pesticide and discharge water movement off site

- Olive enterprise should co-exist with the natural habitat and in accordance with local Native Vegetation Council and Local Council rules and regulations.
- Maintain biodiversity values on the property in a regional context by taking into account native vegetation, wildlife and ecosystems in business planning (EcoHort)
- Minimise impacts on environmental values from soil, sediment and associated pollutants entering waterways
- Manage water run-off and discharge to minimise impacts on downstream environments

- Noting the importance of other Australian horticulture crops having effective pollination

Community:

The olive industry is valued for its contribution to regional Australia and communities:

- The olive industry makes a valuable contribution to the economic and social fabric in regional and peri-urban communities
- Olive groves are a valued part of the landscape in regional and peri-urban communities

Carbon value and greenhouse gas emissions:

The Australian olive industry aims to provide a net positive capture of greenhouse gas emissions

- Utilise olive groves for carbon capture where appropriate
- Benchmark enterprise energy use efficiency:
 - Energy use efficiency (litres of fuel and kwh electricity/ kg product)
 - Carbon footprint for your olive products (eg kg CO₂ / kg olive oil)
- Plan for climate / environmental threats – increasing frequency of high temperature events, frost, flood, drought, fire

1.9.6. Grove Care Best Practice Checklist: 24 Items

Water use:

Be a responsible and efficient user of water:

- Understand olive tree water requirements (understand tree physiology)
- Undertake continuous monitoring of soil moisture and evaporation (application of remote sensing)
- Improve soil moisture repellent, soil moisture holding capacity and drainage properties
- Control weeds at critical times to conserve soil moisture and minimise water stress on the olive tree
- Understand irrigation systems and design (micro-irrigation, sprinklers, furrow)
- Understand water trading and how to secure a water license
- Set annual water use targets
- Understand and measure water use efficiency (Lit H₂O / kg product)

Soil health and tree nutrition:

The productive capacity of the soil is maintained without detriment to the environment

- Manage application of fertilisers to optimise plant uptake and minimise losses to run-off, leaching or gas emissions
- Undertake regular soil testing and leaf analysis
- Understand fertiliser application methods – foliar, fertigation, broadcasting
- Improve soil biology / build soil carbon
- Build soil nitrogen - nitrogen fixation
- Use soil amendments (gypsum, sulphur and lime) to correct sodic (alkali) and acidic soils

Canopy management:

Maintain a productive tree canopy:

- Undertake pruning to obtain optimal canopy surface to volume ratio, in accordance with your method of harvest
- Undertake maintenance pruning to manage biennial bearing and achieve optimal light penetration and air flow (which also assists with effective spray coverage)
- Undertake renovation pruning on older trees to lower tree height, reduce wood and generate new fruiting wood

Harvest:

Manage harvest to optimise fruit quality and grove productivity:

- Consider stage of fruit ripeness, oil content, desired taste profile and ease of processing
- Mark with tape any trees not to be harvested (such as pollinators, and trees with significant pest and disease or other fruit damage)
- Take care when using fruit abscission agents – always read the label
- Use harvest methods that minimise damage to fruit and trees
- Manage ‘field heat’ - take care with storage of olive fruit in bins from harvest to milling (consider bin materials, bin storage, fruit depth, ventilation and shading)
- Keep olives clean – avoid contamination of olives with soil, bird droppings, hydraulic oil etc
- Coordinate harvest to minimise the time olives sit around waiting to be processed.

1.9.7. Integrated Pest and Disease Management (IPDM) Best Practice

Checklist: 21 Items

Goal: To implement IPDM best practice to achieve effective and responsible agri-chemical use:

Ref: <https://olivebiz.com.au/ipm-project/field-days/ipdm-videos-presentations/>

IPDM 101:

- Know your pests, diseases and weeds (ref: *Field Guide to Olive Pests, Diseases and Disorders in Australia*)
- Implement regular grove pest and disease monitoring

Strategy 1: Cultural management

- Maintain good soil and tree health (happy trees)
- Improve soil biology / build soil carbon through application of compost which can include grove and processing waste
- Practise good grove hygiene, maintain quarantine and biosecurity best practice
- Manage the grove environment to reduce pest and disease pressure – canopy management, use of selected cover crops, control alternative hosts
- Change management practices to minimise spread of pests and diseases – harvest timing, selection of resistant cultivars, hygienic pruning practices

Strategy 2: Biological control

- Encourage presence of beneficial organisms in the grove – use of cover crops, reduce of broad spectrum pesticides
- Mass release of beneficial organisms - *entomopathogenic* fungus / competitors / antagonists

Strategy 3: Physical & mechanical control:

- Use of physical traps / barriers - eg for apple weevil

Strategy 4 – Use of selective (targeted) pesticides:

- Spot spraying - strategically timed and limited area application to target pests and diseases
- Implement chemical resistance strategies by rotating chemical groups as recommended
- Consider use of narrow spectrum (selective) pesticides
- Consider use of pesticides which disrupt pest development or behaviour – eg pheromones, insect growth regulators, oil sprays
- Consider use of natural or organic control methods (not always the least disruptive choice)

Stages of IPDM:

IPDM can be implemented in stages:

1. Implement improved cultural and grove hygiene management practices

- Monitor pests/diseases to work out the best time to apply pesticides
- Use on-farm weather stations to monitor and identify high risk weather conditions (disease prediction models)

2. Monitoring of beneficial species, predicting pest and disease populations

- Select “softer” pesticides where possible
- Spot and target applications of pesticides

3. Environmental modifications to encourage beneficial organisms, and discourage pests

- Releases of mass-reared beneficial organisms - *entomopathogenic* fungus / competitors / antagonists, (take into consideration what the beneficials will feed on once the pests are eliminated).

4. Better design of production systems to minimise pest problems

- Selection of appropriate cultivars, planting density and canopy architecture

1.9.8. Processing Best Practice Checklist: 12 Items

Table olive production

Understand the essential elements of table olive production:

- Undertake AOA best practice table olive processing training
- Manage “field heat” - take care with storage of olive fruit in bins from harvest to milling
- Compliance with FSANZ and Local Government requirements for processing facilities
- Compliance with the Voluntary Standard for Table Olives in Australia (RIRDC 2012)
- Purchasing olive fruit for processing – questions to ask your supplier
- Only process sound fruit, and recognise table olive defects and their causes
- Understand table olive primary and secondary processing methods and inherent risks to food safety and quality

- Document table olive primary and secondary processing methods
- Implement Good Manufacturing Practice (GMP), including
- Use only food grade equipment and materials
- Thoroughly clean all processing equipment including vats & barrels to avoid transfer of off flavours (eg Zapatera defect)
- Implement Good Hygiene Practice (GHP) and understand food safety considerations

1.9.9. Product Quality, Storage & Blending Best Practice Checklist: 2 Items

Table olive storage:

Develop Standard Operating procedures (SOPs) for storage of Table Olives (bulk and packaged):

- Store products away from heat and light, and monitor storage conditions
- Undertake annual chemical and sensory testing of table olive products, and understand how to read a test report

1.9.10. Product Packaging, Labelling & Finished Product Distribution Best Practice Checklist: 11 Items

Minimise waste:

Setting environmental sustainable goals for the use of packaging materials:

- Commitment to minimal, recyclable, reusable or compostable packaging.
- Aim for 100% of packaging being recyclable, compostable or reusable by 2025
- Minimise net waste (balancing packaging waste vs food waste)

Product labelling, and distribution:

Develop SOPs for labelling and distribution of olive products:

- Comply with product labelling requirements
- Transport of packed product – temperature control and monitoring
- For fulfilment of on-line sales use suitable protective packaging and monitor efficient courier delivery
- Implement product traceability and product recall systems
- Consider implementing product integrity / anti-fraud systems in high risk markets

Retail checklist:

Supporting retailers with product storage and use information:

- Provide product specification sheets
- Provide product storage advice
- Provide Point of Sale (POS) consumer education materials

The latest *OliveCare*® Best Practice Checklist⁴⁰ is available on the AOA website in the *OliveCare*® Members Area.

⁴⁰ OliveCare® Best Practice Checklists:

<https://australianolives.com.au/olivecare-best-practice-checklists/>

SECTION 2 – On Farm Plan

2.1 Overview:

This Section is aimed at providing growers with a guide to ensure that the olives they deliver to the processing plant for processing into table olives are in sound condition.

This Section contains a checklist and various forms than can be completed by the grower, plus a “HACCP style” analysis of potential hazards.

The forms will cover those aspects that are under the control of the grower including:

- Soil condition and its potential to contaminate fruit
- Farm chemical and fertiliser usage
- Equipment check including spray equipment with PVC or other (non-food grade) plastic hoses
- Harvesting
- Transport of olives to the table olive processing facility

Note: *Freshcare@⁴¹* provides a more in-depth system of managing food safety that is widely accepted throughout the agricultural industries of Australia.

This Section includes:

1. A description of the product and analysis check list of pre-harvest conditions identifying the areas that may require attention.
2. A detailed description of the procedure and processes involved.
3. A flowchart of the steps involved.
4. A hazard analysis for harvesting describing and examining Control Points.
5. A “HACCP style” table outlining areas or responsibility and preventative actions.

In addition to the HACCP based food safety focus of this Plan, a number of stages of the production process need to be monitored by the grower to ensure that olive fruit quality is of the required standard to produce high quality table olives, (eg cultivar, stage of maturation, size and disease / blemish free). Ref: Grove Check List.

Despite the fact that all fruit must be harvested and dealt with, it is the responsibility of the grower to evaluate the fruit condition to ensure that sound olive fruit is segregated to process into high quality table olives.

The harvest supervisor should inspect the trees to decide if there are any trees that are not suitable for harvesting, and should tag any trees that are not to be harvested, ensuring olives from these trees are segregated from sound fruit.

Also take into consideration that fruit left behind on the tree will seriously compromise the following year’s flowering potential, and would increase the chances of having mummified fruit present with the new lots. Harvesting onto the ground for these trees is also an option.

⁴¹ Freshcare@: <https://www.freshcare.com.au/>

Disease control is a year-round process: if you discover a problem at harvest time it is already too late. There are a limited range of control measures: contact the AOA for more information.

There are several food quality issues that are not specifically food safety related but are important and should be considered. These potential hazards are analysed using the same methodology (HACCP) as the Food Safety Hazards but relate to Food Quality rather than Food Safety.

2.2. Product Description: On-farm

The purpose of growing olive trees is to produce olives of sufficiently high quality that they can be processed into high quality table olives. This will require olives to be free of contamination from insects and fungal disease. This requires strict attention to the operations and processes on the farm. Olives grown in Australia should reach a standard that complies with *OliveCare*® for the production of Certified Australian Table Olives.

2.3. Procedure – ON FARM (up to the fresh fruit stage)

2.3.1. Farm Description:

If you do not already have a detailed farm description, complete one now, containing the following information:

- Location of your farm.
- History of land use (to check for potential soil contaminants).
- Size of grove / cultivars planted.
- Farm Map – include planting dates /named or numbered blocks
- Irrigation plan – if applicable.

2.3.2. Your Checklist:

- Has any persistent chemical been previously used on the grove?
 - IF YES: send a sample for testing for organochloride / organophosphate residue.
 - IF NO: there is no significant risk.
- Each and every chemical applications needs to be recorded in a “**Spray Record Diary**” or computer spreadsheet. Check to ensure all applications are of approved chemicals and that withholding periods have been adhered to.
- Olives in bulk storage will deteriorate with heat. Have crates and bins of olives been stored in the shade or in a cool room? Growers need to ensure that core temperature of the olives (measured at 40cm into the fruit bin/pile) should be <5°C higher than air temperature with an absolute limit of <10°C higher than air temperature.
- Any delays between harvesting and processing (such as harvesting over several days before delivery to a processor), and not stored under controlled conditions can cause degradation of the olives and may result in rejection of the batch by the processor, or production of poorer quality table olives.

Note: Research has shown that raw olives, especially green ripe olives, can be stored under controlled conditions for long periods without loss of quality.

2.3.3. Major Steps:

The producers aim is to ensure that the fruit produced is suitable for table olive production. The following steps will assist in achieving this goal.

Major Steps	
1	Ensure there is no contamination in the soil
2	Ensure withholding periods & Maximum Residue Limits (MRLs) have been complied with; ensure all chemicals used have APVMA permits
3	Ensure protocols are in place to assure quality of the olives
4	Ensure there is no contamination from the harvesting bins or machinery
5	Ensure no contamination takes place after the fruit leaves the farm. Consider your method of transport

2.3.4. Detailed Steps:

Detailed Steps

2.3.4.1. Ensure that the olive grove soil is free from contamination

- This will involve a once-off examination of the sites historical records to ensure that chemicals used in the past, as well as recently applied fertilisers are not contaminating the soil and fruit.
- This also covers spillage of fuel, lubricants, fertilisers or chemicals during application.

2.3.4.2. Withholding periods and Maximum Residue Limits (MRL's)

- Ensure the *FSANZ Food Standards Code* (Schedule 20) MRLs have been adhered to and that all chemicals used have current on-label provisions, APVMA permits, or are otherwise covered by 'control-of-use' legislation in the case of Victoria.
- Growers who supply products to export markets should also ensure MRLs for those markets are complied with, as these may be different from those in Australia.
- **Details of the current list of approved chemicals for use on olives is available on the AOA website⁴², or directly from the Australian Pesticides & Veterinary Medicines Authority (APVMA) for permits and label registrations⁴³. If there is any doubt, send fruit samples for testing prior to harvest and processing.**

⁴² Approved chemicals for use on olives: <https://australianolives.com.au/chemical-permits/>

⁴³ Australian Pesticides & Veterinary Medicines Authority (APVMA) – Permits: <https://portal.apvma.gov.au/permits> and Label Registrations: <https://portal.apvma.gov.au/pubcris>

- **In some instances minor use and emergency permits may be issued by APVMA for use of certain chemicals under specific conditions.**
- Compulsory record keeping: All growers are legally obliged to maintain records for the use of pesticides (spray diary)⁴⁴. This record will detail the chemicals bought and used, when and how they were applied, the application rate and weather conditions as well as who applied the chemical.
- This requirement applies to all fungicides and insecticides, foliar fertilisers, fruit loosening agents and other preparations sprayed onto the foliage or applied through irrigation or broadcast spreading.
- **A Pesticides Example Record Keeping template can be found on the NSW EPA website⁴⁵.**
- **Alternatively a Contractor declaration may be used: Ref: Section 9.5.**
- Material Safety Data Sheets for all farm chemicals should be obtained from the website of the chemical producer.

2.3.4.3. Ensure protocols are in place to assure quality of the olives

- A well maintained olive grove will include good plant nutrition, grove hygiene, and sound irrigation and machinery practices.
- Healthy trees have a better capacity to fight off insect and fungal attacks.
- An understanding of the nutrition cycle of an olive tree through leaf and soil analysis will encourage a grower to apply the appropriate fertiliser at the best time of the growth cycle.
- Regular inspections of the foliage will give the grower an early indication of the presence of any insect infestation or fungal diseases. This needs to be done year-round in some climates.
- To avoid spoilage of perfectly good olives, take care to ensure all equipment especially storage bins are kept clean and in good condition.
- If a grove is irrigated a thorough understanding of the uptake and use of water by olive trees is recommended, along with testing of the quality of the irrigation water.
- All machinery used on the farm needs to be kept in proper working order and be well maintained.
- Inferior quality fruit will not produce quality table olives, so it is the responsibility of the grower to harvest fruit that is suitable for processing into high quality finished products. Diseased or contaminated trees should not be picked.
- The harvest supervisor should inspect the trees to decide if there are any trees suffering from disease that are not suitable for harvesting, and should tag any affected trees. These trees are not to be harvested.
- The harvest supervisor and transport driver needs to take every step to ensure that the olives do not get hot during transport.

⁴⁴ Compulsory record keeping: <https://www.epa.nsw.gov.au/your-environment/pesticides/compulsory-record-keeping>

⁴⁵ NSW EPA Pesticides Example Record Keeping Form: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/pesticides/130814pestfmeg.pdf>

These practices are covered under Good Agricultural Practices in the Table Olive Production Manual.

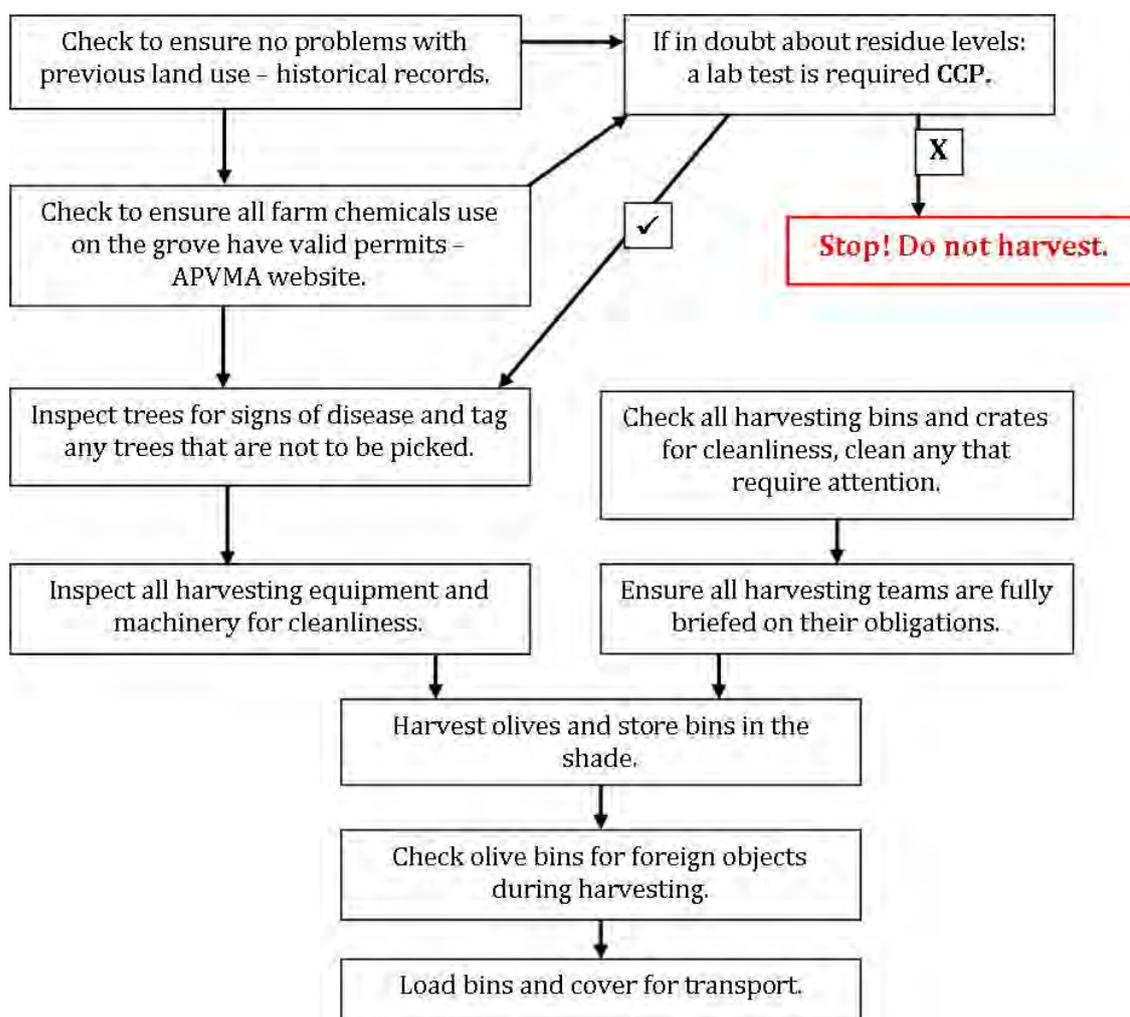
2.3.4.4. Ensure no contamination takes place in the harvesting bins

- During harvest, regular inspections of the picking bins and crates are necessary to ensure foreign objects do not fall into the picking bin.
- Check that bins are cleaned before use and that fruit is not left in uncovered bins in the sun.

2.3.4.5. Ensure no contamination takes place while the fruit is being transported

- The load of olives will need to be covered or transported in a closed vehicle to ensure no road dust; dirt, rain or other objects contaminate the fruit after it leaves the farm *en route* to the processing plant.
- The grower or grove supervisor should complete the “Grower Declaration Form” (See **Section 9.5**) which needs to accompany the olives to the processing plant.
- Unless grove and processing are an integrated operation, the processor may require other documentation as well: e.g. spray diary records or their own batch sheets.

2.4. FLOW CHART – On Farm Including Harvesting:



2.5 Summary of steps:

- Ensure olives are harvested at the correct time / maturity
- Check with the grove Spray Diary that all MRLs have been followed
- Check to ensure all withholding periods have been enforced
- Check all chemicals used have current APVMA (or equivalent) approval for use
- Inspect all the trees and tag any trees that are not to be harvested
- Ensure harvesting team / contractors are aware of which trees not to harvest
- Check with the processor that the schedule for harvesting is in place to minimise the time delay between harvest and processing
- Inspect all equipment, harvesting bins, crates that are to be used for harvesting
- Clean any bins or equipment that are contaminated
- Harvest olives from approved trees
- Store olive bins in the shade: empty, part filled or full, process fruit within 24 hours
- Check for foreign bodies and other contaminants in the bins
- Inspect the cartage vehicle to ensure it is clean enough for the journey
- Load bins onto the cartage vehicle for delivery to the processing facility
- Cover the load to exclude dust, dirt, bird or animal droppings
- Fill in the Grower Declaration form (**Section 9.5**) – take a copy to the contract processor
- Deliver olives to the processing facility

2.6 Hazard Analysis – On-farm:

- For each step in your process, you need to consider 4 different types of hazard:
 - Chemical
 - Physical
 - Biological
 - Environmental
- Ensure you are considering Product Quality, Food Safety and other reputational issues.

2.6.1. Chemical Hazards:

Food Safety:

- Has any persistent chemical been previously used on the grove?
 - IF YES: Send a sample for testing for organochloride / organophosphate residue.
 - IF NO: There is no significant risk.

- Each and every chemical application needs to be recorded in a “**Spray Record Diary**” or computer spreadsheet. Check to ensure all applications are of approved chemicals and that withholding periods have been adhered to.

Food Quality:

- Presence of food grade chemicals that should not be in the product eg flavourings, and preservatives.

2.6.2. Physical Hazards:

Food Safety:

- Presence of foreign bodies in finished product eg soil, glass, metal, can lead to product recall notices, and reputational damage – clean up the grove and processing facilities.

(Food Quality:

- Olives in bulk storage will deteriorate with heat. Have crates and bins of olives been stored in the shade or in a cool room? Growers need to ensure that core temperature of the olives (measured at 40cm into the fruit bin/pile) should be <5°C higher than air temperature (when ambient temperatures are <25°C), with an absolute limit of <10°C higher than air temperature (when ambient temperatures are low).
- Where ambient temperature is high, any delays between harvesting and processing (such as harvesting over several days before delivery to a processor), can cause degradation of the olives and may result in rejection of the batch by the processor, or production of poorer quality table olives with organoleptic defects.

Note: In cool climate regions such as in Tasmania it is quite acceptable to harvest one day, place the bins in the shed over-night and process the next day.

2.6.3. Biological Hazards:

Food Safety:

- Presence of microbial organisms on raw fruit, or contamination by processing under unhygienic conditions, or staff suffering gastric illnesses – always follow GHP

Food Quality:

- Harvesting of olives infected with anthracnose or secondary fungal infections on damaged fruit may result in rejection of the batch by the processor, or production of poorer quality oil with organoleptic defects.
- Spread of pests and diseases within and between groves due to poor biosecurity practices can result in increased costs and reduced grove productivity – use vehicle wash-down facilities and control movement of visitors.

2.6.4 Environmental Hazards (Food Quality & Reputation)

- Weather - frost, flood, drought and fire impact on grove productivity and can also impact on product quality – need to manage these risks, starting with grove site selection and grove establishment.
- Manage processing waste - responsible disposal / recycling of processing waste streams. Build soil carbon and increase biological diversity with companion planting to support sustainable groves.

2.7. Hazard Analysis Methodology – On-farm:

The table below lists steps in the process outlined in the flow chart on the previous page. In your document you will need to list any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed below:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

POTENTIAL HAZARD	L	S	R	C	CONTROL MEASURE	CP / CCP / QCP
MAJOR STEP: ENSURE THE SOIL IS FREE FROM CONTAMINATION						
Biological, Chemical: inspect site records to see if any previous use of the land could be affected by previous chemical use. Olive groves planted in soil with previous cotton, potato or brassica plantings may have an increased risk from the soil borne fungus Verticillium wilt (<i>Verticillium dahlia</i>)					<i>If there is any suspicion of chemical residues or soil borne pathogenic bacteria or fungi the soil should be tested</i>	CCP
Physical, Quality: no food safety or food quality issues of a physical nature identified						

POTENTIAL HAZARD	L	S	R	C	CONTROL MEASURE	CP / CCP / QCP
MAJOR STEP: ENSURE MRLs and APVMA PERMITS AND WITHHOLDING PERIODS ARE CORRECT						
Biological, Physical, Quality: no food safety or quality hazards identified						
Chemical: chance of chemical residues on the olives if the sprays have not been applied correctly; chance of chemicals being used that do not have APVMA certification. Use of spray equipment with PVC or other (non-food grade) plastic hoses risks contamination of fruit with phthalates.					<i>If there is any suspicion of chemical residues the olives should be tested. Check spray records against AOA or APVMA website information on current registrations Check condition and specification of all plastic hoses and fittings</i>	
MAJOR STEP: ENSURE PROTOCOLS ARE IN PLACE TO ENSURE QUALITY OF THE OLIVES						
Good Nutrition Practices: an imbalance of nutrients in the soil or on the foliage could affect the cell structure of the olives, compromising the quality of the fruit, and increasing susceptibility to pests and diseases					<i>Samples of olives should be sent for independent testing (leaf analysis).</i>	
Good Grove Practices: high quality table olives requires raw olives that are not contaminated with anthracnose, sooty mould spores or insects					<i>Using coloured flagging tape, tag any trees that are unsuitable for harvesting</i>	
Good Biosecurity Practices – the presence of quarantinable pests and diseases may seriously disrupt production and marketing					<i>Implement good on farm biosecurity practices and grove hygiene, regularly monitor crops and report any unusual pests and disease symptoms</i>	
Good Hygiene Practices: quality of raw olives could be affected by the cleanliness of the storage bins.					<i>Supervisor to inspect all bins before use and clean any that look contaminated</i>	
Good Irrigation Practices: if irrigation is used on an olive grove a good understanding of the growth cycle of the trees will be required to schedule this irrigation.					<i>Study of the growth habit and rainfall pattern of the specific grove will help with irrigation scheduling</i>	
Good machinery and equipment maintenance practices: use of PVC or other (non-food grade) plastic and perished hoses and fittings can contaminate fruit with phthalates compromising export market access.					<i>Implement a machinery and equipment maintenance schedule including replacement of perishable or unsuitable fittings</i>	

MAJOR STEP: ENSURE THERE IS NO CONTAMINATION FROM HARVESTING BINS OR MACHINERY						
Biological: use of non-potable water, animal droppings and other contaminants in uncleaned bins and equipment will pose a risk of contamination					Supervisor to inspect all bins and other equipment before use and clean any that are contaminated	
Chemical: Avoid bins may have been used for storage of chemicals or fuel.					Supervisor to inspect all bins and reject those used for storage of chemicals or fuel.	
Physical: bins may have foreign objects, rubbish, leaves and other detritus that needs to be cleaned out. Contaminated soil on bin bases may fall into other stacked bins					Supervisor to inspect all bins before use and clean any that look dirty. Ensure bins are stored on clean surfaces.	CCP
Quality: contaminants could compromise the quality of the olives and olive products					Inspect bins before covering with a tarpaulin	QCP
MAJOR STEP: COVER LOAD AND TRANSPORT TO THE PROCESSING PLANT						
Biological, Quality: bird droppings, dirt and/or insects could enter uncovered bins					Cover all bins	
Chemical: Avoid fuel or other chemicals transported in the same cartage vehicle as the bins : harvesting equipment leaks hydraulic oil residue into bins					Remove all containers of fuel, chemicals from the tray of the truck; reject any bins of contaminated olives	
Physical: foreign objects could fall into bins (from harvesting equipment or moving olives from grove to truck)					Inspect bins before covering	
R STEP: ENSURE THE OLIVES DO NOT HAVE SIGNIFICANT SPOILAGE DUE TO FUNGAL OR INSECT DAMAGE						
Biological, Quality: presence of circular lesions from anthracnose infestation growing on the olives; presence of olive lace bug insects in the bins; presence of black sooty mould on the olives. Presence of secondary fungal infections on damaged fruit.					Do not harvest trees that are severely affected. Do not send bins that are affected to the processing facility. Protect bins from sunlight and heat in the field and process olives promptly.	CP
Chemical: none						
Physical: none						

2.8 Hazard Management – ON FARM

Step	Hazard	Control Measure	Monitoring Procedures	Critical limits	Corrective Action	Records
Ensure all withholding periods have been observed	Chemical residue on olives	Inspect spray records	<u>What:</u> spray diary <u>How:</u> manual inspection <u>When:</u> prior to harvesting <u>Who:</u> farm owner	FSANZ - Food Standards Code Section 1.4.1	If there is a risk of non-compliance, take samples for testing. Do not harvest olives if there is contamination	9.5 Grower declaration
Ensure all chemicals have approved on-label use or APVMA permits	Chemical residue on olives	Check chemical usage against APVMA permissions	<u>What:</u> APVMA or AOA website <u>How:</u> inspect and print off copies of chemical labels, chemical permits and Material Safety Data Sheets <u>When:</u> prior to harvesting <u>Who:</u> farm owner	FSANZ - Food Standards Code Section 1.4.1	If there is a risk of non-compliance, take samples for testing. Do not harvest fruit if there is contamination	9.5 Grower Declaration
Ensure the olives do not have significant spoilage due to fungal or insect damage	Anthraco-nose or sooty mould or olive lace bug infestations may be included with sound olives	Tag any trees that are not suitable for harvesting	<u>What:</u> visual inspection of all trees <u>How:</u> look at each tree <u>When:</u> prior to harvesting <u>Who:</u> farm owner, manager supervisor	More than 5% of the foliage with sooty mould or presence of any live olive lace bugs or significant infection with anthracnose	Use brightly coloured flagging tape to mark any trees that are not to be harvested	Mark the location of diseased trees on farm map, or reject fruit on the sorting table.
Ensure orchard machinery is in good condition to avoid risk of contamination of olives	PVC and some other (non-food grade) plastic hoses contain phthalates which may contaminate fruit and compromise access to export markets	Replace all old and PVC or other (non-food grade) plastic hoses on spray equipment	Test export consignments for phthalates,	Phthalate levels greater than 1.5 ppm	Divert product with high phthalate levels to alternative markets not having this specification	Maintain register of date of purchase of perishable fittings and establish a replacement program.

Step	Hazard	Control Measure	Monitoring Procedures	Critical limits	Corrective Action	Records
Ensure no contamination in the picking bins	Contamination of the harvesting bins with non-potable water, dirt, mould etc.	Inspect and wash, drain any dirty bins / crates	<u>What:</u> inspect the picking bins / crates <u>How:</u> manual inspection <u>When:</u> prior to harvesting <u>Who:</u> farm owner, supervisor	The presence of any visible dirt, water, mould or chemical smells	Reject contaminated bins, or clean with detergent, rinse with potable water and drain before use	9.4 Harvest Operations Run Sheet
Ensure load is covered <i>en route</i> to mill	Animal or bird droppings, dust, dirt entering the bins once they leave the farm	Inspect and cover the load	<u>What:</u> inspect the load on the truck <u>How:</u> manual inspection <u>When:</u> prior to dispatch <u>Who:</u> supervisor	All fruit should be covered	Cover the load to keep out foreign material	9.5 Grower Declaration

SECTION 3 - Primary Processing: Natural Olives

3.1. Overview:

It must be stressed that this is designed as a generic guide to a “typical” olive processing plant; noting a Food Safety Program such as HACCP requires customizing to specific equipment, business and operators.

The processor must ensure that the olives delivered are:

1. Free of any contamination and disease.
2. Delivered to the processing plant in suitable containers.
3. Delivered in an acceptable condition.

The processor should require that the grower to complete a Grower Declaration form (6.7 Grower Declaration) or equivalent declaration prior to accepting and processing their olives.

Note: Olive growers who contract out processing operations but market under their own brand(s) need to obtain documentary evidence of HACCP style Food Quality Plan(s) from their contract processor.

OliveCare® has adopted the Voluntary Table Olive Standard in Australia. This has been developed by the National Table Olive Committee of the AOA to lay down the standards that Australian produced table olives need to reach.

Steps covered in this module

1. A description of the processes required to prepare fresh olives for processing into table olives.
2. A detailed description of the procedure and processes involved.
3. A flowchart of the steps involved.
4. A hazard analysis for harvesting describing and examining Control Points.
5. A HACCP style table outlining areas or responsibility and preventative actions.

The brine fermentation technique outlined here is described in detail in the book *'Producing Table Olives' by Prof Stan Kailis and David Harris⁴⁶*, published in 2007. This technique is widely used by small to medium sized table olive producers both in Australia and overseas. This process is also outlined in *Table Olive Processing Manual (RIRDC 12-100)⁴⁷*.

There are several other very effective processing techniques other than those outlined in Section 3.3. Each processor will need to customise the Plan to suit the individual circumstances.

This Section covers the de-bittering process of olives in bulk, carried out immediately after harvesting, and using either:

- A brine fermentation technique.
- A dehydration method using dry salt or heat.

⁴⁶ *Producing Table Olives* edited by Stanley Kailis and David Harris 2007 (CSIRO Publishing):

<https://ebooks.publish.csiro.au/content/producing-table-olives>

⁴⁷ Table Olive Production Manual (RIRDC 2012): <https://www.agrifutures.com.au/wp-content/uploads/publications/12-100.pdf>

There is also a widely used technique for processing green table olives using sodium hydroxide (caustic soda or lye) described in [Section 4 - Primary Production: Treated Olives](#).

Internationally, processing of black ripe olives (Californian style black olives) is significant. Processing this type of olive requires substantial equipment and technical skill, and is not covered in this guide.

Secondary processing is covered in [Section 5 – Post Production](#) that takes place several weeks or months after this initial processing.

It is acknowledged that processing plants will have variations in the size of processing vessel – ranging from small food grade drums through the popular 200 L drum, up to custom built tanks holding several tonnes of olives.

Whilst the principles are the same throughout, a Food Safety Plan will need to be tailored to each processing plant.

3.2. Product Description - Primary Processing: Natural Olives

Natural olives: Green olives, olives turning colour or black olives placed directly in brine in which they undergo complete or partial fermentation (anaerobic or aerobic), preserved or not by the addition of acidifying agents.

3.3. Primary Processing of Natural Olives Procedure (up to bulk stage)

This procedure is designed to cover the typical small to medium scale table olive processing plant for the de-bittering and preserving process. Some steps relate to food safety, others have no food safety issues but are part of standard operations.

3.3.1. Major Steps:

Section 3: Primary Processing – Natural Olives Major Steps	
1	Receival of fruit at the processing plant
2	Recording of deliveries, batch tracking systems
3	Ensure potable water supply
4	Preparation of processing brine
5	Preparation of processing vessels
6	Sorting of raw olives
7	Washing of raw olives
8	Brine fermentation processing method
9	Dehydration processing methods
10	Monitoring post primary production

3.3.2. Detailed Steps:

Detailed Steps

3.3.2.1. Arrival of fruit at the table olive processing facility

- Delivery & processing schedule in place.
- Unloading and storage organised.
- Grower declaration (or equivalent) presented.
- Unload according to OH&S regulations.
- Store raw olives in an area that ensures that the core temperature of the olives (measured at 40cm into the fruit bin/pile) should be < 5°C higher than air temperature (if ambient temperatures are >25°C) with an absolute limit of <10°C higher than air temperature (at lower ambient temperatures). For table olive processing, raw olives can be placed in ventilated 20-30 kg crates to reduce heat and microbial risks.
- The processor must ensure that the raw olives are delivered:
 - free of any contamination.
 - in suitable containers.
 - in an acceptable condition.
 - are stored in a location and manner that will avoid spoilage.

Unless grove operations are integrated with processing, the processor should require that the grower to complete a “Grower Declaration” form or equivalent declaration prior to accepting and processing their fruit. **See 9.5 Grower Declaration Form.**

3.3.2.2. Recording deliveries, batch tracking

- Weigh and record details on 9.8 Olive Production Record, or similar.
- Assign a unique identifying batch / barrel code to assist with traceability.
- It is suggested the processor take a photograph of each batch as it arrives at the plant.

3.3.2.3. Potable water supply

- Potable water is water that meets the test parameters set by health authorities as being suitable for drinking.
- Test the water quality at least once a year to ensure no chance of microbiological spoilage.

Note: Town water can be regarded as potable but farm / tank water should be treated and tested.

- Potable water must be used during all washing procedures.
- Use fresh potable water for each batch.

3.3.2.4. Preparation of brine

- Pre-prepare processing brine in a separate container.
- Clean / rinse the plastic bags containing the salt before making up the processing brine as the bags themselves can attract dust.
- Adjust salt concentration to suit the batch being processed.
- Circulate the brine to ensure consistent mixture.

- Ensure no dust from bags of salt enters the mixture.
- Prepare a starter culture of *Lactobacillus* (optional)

3.3.2.5. Preparation of processing vessels

- Clean and sanitise all processing vessels (drums and tanks) along with lids and seals.
- Ensure ease of access and safe working conditions – as a potential slip hazard exists. (Ref OH&S Regulations in your State)

3.3.2.6. Sorting of raw olives

- Leaf removal with de-leafer and some basic sorting of rejects.
- Olives will need to be moved to the sorting tables (optional: to be size graded) to be sorted to remove undersized, damaged, diseased or miss-shaped fruit, leaves, twigs and other extraneous material.
- Sorting tables need to be cleaned and sanitised before use and regularly during the day's processing.
- Suitable containers for reject olives / material other than olives should be placed in convenient locations. The waste material needs to be disposed of in accordance to *OliveCare® Environmental Guidelines*.
- Note larger table olive processors may have access to colour sorter machinery that need to be carefully calibrated to ensure the appropriate percentage of defect is removed from the raw olive stream.

3.3.2.7. Washing of raw olives

- Raw olives are rinsed twice to remove dust and dirt before sealing in their processing vessels.
- This process may take place either before or after the sorting process.

3.3.2.8. The de-bittering process

- Processing vessels should be partly filled with brine so olives tipped into a vessel fall into water rather than a solid surface to avoid bruising.
- The vessels need to be filled to ensure all air is excluded once the lid is fastened down.
- During the fermentation process excess Carbon Dioxide may need to be vented.
- Processing vessels will need to be marked to clearly identify the contents.
- A starter culture of *Lactobacillus* may be introduced (optional).

3.3.2.9. Dehydration processing methods

3.3.2.9.1. Heat dried salted table olives

- Mix naturally black ripe olives with salt for a few days to allow the salt to draw out some of the moisture.
- Place salted olives onto shallow ventilated metal trays in place the trays of olives into a convection oven at 50°C.
- Allow the olives to sit at this temperature for 6 hours, taste test and continue the process if needed.

- Once the moisture level has dropped to an acceptable level and use immediately or pack in jars and pasteurise.

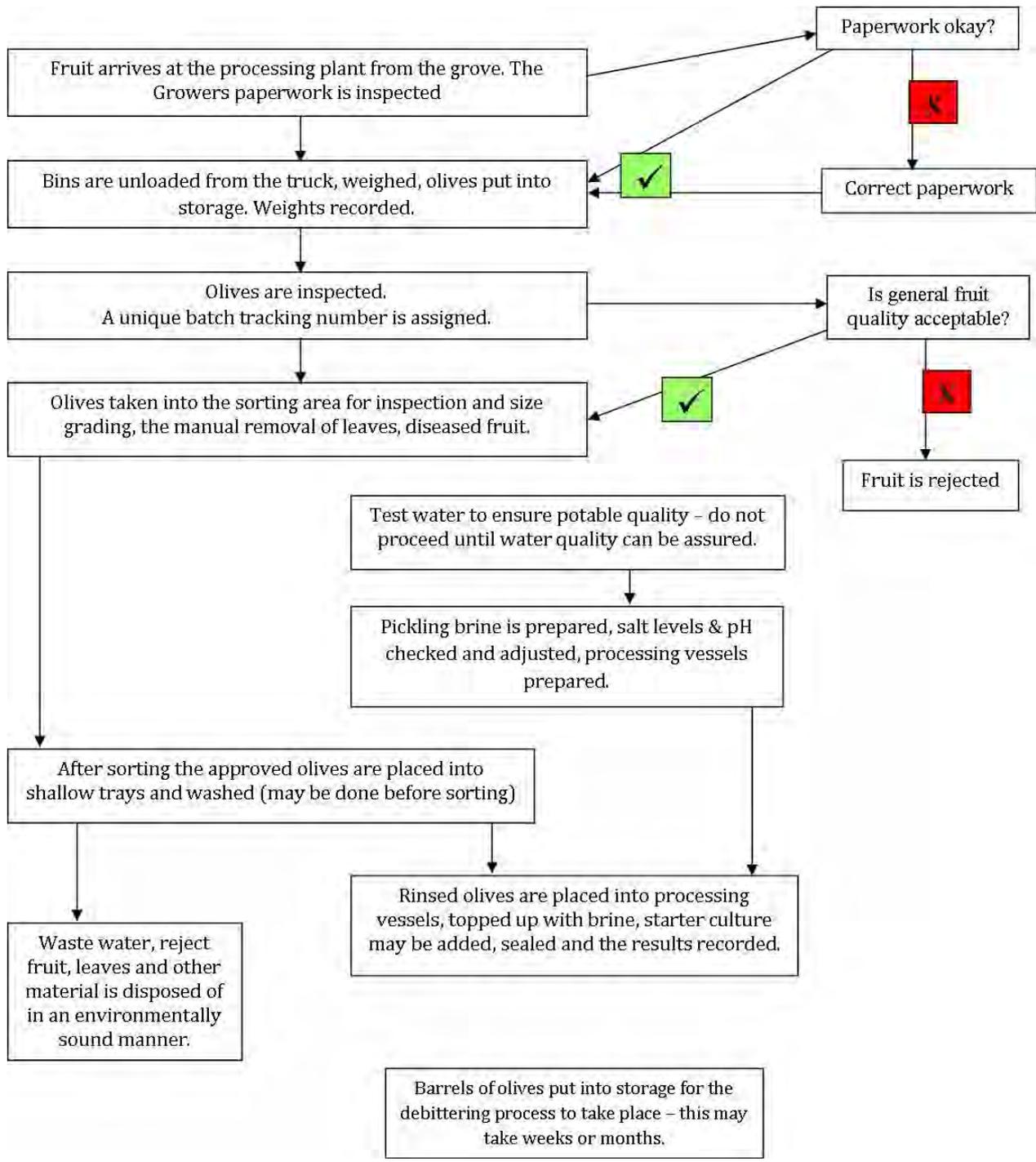
3.3.2.9.2. Salt dried table olives

- Fill a shallow tray with a layer of coarse salt.
- Allow waste water to collect in a drip tray under the olive / salt mixture.
- Place raw olives, usually black – on top of the layer of salt.
- Add a further layer of salt.
- Add further layers of salt, olives (optional).
- Allow the salt to draw the bitterness out of the olives, test (Approx 3 weeks).
- Wash off the salt and use immediately or pack in jars and pasteurise.

3.3.2.10. Monitoring

- During the process the condition of the fruit and brine will need to be checked and results recorded. 9.8 Olive Production Records. Any variations from the accepted norm will require adjustment to ensure food safety.
- Yeast and mould spores may grow in the brine – such microbial growth will need to be removed.
- Gas pockets may form under the skin and in cavities of processing olives – caused by *sporogenic* bacilli. These olives need to be rejected and cannot be used.
- Putrid-butyric fermentations (*zapateria*) may occur due to the presence of anaerobic spores. These olives need to be rejected and cannot be used.
- Olives may shed their skins (sloughing) due to the presence of *cellulolytic* bacteria, or by the use of sodium hydroxide as part of the process. These olives need to be rejected and cannot be used.
- Black olives may turn bluish-ashen and have unpleasant smells if certain ferrous salts are present, salt concentration is too low. These olives need to be rejected and cannot be used.
- Brine may go cloudy under normal processing conditions – the presence of the desirable lactobacillus *plantarum* (*pentosus*) will create these conditions naturally: this is acceptable.
- Olives rejected during the processing should be disposed of and cannot be re-used.
- Sugar levels (not usually done), salt levels, brine pH, temperature of the brine all need to be recorded and any trends away from the accepted norm to be investigated.
- Use of glass equipment should be minimized eg glass salinometers to minimise the chance of breakage and contamination.

3.4. FLOW CHART - Table Olives Processing Natural Olives



3.5. Hazard Analysis – NATURAL OLIVES – Food Safety

This table lists steps in the process outlined in the flowchart; any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed here:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: STORAGE AT THE PROCESSING FACILITY						
Biological: Bird droppings or vermin may have entered if the load was not covered correctly.					<i>Ensure load was adequately covered and inspect the fruit if there is any doubt.</i>	
Chemical: Raw olives may have become contaminated if chemicals or fuel had been stored or transported in the same area as fruit.					<i>Inspect for any evidence of chemical cans or containers. Ensure olives are not stored close to chemical or fuel containers.</i>	
Physical: Spoilage or degradation of fruit may occur if the fruit is exposed to heat and strong sunlight for an extended period of time.					<i>Store the olives inside the cool of the processing facility.</i>	
MAJOR STEP: RECORD DELIVERIES, BATCH TRACKING						
Biological, Chemical, Physical: none – this is all paperwork and does not relate to food safety.						

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: WATER SUPPLY						
Biological: chance of microbiological spoilage due to organisms in non-potable water.					<i>Use potable water. Maintain filters and UV systems.</i>	
Physical: no food safety issues.						
Chemical: chance of introducing or spreading contaminants in the washing water.					<i>Use potable water.</i>	
MAJOR STEP: PREPARATION OF BRINE						
Biological: chance of contamination from non-potable water.					<i>Always use potable water.</i>	
Chemical: chance of contamination from cleaning chemicals, salt and acidifying agents, non-food grade equipment.					<i>Rinse thoroughly and sanitise before use Purchase only from approved suppliers. <u>9.2 Approved supplier program</u></i>	
Physical: chance of material falling into the brine solution.					<i>Ensure nothing falls in, ensure storage vessel is kept covered.</i>	
MAJOR STEP: PREPARATION OF PROCESSING VESSELS						
Biological: contamination of tanks / barrels from previous batches of olives.					<i>Clean, rinse with 2% sodium hydroxide in potable water, (or sodium percarbonate), rinse with potable water to remove sodium hydroxide and then sanitise each barrel / vessel before use.</i>	
Chemical: contamination with cleaning chemicals.					<i>Ensure all vessels, pumps, pipes, buckets and other equipment is clean and rinsed before use.</i>	
Physical: material could fall into tanks / barrels awaiting use eg Jewellery, hair nets, plastic gloves from operatives.					<i>Place a lid or other covering over the entrance to the barrel while awaiting to be used.</i>	
MAJOR STEP: OLIVE SORTING						
Biological: raw olives may have some form of infestation or fungal contamination from the tree. Spiders and insects may be present.					<i>Sorters to wear disposable rubber gloves and hair nets. Sorters to physically remove contaminated fruit during the sorting process. Spiders, insects to be removed.</i>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Chemical: olives may have a residue of chemical spray, sorting tables may have chemical residue.					<i>Tables to be clean and sanitised, the olives will be washed in the next step to remove any chemical residue.</i>	
Physical: material other than olives could be missed and enter the next phase, insects could enter the sorting.					<i>Take care with the sorting and dispose of any material into conveniently located buckets.</i>	
MAJOR STEP: WASHING OF OLIVES						
Biological: chance of contamination of olives from non-potable water.					<i>Supervisor is to ensure running, potable water is used.</i>	
Chemical: chance of contamination of olives from cleaning chemicals.					<i>Supervisor is to inspect all storage equipment before use.</i>	
Physical: washing trays need to be clean before use. Chance of trays becoming contaminated during the process.					<i>Supervisor to inspect all washing trays before and during use.</i>	
MAJOR STEP: DE-BITTERING PROCESS						
Biological: air-borne yeast or mould spores could be introduced, microbiological spoilage if the brines are not within specifications. A starter culture may be introduced.					<i>Exclude all air from the processing vessel to minimise the chance of spores being introduced, ensure brine is to specifications Where starter cultures are used ensure that these conform to specifications.</i>	
Chemical: salt and acid, (optional: sodium hydroxide) could all be used in the processing brine.					<i>Pre-mix solutions of brine and acid / (sodium hydroxide) under controlled conditions.</i>	
Physical: processing vessels (tanks / barrels) may be very close to full and may spill, creating slip hazard (not a food safety issue, but an OH&S issue). Material other than olives may fall into the vessels.					<i>Ensure operators are wearing slip-proof footwear. Ensure nothing falls into the processing vessels. Ensure operatives are not wearing jewellery and no tests are undertaken directly in the processing brine using portable measuring equipment eg pH meters, salinometers, thermometers</i>	

MAJOR STEP: MONITORING

<p>Biological: yeast and mould growths may be present, zapateria spoilage, other forms of microbiological spoilage, unpleasant smells, sloughed skins, yeast spots, gas pockets under the skin.</p>				<p><i>Check fermentation brines regularly – visually, aromas, malodours. Ensure anaerobic conditions are maintained to minimise surface growth of yeast and fungi ie exclude air. Low level growth should be flushed away immediately with fresh brine and a brine sample taken for microbiological assessment. NOTE- the process of fermentation can produce a slightly cloudy brine – this is quite acceptable. If brine is heavily clouded and malodorous the batch should be discarded.</i></p> <p><i>Malodorous olives should be discarded unless cleared after microbiologically tested.</i></p> <p><i>Yeast spots are actually collections of lactic acid bacteria and not pose a health problem</i></p>	
<p>Chemical: olives will spoil if the brine moves outside the stipulated band of salt / pH.</p>				<p><i>Replace brine or add more salt / adjust the pH by adding acid.</i></p>	
<p>Physical: pressure build-up in the fermentation vessel. Other material could fall into open vessels. Failure of electrical or electronic systems could produce false readings. Danger of electrocution due to the proximity of electrical or electronic systems and water / brine.</p>				<p><i>Ensure the pressure is released slowly when the lid is removed. Ensure nothing falls into open tank or barrel. Be mindful of the chance of readings that seem out of specifications, indicating equipment failure.</i></p>	

3.6. Hazard Management – PROCESSING – Food Safety

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Arrival of raw olives at the processing plant, unloading & storage.	Vermin or bird droppings, chemicals or other foreign material in with the olives	Inspect the bins of raw olives on arrival	<u>What:</u> condition of the fruit <u>How:</u> manual inspection <u>When:</u> during unloading the bins from the transport vehicle <u>Who:</u> processing plant supervisor	Presence of significant amounts of foreign material, malodours from chemicals or fuel	Reject any batches deemed to be over acceptable limits.	9.7 Olive Delivery Record of any hazard event.
Record deliveries and assign batch codes.	None	N/A	N/A	N/A	N/A	9.7 Olive Delivery Record, or similar
Washing and processing water supply	Non-potable water	Use only potable water	<u>What:</u> check water quality <u>How:</u> samples sent for inspection <u>When:</u> before the start of the processing season <u>Who:</u> processing plant supervisor	Pre-determined levels of microbiological contamination exceeded	Do not process until water of an acceptable standard is available	Visual NATA lab tests before harvest season begins
Preparation of brine	Contamination by yeast, spores, non-potable water	Clean and sanitise all equipment and materials before use	<u>What:</u> check water, salt <u>How:</u> manual inspection <u>When:</u> before mixing brine <u>Who:</u> plant operator	Discoloured salt, cloudy brine, Food acids	Discard any salt or acid that is not of food standard	9.6 Cleaning Checklist
Preparation of processing vessels (tanks and barrels)	Contamination of tanks / barrels by cleaning chemicals, previous batches	Inspect all tanks / barrels, buckets and equipment before use	<u>What:</u> cleanliness of processing vessels <u>How:</u> manual inspection <u>When:</u> before starting processing <u>Who:</u> plant supervisor	Presence of any signs of dirt, chemical odours or residues	Clean, rinse and dry all equipment before use	9.6 Cleaning Checklist
Sorting of raw olives	Contamination of sorting table by previous batches, dirty olives	Inspect all surfaces before use. Reject sub-standard olives	<u>What:</u> cleanliness of table, quality of olives <u>How:</u> manual inspection <u>When:</u> before processing <u>Who:</u> plant supervisor	Presence of any signs of dirt, chemical odours or residues	Clean, rinse and dry all equipment before use	
Washing raw olives	Contamination of olives by non-potable	Ensure only potable water is used for	<u>What:</u> check that water has been tested <u>How:</u> samples sent for	Pre-determined levels of microbiological	Only process when	

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
	water	washing.	inspection <u>When:</u> before the start of the processing season <u>Who:</u> processing plant supervisor	contamination	suitable water supply can be assured.	
De-bittering process	Introduction of microbiological agents, spores and yeast to the processing vessel	Ensure the vessel is full to overflowing to ensure anaerobic conditions	<u>What:</u> chance of accidental contamination is limited <u>How:</u> fill tanks / barrels to overflowing <u>When:</u> before sealing the vessel <u>Who:</u> plant operator	Air-space in the vessel	Fill to overflowing and allow no air space	9.8 Olive Production Record
Monitoring	Contamination of olives with moulds or anomalous microorganisms	Remove any Contamination, ensure brine is able to preserve olives	<u>What:</u> inspect olives and condition of brine <u>How:</u> remove lid, test salt and pH levels, flush out any yeast or mould, top up with fresh brine <u>When:</u> weekly for the first 6 weeks, monthly after that <u>Who:</u> processing plant supervisor	Long term salt level to stay above 6%, pH to stay below 4.2	Add salt or food grade acid to adjust	9.8 Olive Production Record

SECTION 4 – Primary Processing: Treated Olives

4.1. Overview

This section is divided into two sections: Commercial and Boutique. Commercial refers to the processes used extensively for large scale commercial production of green olives. This starts with operations in the grove and requires mechanical harvesting. Boutique processing refers to smaller scale operations using hand-picked olives and starts at the processing facility.

Ref: Table Olive Production Manual and Voluntary Standard for Table Olives in Australia.

4.1.1. Commercial Production (a)

In the grove the trees may be sprayed with a fruit-loosening (abscission) agent a few days prior to harvesting. A mechanical harvester that shakes the tree rather than beating the foliage is ideal (such as a Coe side-by-side harvester) with additional padding placed into the harvester's catching area to minimise bruising of the fruit. Once removed from the tree the olives should have any leaves removed by an air blast, and are immediately placed into a sodium hydroxide solution on the farm. The strength of the sodium hydroxide solution will vary with fruit and operating conditions. This treatment prevents bruising of the fruit and will initiate processing.

Olives are then transported in this sodium hydroxide solution to the main processing plant where they are tipped out of the transport vessels (bins) and into processing vessels (tanks) containing sodium hydroxide. The sodium hydroxide solution will continue to penetrate the skin and flesh of the olive.

4.1.2. Boutique Production (b)

Olives are hand-picked by the grower and delivered to the processing plant. Once the olives arrive at the processing facility the handling is much the same from the food safety aspects.

Samples of the olives must be checked regularly from different levels within the tanks. Once 70% of the sample olives have penetration two-thirds of the way to the stone, the sodium hydroxide solution needs to be removed from the processing tank and the olives rinsed in fresh potable water. Three rinses with fresh potable water are generally required to remove all the sodium hydroxide from the olives and stop the initial processing.

Following the sodium hydroxide treatment and rinsing, the olives are fermented in a brine solution, using a starter culture of lactobacilli. Carbon Dioxide will be required to be pumped into the brine / olive mixture to adjust the pH of the solution.

An adjustment of the total sugars may be required, as may additional salt.

4.2. Product Description – Primary Processing – TREATED OLIVES

Green olives, olives turning colour or black olives that have undergone alkaline treatment, then packed in brine in which they undergo complete or partial fermentation, and preserved or not by the addition of acidifying agents and/or cold (refrigeration) or heat treatment.

4.3. Processing Procedure - TREATED OLIVES (Commercial Large Scale)

This is designed to cover the typical large scale commercial table olive processing plant, using machine harvesting and some processing in the field before transferring the olives to a commercial processing plant. For further details see the Table Olive Processing Manual.

4.3.1. Major Steps:

Major Steps	
1	Prepare for Bottling
2	Determine harvest date and apply fruit loosening agent
3	Prepare machine harvester for operations
4	Ensure potable water supply.
5	Prepare transport bins and prepare sodium hydroxide solution.
6	Harvesting into prepared bins.
7	Arrival and unloading of fruit at the processing plant.
8	Transfer of fruit to processing tanks.
9	Recording of deliveries, batch tracking systems.
10	Preparation of additional processing sodium hydroxide solution.
11	Testing for sodium hydroxide penetration.
12	Flushing to remove excess sodium hydroxide.

4.3.2. Detailed Steps:

Detailed Steps (commercial operation)

4.3.2.1. Determine harvest date and apply fruit loosening agent

- Inspect the grove to determine the ripeness of the olives.
- Apply an abscission agent to facilitate easier fruit removal.
- Arrange for machine harvesting on a set date.

4.3.2.2. Prepare machine harvester for operations

- Pad the hard surfaces of the machine to minimise bruising of the fruit during operations.

4.3.2.3. Prepare transport bins and liners

- Prepare harvesting bins containing 150 µm plastic liners inside large plastic bins.
- Test olives to determine the degree of ripeness.
- Prepare a sodium hydroxide solution of the correct strength.
- Fill each liner with prepared sodium hydroxide solution.
- Close the liners / bags and seal with a cable tie for transport.

4.3.2.4. Ensure potable water supply

- Test available water supply to ensure no chance of bacterial contamination.

Note: Town water can be regarded as potable but farm / tank water should be treated and tested.

4.3.2.5. Harvest into prepared bins

- Using a pre-prepared shaker machine, harvest the olives.
- Using a high pressure air blast, remove leaves and twigs.
- Using a conveyor, load the olives into the pre-prepared bags containing sodium hydroxide solution.

4.3.2.6. Arrival and unloading of fruit at the processing plant

- On arrival at the processing plant, record weight of batches of olives.

4.3.2.7. Transfer of fruit to processing tanks

- Using pumps and funnels to carefully transfer the fruit into the processing tanks.

4.3.2.8. Recording of deliveries, batch tracking systems

- Establish a batch tracking record procedure to allow olives to be traced back to grove / date of harvest.

4.3.2.9. Preparation of processing sodium hydroxide solution

- Prepare additional sodium hydroxide solution to be used to top up tanks if required.

4.3.2.10. Test for sodium hydroxide penetration

- Sample olives at various depths from the tanks.
- Examine the olives to determine the penetration of the sodium hydroxide.
- When 70% of the sampled olives show penetration two-thirds the way to the olive stone, the process is complete.

4.3.2.11. Flush to remove excess sodium hydroxide

- Pump sodium hydroxide solution out of the tank and reserve for later re-use.
- Fill tank with fresh water, circulate, and discard this rinse water (quick rinse).
- Fill the tank with fresh water and leave for two hours (first rinse).
- Drain this second lot of water and refill the tank.
- Leave overnight (second rinse).

4.3.2.12. Stabilization of olives

- Remove the second rinse water and replace with 8% brine solution.
- Ensure all olives are kept below the level of the brine. Leave overnight.

4.3.2.13. Inoculation with starter culture

- Circulate the brine to ensure thorough mixing.
- Reduce the pH of the tank to between 6 and 7 using carbon dioxide bubbled through the solution.
- Add starter culture of Lactobacilli.
- Fill the tank and seal the surface from contact with air.

4.3.2.14. Fermentation of olives

- Leave the tanks alone to allow the lactobacilli to multiply.
- After 2 days, circulate the brine to ensure mixing.

4.3.2.15. Monitor during production

- Test the brine for microbiological activity, salt levels, pH, and sugar levels.
- Add dextrose monohydrate to allow bacterial fermentation to continue if required.
- Brine circulation should continue on weekly basis

4.4. Processing Procedure – TREATED OLIVES (Medium/Boutique Scale)

This is designed to cover the typical small to medium scale table olive processing plant, relying on the grower to pick by hand to avoid bruising the olives, then delivering the olives to the processing shed as described in Section 2 On-Farm operation.

4.4.1. Major Steps:

Major Steps	
1	Ensure potable water supply.
2	Preparation of processing sodium hydroxide solution.
3	Recording of deliveries, batch tracking systems.
4	Transfer of fruit to processing tanks.
5	Testing for sodium hydroxide penetration.
6	Flushing to remove excess sodium hydroxide.
7	Stabilization of olives.
8	Inoculation with starter culture.
9	Fermentation of olives.
10	Monitoring during production
11	Ensure potable water supply.
12	Preparation of processing sodium hydroxide solution.

4.4.2. Detailed Steps:

Detailed Steps (Boutique operation)

4.4.2.1. Ensure potable water supply

- Test available water supply to ensure no chance of bacterial contamination.

Note: Town water can be regarded as potable but farm / tank water should be treated and tested.

4.4.2.2. Arrival and unloading of fruit at the processing plant

- On arrival at the processing plant, record weight of batches of olives.
- Establish a batch tracking record procedure to allow olives to be traced back to grove / date of harvest.

4.4.2.3. Preparation of processing sodium hydroxide solution

- Prepare sodium hydroxide solution to be used for processing.

4.4.2.4. Prepare and transfer fruit to processing barrels

- Wash the olives to remove any dust, leaves or other material.
- Transfer the fruit into the processing tanks.

4.4.2.5. Test for sodium hydroxide penetration

- Sample olives at various depths from the tanks.
- Examine the olives to determine the penetration of the sodium hydroxide.
- When 70% of the sampled olives show penetration two-thirds the way to the olive stone, the process is complete.

4.4.2.6. Flushing to remove excess sodium hydroxide

- Pump sodium hydroxide solution out of the tank and reserve for later re-use.
- Fill tank with fresh water, circulate, and discard this rinse water (quick rinse).
- Fill the tank with fresh water and leave for two hours (first rinse).
- Drain this second lot of water and refill the tank.
- Leave overnight (second rinse).

4.4.2.7. Stabilization of olives

- Remove the second rinse water and replace with 8% brine solution.
- Ensure all olives are kept below the level of the brine.
- Leave overnight.

4.4.2.8. Inoculation with starter culture

- Circulate the brine to ensure thorough mixing.
- Reduce the pH of the tank to between 6 and 7 using carbon dioxide bubbled through the solution.
- Add starter culture of Lactobacilli.
- Fill the tank and seal the surface from contact with air.

4.4.2.9. Fermentation of olives

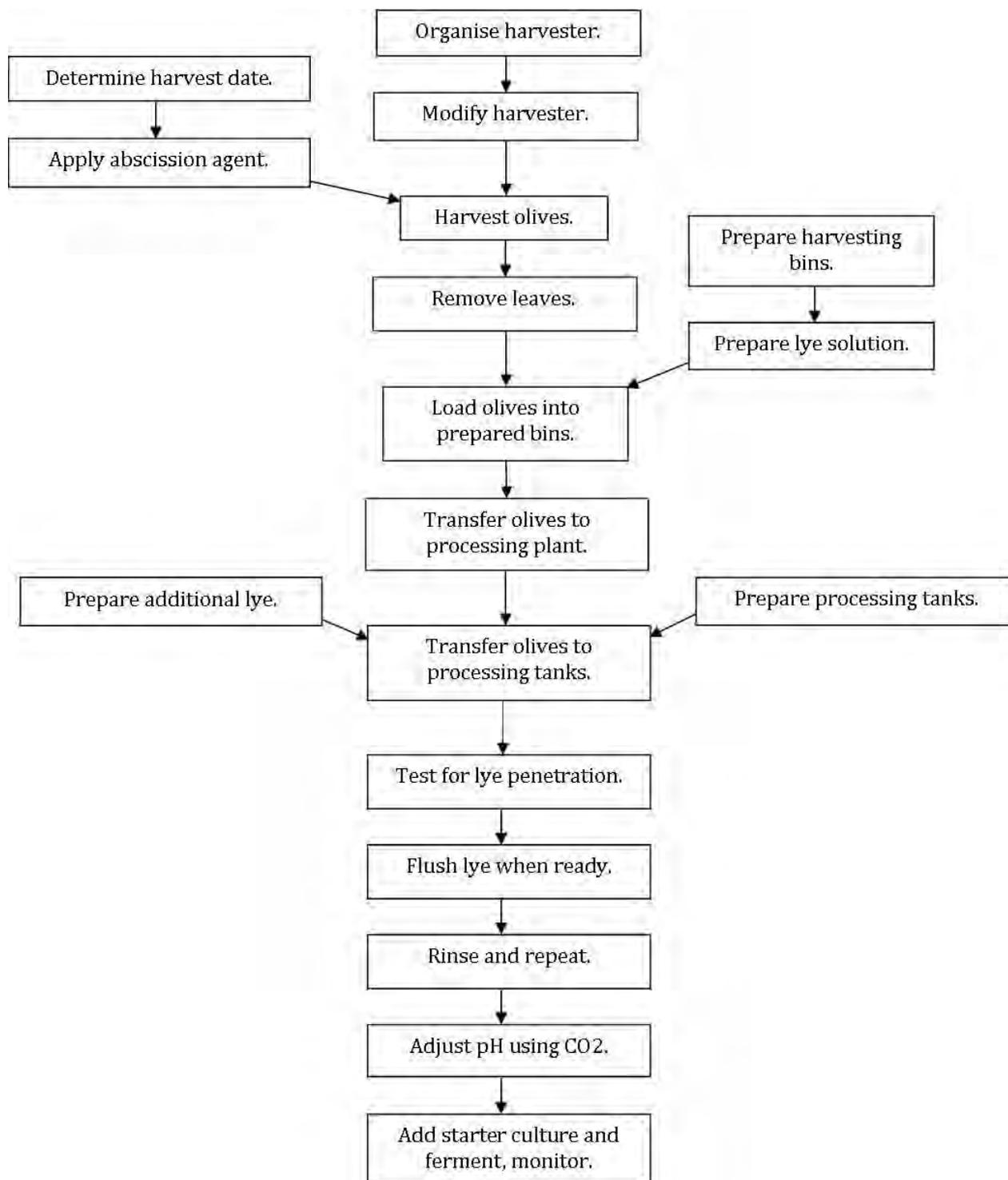
- Leave the tanks alone to allow the lactobacilli to multiply.
- After 2 days, circulate the brine to ensure mixing.

4.4.2.10. Monitoring during production

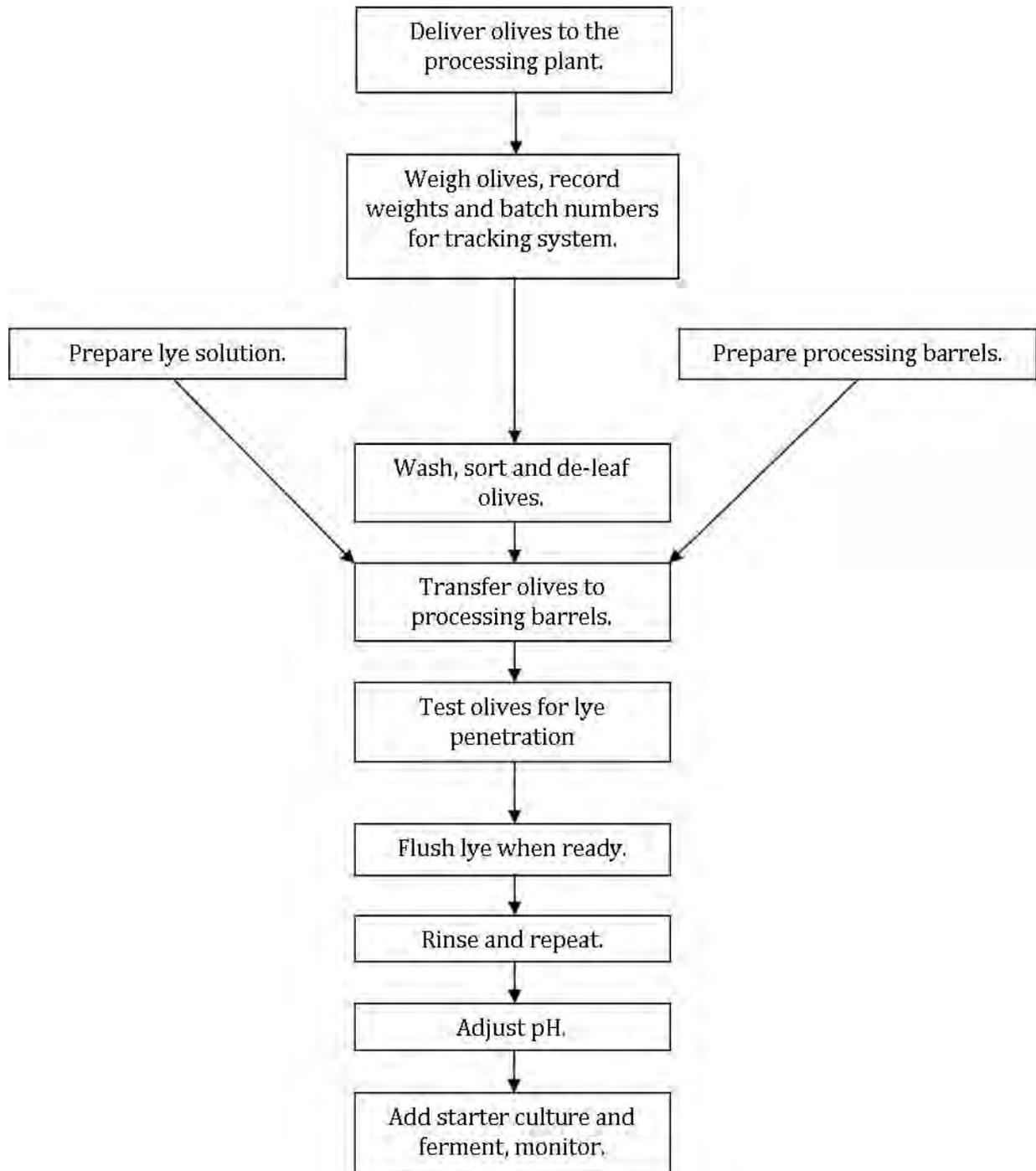
- Test the brine for microbiological activity, salt levels, pH, and sugar levels.
- Add dextrose monohydrate to allow bacterial fermentation to continue if required.
- Brine circulation should continue on weekly basis.

There is an additional, optional step known as **Californian Ripe** to turn green treated olives into black olives. This process requires a canning plant and sterilization of the olives at higher temperature than pasteurization. Olives in the style are imported from mainly for use on pizza, and so reference is made in the *Australian Table Olive Standard*, but so far as the AOA is aware, nobody in Australia produces this style of olive.

4.5. FLOW CHART – Commercial Scale Production



4.6. FLOW CHART – Boutique Scale Production



4.7. Hazard Analysis – TREATED OLIVES (Commercial scale) – Food Safety

This table lists steps in the process outlined in the flowchart; any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed here:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: DETERMINE HARVESTING DATES AND APPLY FRUIT LOOSENING AGENTS						
Biological: abscission agent may promote leaf drop.					<i>Not a food safety issue.</i>	
Chemical: abscission agent may cause leaf loss. Also burning of foliage if not applied under right conditions.					<i>Not a food safety issue.</i>	
Physical: chance of premature fruit drop.					<i>Not a food safety issue.</i>	
MAJOR STEP: PREPARE MACHINE HARVESTER FOR OPERATIONS						
Biological: padding needs to be clean and free of contamination.					<i>Inspect and clean with detergent, rinse and wipe clean before use.</i>	
Chemical: padding needs to be free of chemical contamination					<i>Inspect and clean with detergent, rinse and wipe clean before use.</i>	
Physical: padding needs to cover hard surfaces					<i>Inspect and clean with detergent, rinse and wipe clean before use.</i>	
MAJOR STEP: PREPARE TRANSPORT BINS & SODIUM HYDROXIDE SOLUTION						
Biological: chance of contamination in unclean bins.					<i>Inspect and clean the bins.</i>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Chemical: dangerous sodium hydroxide solution.					<i>Not a food safety issue but a significant OH&S issue – refer to the Table Olive Production Manual.</i>	
Physical: spillage of sodium hydroxide solution, corrosive.					<i>Not a food safety issue.</i>	
MAJOR STEP: ENSURE POTABLE WATER						
Biological: chance of microbiological contamination if water isn't potable.					<i>Ensure potable water – send samples for testing.</i>	
Chemical: pH of the potable water needs to be known to allow accurate sodium hydroxide concentration.					<i>Not a food safety issue.</i>	
Physical: no physical food safety hazard.					<i>Not a food safety issue</i>	
MAJOR STEP: HARVESTING INTO PREPARED BINS						
Biological: chance of unwanted biological agents and other material entering bins, eg microbes, insects and small animals.					<i>Inspect bins before use.</i>	
Chemical: chance of spoilage if concentration sodium hydroxide solution is incorrect.					<i>Not a food safety issue.</i>	
Physical: chance of bins getting hot, spoilage.					<i>Protect bins for heat, store in the shade.</i>	
MAJOR STEP: ARRIVAL AND UNLOADING AT PROCESSING PLANT						
Biological: chance of unwanted biological agents and other material entering bins, eg microbes, insects and small animals.					<i>Ensure the area is free of birds, vermin.</i>	
Chemical: no food safety issues.					<i>No food safety issues.</i>	
Physical: chance of foreign bodies entering the cycle eg jewellery, watches.					<i>Ensure no accidental contamination.</i>	
MAJOR STEP: TRANSFER OF FRUIT TO PROCESSING TANKS						
Biological: chance of microbiological spoilage from residue inside the tanks.					<i>Inspect and clean all tanks before use.</i>	
Chemical: chance of contamination from cleaning chemicals.					<i>Inspect and clean, rinse all tanks before use.</i>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Physical: chance of foreign bodies entering the cycle eg jewellery, watches.					<i>Inspect all tanks before use.</i>	
MAJOR STEP: RECORDING OF DELIVERIES AND BATCH TRACKING SYSTEM						
Biological: none.					<i>This is paperwork only, no food safety issues.</i>	
Chemical: none.					<i>No food safety issue.</i>	
Physical: none.					<i>No food safety issue.</i>	
MAJOR STEP: PREPARATION OF SODIUM HYDROXIDE SOLUTION						
Biological: chance of contamination from non-potable water being used.					<i>Ensure potable water used.</i>	
Chemical: chance of spoilage if concentration of sodium hydroxide solution is incorrect.					<i>Ensure food grade sodium hydroxide used – note that in large volumes it is safest to add water to sodium hydroxide.</i>	
Physical: chance of contamination from foreign bodies.					<i>Cover to protect from accidental contamination.</i>	
MAJOR STEP: TESTING FOR SODIUM HYDROXIDE PENETRATION						
Biological: chance of contamination during the sampling process.					<i>Ensure all hygiene protocols are observed.</i>	
Chemical: chance of contamination by the sampling and testing equipment.					<i>Ensure all sampling equipment is clean and sanitised.</i>	
Physical: chance of foreign bodies entering during the sampling.					<i>Ensure no accidental contamination.</i>	
MAJOR STEP: FLUSHING TO REMOVE EXCESS SODIUM HYDROXIDE						
Biological: chance of contamination if non-potable water is used.					<i>Ensure potable water is used.</i>	
Chemical: chance of contamination if non-potable water used, chance of degradation of quality if the process is not done correctly.					<i>Ensure potable water is used. Ensure sodium hydroxide is removed successfully.</i>	
Physical: no food safety issues.					<i>No food safety issues.</i>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: STABILISATION OF TREATED OLIVES (ACIDIFICATION)						
Biological: chance of contamination by insects, vermin during the process.					<i>Ensure tank is kept covered.</i>	
Chemical: chance of contamination by non-food grade chemicals, CO ₂ .					<i>Ensure only approved food grade chemicals are used.</i>	
Physical: chance of contamination by unclean filters, foreign objects.					<i>Ensure filters are in good condition and tank is kept covered.</i>	
MAJOR STEP: INOCULATION WITH STARTER CULTURE						
Biological: possible contamination of starter culture.					<i>Ensure correct starter culture is used. Use clean, sterile or sanitised equipment.</i>	
Chemical: possible contamination by starter culture.					<i>Ensure correct starter culture is used.</i>	
Physical: no food safety issues.					<i>No food safety issues.</i>	
MAJOR STEP: FERMENTATION OF OLIVES						
Biological: chance of microbiological spoilage from incorrect fermentation.					<i>Monitor and inspect, test samples.</i>	
Chemical: chance of spoilage from unbalanced acid / salt levels.					<i>Monitor and inspect, test samples.</i>	
Physical: chance of contamination from foreign objects.					<i>Keep tanks covered to exclude foreign objects, take care in sampling.</i>	
MAJOR STEP: MONITORING						
Biological: chance of contamination during sampling procedure.					<i>Ensure sampling protocols are followed.</i>	
Chemical: chance of contamination by sampling equipment.					<i>Ensure all sampling equipment is sterile.</i>	
Physical: chance of contamination by sampling equipment.					<i>Ensure all sampling equipment is sterile.</i>	

4.8. Hazard Analysis– TREATED OLIVES (Boutique scale) – Food Safety

This table lists steps in the process outlined in the flowchart; any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed here:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: POTABLE WATER						
Biological: chance of microbiological contamination if water non-potable is used.					<i>Ensure potable water – send samples for testing annually.</i>	
Chemical: starting pH of water needs to be known to allow accurate sodium hydroxide concentration.					<i>Not a food safety issue.</i>	
Physical: no physical food safety hazard.					<i>Not a food safety issue.</i>	
MAJOR STEP: ARRIVAL AND UNLOADING AT PROCESSING PLANT						
Biological: chance of animal / bird contamination of fruit in storage.					<i>Ensure the storage area is free of birds, vermin; store the raw olives in bins inside a shed away from heat.</i>	
Chemical: no food safety issues.					<i>No food safety issues.</i>	
Physical: chance of foreign bodies entering the cycle.					<i>Cover the bins to ensure no accidental contamination.</i>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: RECORDING OF DELIVERIES AND BATCH TRACKING SYSTEM						
Biological: none					<i>This is paperwork only, no food safety issues.</i>	
Chemical: none					<i>No food safety issue.</i>	
Physical: none					<i>No food safety issue.</i>	
MAJOR STEP: PREPARATION OF SODIUM HYDROXIDE SOLUTION						
Biological: chance of contamination from non-potable water being used.					<i>Ensure potable water used.</i>	
Chemical: significant chance of contamination/ spoilage due to incorrect sodium hydroxide solution.					<i>Ensure food grade sodium hydroxide used – note that in small batches sodium hydroxide should be added to water.</i>	
Physical: chance of contamination from foreign bodies.					<i>Cover to protect from accidental contamination.</i>	
MAJOR STEP: TRANSFER OF FRUIT TO PROCESSING TANKS						
Biological: chance of microbiological spoilage from residue inside the tanks.					<i>Inspect and clean all tanks before use.</i>	
Chemical: chance of contamination from cleaning chemicals.					<i>Inspect and clean, rinse all tanks before use.</i>	
Physical: chance of foreign bodies entering the cycle.					<i>Inspect all tanks before use.</i>	
MAJOR STEP: TESTING FOR SODIUM HYDROXIDE PENETRATION						
Biological: chance of contamination during the sampling process.					<i>Ensure all hygiene protocols are observed.</i>	
Chemical: chance of contamination by the sampling equipment.					<i>Ensure all sampling equipment is sanitised.</i>	
Physical: chance of foreign bodies entering during the sampling.					<i>Ensure no accidental contamination.</i>	
MAJOR STEP: FLUSHING TO REMOVE EXCESS SODIUM HYDROXIDE						
Biological: chance of contamination if non-potable water is used.					<i>Ensure potable water is used.</i>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Chemical: chance of contamination if non-potable water used.					<i>Ensure potable water is used.</i>	
Physical: no food safety issues.					<i>No food safety issues</i>	
MAJOR STEP: STABILISATION OF TREATED OLIVES						
Biological: chance of contamination by insects, vermin during the process.					<i>Ensure tank is kept covered.</i>	
Chemical: chance of contamination by non-food grade chemicals, CO2.					<i>Ensure only approved food grade chemicals are used.</i>	
Physical: chance of contamination by foreign objects.					<i>Ensure tank is kept covered.</i>	
MAJOR STEP: INOCULATION WITH STARTER CULTURE						
Biological: possible contamination of starter culture.					<i>Ensure correct starter culture is used.</i>	
Chemical: possible contamination by starter culture.					<i>Ensure correct starter culture is used.</i>	
Physical: no food safety issues.					<i>No food safety issues.</i>	
MAJOR STEP: FERMENTAION OF OLIVES						
Biological: chance of microbiological spoilage from incorrect fermentation.					<i>Monitor and inspect, test samples.</i>	
Chemical: chance of spoilage from unbalanced acid / salt levels.					<i>Monitor and inspect, test samples.</i>	
Physical: chance of contamination from foreign objects.					<i>Keep tanks covered to exclude foreign objects, take care in sampling.</i>	
MAJOR STEP: MONITORING						
Biological: chance of contamination during sampling procedure.					<i>Ensure sampling protocols are followed.</i>	
Chemical: chance of contamination by sampling equipment.					<i>Ensure all sampling equipment is sterile.</i>	
Physical: chance of contamination by sampling equipment.					<i>Ensure all sampling equipment is sterile.</i>	

4.9. Hazard Management - TREATED OLIVES (Commercial Scale)

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Determine harvesting date and apply fruit loosening agent	No food safety issues	N/A	N/A	N/A	N/A	9.4 Daily Operation Sheet - Harvest
Prepare machine harvester for operations	Cleanliness of the machinery, padding	Inspect and clean if required	<p><u>What:</u> condition of padding</p> <p><u>How:</u> visual inspection</p> <p><u>When:</u> before the start of harvesting</p> <p><u>Who:</u> harvesting supervisor</p>	Presence of any dirt, bird droppings etc	Clean, rinse, sanitise	
Prepare transport bins, prepare sodium hydroxide solution	Dirty bins, sodium hydroxide solution concentration	Inspect and clean bins	<p><u>What:</u> check cleanliness, sodium hydroxide solution concentration</p> <p><u>How:</u> manual inspection</p> <p><u>When:</u> before the start of harvesting</p> <p><u>Who:</u> harvesting supervisor</p>	<p>Presence of any dirt, bird droppings, water etc.</p> <p>Concentration of sodium hydroxide will depend on several factors</p>	Clean, rinse, sanitise	9.5 Grower Declaration
Ensure potable water supply	Contaminated water	Have samples tested	<p><u>What:</u> check water quality</p> <p><u>How:</u> lab test</p> <p><u>When:</u> before using water</p> <p><u>Who:</u> plant operator</p>	Non-potable water	Ensure integrity of water supply	NATA lab tests
Harvest into prepared bins	Contaminated bins, splashing during loading	Inspect and clean bins, keep covered	<p><u>What:</u> cleanliness of transport bins</p> <p><u>How:</u> manual inspection</p> <p><u>When:</u> before starting harvesting</p> <p><u>Who:</u> harvesting supervisor</p>	Presence of any dirt, bird droppings, water etc	Seal bins when not in use, have vinegar solution on hand in case of splashes	
Arrival, unloading and storage of raw olives at processing plant	Contamination by vermin, foreign bodies	Ensure work area is clean	<p><u>What:</u> cleanliness of workspace</p> <p><u>How:</u> manual inspection</p> <p><u>When:</u> before processing</p> <p><u>Who:</u> plant supervisor</p>	Presence of any dirt, bird droppings, vermin	Keep bins, tanks covered when not in use	9.7 Olive Delivery Record

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Transfer raw olives to processing tanks	Contamination in the processing tanks, splashing during loading	Ensure processing tanks are clean and ready for use	<u>What:</u> check the tanks are clean <u>How:</u> visual inspection <u>When:</u> before the start of the transfer process <u>Who:</u> processing plant supervisor	Presence of water, dirt in the tanks	Keep tanks sealed when not in use, ensure vinegar or acetic acid solution is on hand	9.8 Olive Production Records
Recording of deliveries and batch tracking system	No food safety issues	N/A	N/A	N/A	N/A	9.7 Raw Olive Delivery Records
Adjustment of sodium hydroxide solution (in the factory)	Contamination of sodium hydroxide solution during mixing	Ensure food grade chemicals, potable water used	<u>What:</u> check suppliers <u>How:</u> refer to approved supplier program <u>When:</u> prior to mixing <u>Who:</u> processing plant supervisor	All ingredients, chemicals to be food grade	Only purchase from approved suppliers	10.2 Approved suppliers program
Testing for sodium hydroxide penetration	Contamination during sampling	Ensure all equipment is sterile	<u>What:</u> sanitising equipment <u>How:</u> follow approved procedure <u>When:</u> prior to testing <u>Who:</u> processing plant operator	All equipment used in sampling to be clean and sterile	Clean and sanitise	9.8 Olive Production Records
Flushing to remove excess sodium hydroxide	Contamination during processing	Ensure water is potable	<u>What:</u> check water supply <u>How:</u> lab test <u>When:</u> prior to starting process <u>Who:</u> processing plant supervisor	Presence of non-potable water	Do not process until water quality can be verified	9.8 Olive Production Records
Stabilisation of olives	Contamination during chemical treatments using CO2	Check all chemicals, ingredients are food grade	<u>What:</u> check suppliers <u>How:</u> refer to approved supplier program <u>When:</u> prior to mixing <u>Who:</u> processing plant supervisor	Presence of non food grade chemicals, ingredients	Do not process until chemical quality can be verified	10.2 Approved supplier program
Inoculation with starter culture	Contamination of culture	Check all chemicals, ingredients are food grade	<u>What:</u> check supplies <u>How:</u> refer to approved supplier program <u>When:</u> prior to mixing <u>Who:</u> processing plant supervisor	Presence of non food grade chemicals, ingredients, presence of microbial spoilage	Do not process until chemical quality can be verified	10.2 Approved supplier program

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Fermentation of treated olives	Contamination during process	Inspect during processing	<u>What:</u> condition of the brine <u>How:</u> visual inspection, test samples <u>When:</u> during fermentation <u>Who:</u> processing plant supervisor	Presence of undesirable microorganisms	See Table Olive Production Manual for corrective actions depending on the problem	9.8 Olive Production Records
Monitoring	Contamination during process	Ensure all equipment used is sterile	<u>What:</u> sanitising equipment <u>How:</u> clean & sanitise <u>When:</u> during monitoring <u>Who:</u> processing plant operator	Presence of dirty equipment	Clean & sanitise	9.6 Daily Cleaning Checklist

4.10. Hazard Management– TREATED OLIVES (Boutique Scale)

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Ensure potable water supply	Non-potable water	Have samples tested	<u>What:</u> check water quality <u>How:</u> lab test <u>When:</u> before using water <u>Who:</u> plant operator	Non-potable water	Ensure integrity of water supply	NATA lab tests
Arrival and storage of raw olives at processing plant	Contamination by vermin, foreign bodies	Ensure work area is clean	<u>What:</u> cleanliness of workspace <u>How:</u> manual inspection <u>When:</u> before processing <u>Who:</u> plant supervisor	Presence of any dirt, bird droppings, vermin	Keep bins, tanks, barrels covered when not in use	9.7 Raw Olive Delivery Record
Recording of deliveries and batch tracking system	No food safety issues	N/A	N/A	N/A		9.7 Raw Olive Delivery Record
Transfer raw olives to processing tanks	Contamination in the processing tanks / barrels, splashing during loading	Ensure processing tanks are clean and ready for use	<u>What:</u> check the tanks / barrels are clean <u>How:</u> visual inspection <u>When:</u> before the start of the transfer process <u>Who:</u> processing plant supervisor	Presence of water, dirt in the tanks	Keep tanks sealed when not in use, ensure vinegar or acetic acid solution is on hand	9.6 Daily Cleaning Checklist

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Preparation of sodium hydroxide solution	Contamination of sodium hydroxide solution during mixing	Ensure food grade chemicals, potable water used	<u>What:</u> check suppliers <u>How:</u> refer to approved supplier program <u>When:</u> prior to mixing <u>Who:</u> processing plant supervisor	All ingredients, chemicals to be food grade	Only purchase from approved suppliers	10.2 Approved suppliers program
Testing for sodium hydroxide penetration	Contamination during sampling	Ensure all equipment is sterile	<u>What:</u> sanitising equipment <u>How:</u> follow approved procedure <u>When:</u> prior to testing <u>Who:</u> processing plant operator	All equipment used in sampling to be clean and sterile	Clean and sanitise	9.8 Olive Production Record
Flushing and rinsing to remove excess sodium hydroxide	Contamination during processing	Ensure water is potable	<u>What:</u> check water supply <u>How:</u> lab test <u>When:</u> prior to starting process <u>Who:</u> processing plant supervisor	Presence of non-potable water	Do not process until water quality can be verified	9.8 Olive Production Record
Stabilisation of treated olives	Contamination during chemical treatments using CO2	Check all chemicals, ingredients are food grade	<u>What:</u> check suppliers <u>How:</u> refer to approved supplier program <u>When:</u> prior to mixing <u>Who:</u> processing plant supervisor	Presence of non food grade chemicals, ingredients	Do not process until chemical quality can be verified	10.2 Approved supplier program
Inoculation with starter culture	Contamination of culture	Check all chemicals, ingredients are food grade	<u>What:</u> check supplies <u>How:</u> refer to approved supplier program <u>When:</u> prior to mixing <u>Who:</u> processing plant supervisor	Presence of non food grade chemicals, ingredients, presence of spoilage	Do not process until chemical quality can be verified	10.2 Approved supplier program
Fermentation of treated olives	Contamination during process	Inspect during processing	<u>What:</u> condition of the brine <u>How:</u> visual inspection, test samples <u>When:</u> during fermentation <u>Who:</u> processing plant supervisor	Presence of undesirable microorganisms	See Table Olive Production Manual for corrective actions depending on the problem	9.8 Olive Production Record
Monitoring	Contamination during process	Ensure all equipment used is sterile	<u>What:</u> sanitising equipment <u>How:</u> clean & sanitise <u>When:</u> during monitoring <u>Who:</u> processing plant operator	Presence of dirty equipment	Clean & sanitise	9.6 Daily Cleaning Checklist

SECTION 5 – Post Production Processing

5.1. Overview:

This module applies to the process of taking processed olives from the previous Sections 3 & 4 and preparing them for bottling or alternate packaging.

The major steps are covered in this module:

1. Testing olives to ensure suitability for secondary processing.
2. Breaking down large containers into manageable amounts.
3. Secondary sorting to cull sub-standard olives.
4. Darkening of olives (optional).

Once the olives have been through the de-bittering process and are palatable, there are numerous options available for sale after secondary processing:

- Sale of sorted or unsorted olives in bulk containers (typically 200 L drums)
- Sale of sorted olives in easy to handle 20 litre plastic buckets – in brine
- Sale of sorted olives in smaller – typically 1 or 5 litre – plastic buckets in brine (pails), or bottles.

5.1.1. Food Safety:

This module is concerned with food safety and the chance of perfectly sound olives being delivered to the packing shed from the processor becoming contaminated during that packing process.

The darkening process generally involves oxidation: exposure to air can also lead to exposure to air-borne pathogens.

5.1.2. Food Quality:

Contamination could reduce the quality of the finished product and could also render the olives unsafe for consumers.

Note: Processed table olives that are of poor quality can still be safe to eat.

5.2. Product Description:

When fermentation is complete and required for final packaging, the olives are removed from the fermentation tanks, barrels or smaller containers for quality sorting, size grading, value adding and packaging.

5.3. Procedure – Post Processing (Final Packaging)

This is the procedure to take olives that have been processed using the various techniques outlined in Section 3 or 4 and prepare them for sale:

5.3.1. Major Steps:

Major Steps	
1	Testing to ensure suitability
2	Break down into manageable volumes
3	Sorting and culling
4	Darkening of olives (naturally black ripe olives)

5.3.2. Detailed Steps:

Detailed Steps

5.3.2.1. Testing to ensure suitability

- Processed olives in bulk containers are inspected, tasted and tested to ensure their suitability for further processing
- Bulk solutions may need to have the salt levels, pH or water levels adjusted to meet the Voluntary Standard
- Records of the salt level and pH of each batch needs to be recorded

Ref: AOA Certified Table Olive Compliance⁴⁸: <https://australianolives.com.au/aoa-certified-table-olive-compliance/>

5.3.2.2. Break down bulk containers into manageable volumes

- Once approved for secondary processing, processed olives in large volume containers may need to be split and placed into several smaller containers for later processing
- Fresh brine may be required for the interim storage
- Filtered processing brine may be used for secondary processing

5.3.2.3. Sorting and culling

- As the de-bittering process tends to be uneven, some of the olives may be too soft for premium table olive use. These need to be separated by manual, visual sorting
- Any diseased olives that slipped through the first sorting can be removed at this stage
- Premium quality olives of a consistent size and colour should be sorted into new containers

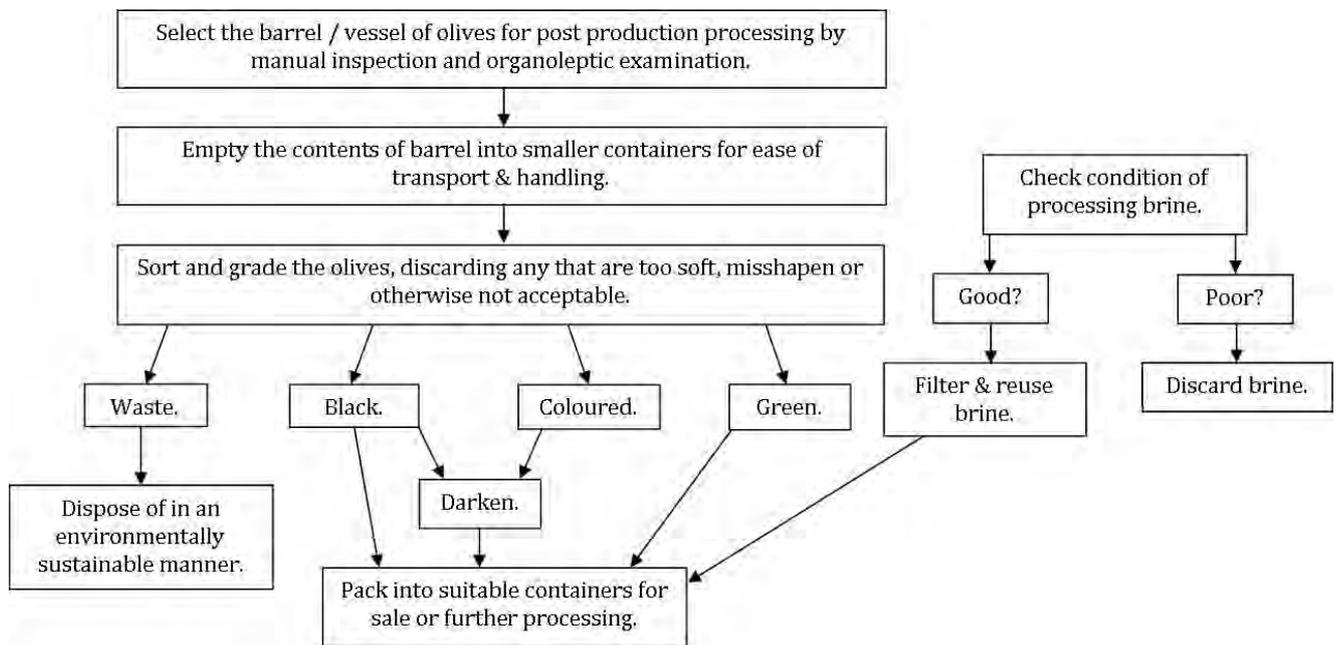
⁴⁸ AOA Certified Table Olive Compliance: <https://australianolives.com.au/aoa-certified-table-olive-compliance/>

- Hygiene is of paramount importance at this stage – hand washing protocols must be adhered to ([See 9.7 Personal Hygiene](#))

5.3.2.4. Darkening of black olives (optional)

- There is a chance that some of the olives will not be even in colour. In the case of green olives that should not pose a problem, in the case of naturally black ripe olives some may need to be exposed to air to darken by oxidation.
- The process can be carried out while the olives are still in brine by injecting air into the tanks/barrels, or by layering olives out into trays in and exposing them to the air for 1- 2 days

5.4. FLOW CHART – Post Processing



5.5. Hazard Analysis – POST PRODUCTION PROCESSING

This table lists steps in the process outlined in the flowchart; any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed here:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: TEST THE OLIVES TO ASSESS THE SUITABILITY FOR FURTHER PROCESSING						
Biological: Yeast and mould spores may form on the surface of the brine. Zapateria or other microbiological spoilage may be present.					<i>Flush / wipe away any yeast or fungal growth, top up vessel with fresh brine, salt, acid as required. Discard the brine if outside the acceptable parameters.</i>	
Chemical: Acid may need to be diluted before use, salt solution prepared in advance.					<i>Check the strength / pH of all additives before adding to the vessels.</i>	
Physical: Foreign matter can fall into an open vessel. Insects, vermin may get in if left unattended.					<i>Keep lids / coverings over all vessels when not being actively inspected.</i>	
MAJOR STEP: BREAK DOWN LARGER CONTAINERS INTO SMALLER VOLUMES						
Biological: moulds and fungi could be transferred from tanks / barrels to buckets.					<i>Rinse the olives in fresh potable water / brine to remove any contamination</i>	
Chemical: Traces of cleaning fluids can remain in buckets.					<i>Rinse all buckets in potable water.</i>	
Physical: Foreign material can fall into open buckets, larger vessels.					<i>Keep lids or coverings over buckets and other vessels.</i>	

MAJOR STEP: SORTING AND CULLING OF PROCESSED OLIVES						
Biological: as olives are to be hand sorted there is the chance of contamination from sorters, benches, sorting equipment.					Ensure sorters were protective equipment, clean and sanitise all benches and equipment.	
Chemical: If processed olives are to be sorted into trays / buckets for later bottling – chance of contamination from cleaning chemicals.					Ensure all trays and buckets are rinsed with potable water.	
Physical: danger to workers – slip and lifting hazards (OH&S).					Ensure there is no risk to staff.	
MAJOR STEP: DARKENING OF OLIVES						
Biological: danger of contamination by insects especially vinegar flies, vermin during the darkening process, chance of yeast or mould forming.					Ensure olives are covered to keep out pests; olives may need to be rinsed in fresh potable water.	
Chemical: rust on equipment, leaking of oil from machinery, chance of contamination from unfiltered air.					Check all equipment before use and clean, sanitise if required. Ensure a suitable air filter is installed if using compressed air.	
Physical:					No food safety issues.	

Hazard Management – POST PRODUCTION PROCESSING

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Test olives in tanks / barrels.	Yeast. Mould. Spoilage.	Test quality and chemical composition of the brine, taste the olives.	<u>What:</u> condition of the brine <u>How:</u> salt level – refractometer. pH meter <u>When:</u> monthly <u>Who:</u> supervisor	Maintain salt level at >6%, pH at below 4.2 Flavour / texture of the olives.	Add salt, acid as required Leave for later processing.	9.8 Olive Production Record
Break-down tanks / barrels.	Transfer of Contamination from tanks / barrels.	Remove any contaminated brine.	<u>What:</u> condition of olives <u>How:</u> visual inspection <u>When:</u> while transferring from larger vessel <u>Who:</u> supervisor	Visual presence of any spores, moulds.	Rinse, flush away surface growth. Dispose of flushing water and old brine in approved manner.	

Sorting and culling.	Contamination of olives during sorting. Signs of anthracnose damage.	Remove any sub-standard but not infested olives for possible use in tapenade or olive paste. Removal of leaves.	<u>What:</u> condition of olives, firmness, taste <u>How:</u> visual and manual inspection <u>When:</u> during sorting <u>Who:</u> sorting team	Off flavours or smells, blotchy or damaged skins, soft olives.	Reject sub standard olives.	9.8 Olive Production Record
Darken olives by air injection (optional).	Contamination during darkening process by oil, rust.	Ensure all equipment is in good order	<u>What:</u> taste, darkness <u>How:</u> tasting <u>When:</u> after darkening <u>Who:</u> supervisor	Abnormal flavours and / or odours.	Change filters, clean equipment, supply covers for trays.	9.8 Olive Production Record
Darken olives by open tray oxidation (optional).	Contamination by insects, vermin.	Cover olives if they are in trays, wash the olives to remove yeast.	<u>What:</u> taste, darkness <u>How:</u> tasting <u>When:</u> after darkening <u>Who:</u> supervisor	Abnormal flavours.	Ensure all ingredients are from approved supplier.	9.8 Olive Production Record

SECTION 6 – Secondary Processing and Packaging

6.1. Overview

This module deals with the process of preparing olives for sale, once through the de-bittering and sorting processes.

This section includes:

- Preparation of olives packed into brines and marinades.
- Aromatizing of the olives by adding herbs and spices.
- Sliced, crushed and destoned olives.
- Stuffed olives.
- Olives packed in oil.
- Pasteurizing olives in jars.
- Olives to be sold in large scale bulk containers – generally 200 L plastic barrels are used for commercial sales.
- Sales to the food and catering industry of plastic buckets of 5 L, 10 Lit and 20 L.; Bottles of 2 L to 4L
- Retail sales comprising smaller plastic containers, glass or plastic jars, soft pack, pouches and vacuum packing.

All olives offered for sale should conform to the *Voluntary Standard for Table Olives in Australia.*

6.2. Product Description – Secondary Processing and Table Olive Packaging

Certified Australian table olive preparations ready for retail sale.

6.3. Procedure – Secondary Processing and Table Olive Packaging

This is the process of taking olives that have been successfully de-bittered using the techniques outlined in Sections 3 & 4, then prepared ready for sale (Section 5) and preparing and packing the olives for sale.

6.3.1. Major Steps:

Major Steps	
1	Preparation and packaging of processed olives in simple salt brine (with optional layer of EVOO or Vegetable Oil).
2	Preparation and packaging of processed olives in a brine / vinegar mixture (marinade) (with optional layer of EVOO or Vegetable Oil).
3	Preparation and packaging of processed olives in a marinade with herbs and spices (aromatizing) (with optional layer of EVOO or Vegetable Oil).
4	Destoned olives
5	Destoned stuffed olives.
6	Sliced olives.
7	Packaging of olives in oil.
8	Pasteurizing jars / containers of olives.
9	Packaging of olives in vacuum packed pouches.
10	Preparation of non-fermented treated olives.

6.3.2. Detailed Steps:

There are several different processes covered in this module. Not all steps will apply.

Detailed Steps

6.3.2.1. Preparation and packaging of table olives in simple salt / water brine

- Filter the processing brine to remove unwanted solids, (or use new brine).
- Add further fresh brine / additional salt to make up the required strength and volume.
- Test the filtered brine for pH, acid level, and salt level. Adjust pH of acid brine as required.
- Clean & sanitise the jars or pails to be used for final packaging.
- Fill the jars / pails with table olives and brine.
- Include an optional layer of EVOO or high quality vegetable oil.

6.3.2.2. Preparation and packaging of olives in a brine / vinegar mixture (marinade)

- Filter the processing brine to remove unwanted solids (or use new brine).
- Make up additional mixture of brine and wine vinegar and blend with original brine.
- Test the filtered / new brine for pH, acid level, and salt level. Adjust pH of acid brine as required.
- Clean / sanitise the jars or pails to be used for final packaging.
- Fill the jars / pails with table olives and marinade.
- Include an optional layer of EVOO or high quality vegetable oil.

6.3.2.3. Preparation and packaging of olives in a marinade with herbs and spices (aromatising)

- Filter the processing brine to remove unwanted solids.
- Make up additional mixture of brine and wine vinegar and blend with original brine.
- Test the filtered brine for pH, acid level, and salt level. Adjust pH of acid brine as required.
- Sterilise / sanitise the jars or pails to be used for final packaging.
- Add selected herbs and spices to the jars or pails. (Use dried food grade herbs and spices).
- Fill the jars / pails with table olives and marinade with herbs and spices.
- Include an optional layer of EVOO or high quality vegetable oil.

6.3.2.4. Destoned table olives

- Take olives processed by methods described in Sections 3.2, 4.2 or 5.2
- Remove the stone using a mechanical punch.
- Package as destoned olives in brine or marinade.

6.3.2.5. Stuffed table olives with different ingredients

- Take olives processed by methods described in Sections 3.2, 4.2 or 5.2
- Remove the stone using a mechanical punch.
- Fill the cavity where the stone used to be with pimento, anchovy, cheese or other fillings.
- Package the stuffed olives in jars, other suitable containers or pails in brine, marinade or oil as per the Voluntary Standard.

6.3.2.6. Sliced table olives

- Take olives processed by methods described in Sections 4 or 5.
- Slice, chop or quarter the olives to remove the flesh from the stone.

- Package in jars or pails in brine.

6.3.2.7. Pack olives in oil

- Take table olives processed by methods described in Sections 3.2, 4.2 or 5.2
- Pack olives in glass jars (herbs & spices optional).
- Fill the jars with olive oil or other suitable vegetable oil (refer to the Voluntary Standard re use of oils).

6.3.2.8. Pasteurizing of olives in brine / marinades

- Place glass jars containing olives and brine / marinade into a water bath.
- Heat water to sufficient temperature to raise the temperature of the brine / marinade to 65°C.
- Maintain this temperature for 20 minutes to pasteurise the olives inside the jars.
- For medium to large scale table olive production, use a tunnel pasteuriser.
- To prepare a “salad blend” containing olives and additional ingredients such as capsicum, eggplant, onion, garlic, feta cheese and other pickled vegetables etc: prepare and pasteurise as above.

6.3.2.9. Table olives in brine in pouches

- Take table olives processed by methods described in Sections 4 or 5.
- Make up a mixture of processed olives, along with brine / marinade / oil and required aromatics (herbs & spices).
- Check pouches are clean and in good condition, not discoloured with without holes.
- Fill pouches with pre-prepared olive / herb & spice / brine / marinade / oil mixture.
- Use vacuum pack machine to extract air and seal.

6.3.2.10. Preparation of non-fermented olives treated with sodium hydroxide

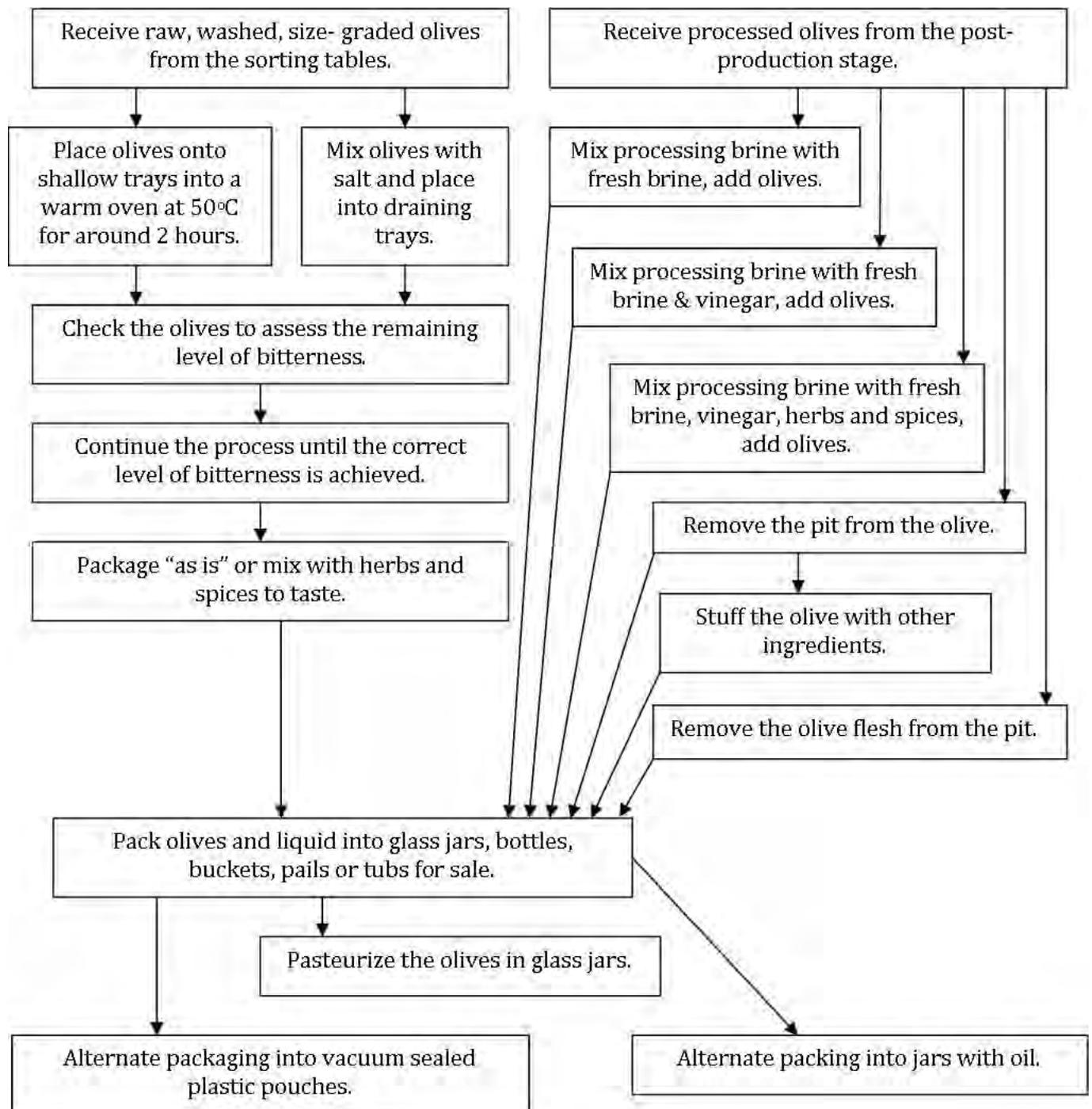
- Prepare treated olives as described in 4.2.7 to the stage where they are de-bittered.
- Store the processed olives in a brine with a final salt level of at least 6% and a pH of less than 4.2
- Store below 4°C or pasteurise the processed olives.

There is an additional, optional step known as **Californian Ripe** to turn green treated olives into black olives with sodium hydroxide treatments followed by oxidation and colour stabilisation with iron salts. This process requires a canning plant and sterilisation of the olives at higher temperature than pasteurisation. Olives in the style are imported from mainly for use on pizza, and so reference is made in the Australian Table Olive Standard, but

so far as the AOA is aware, nobody in Australia produces this style of olive. Refer to the *Australian Table Olive Standard* for imported products.

Note that Californian Ripe olives are also known as black ripe olives even though they started as raw olives at the green maturation stage. Furthermore, the salt and pH levels of the packing solutions used are not self-preserving. Therefore, if this type of table olive is used for secondary processing including preparing tapenades and olive pastes, the final products need to meet the Voluntary standard, especially acid content and pH.

6.4. FLOW CHART – Secondary Processing & Table Olive Packaging



6.5. Hazard Analysis – SECONDARY PROCESSING & PACKAGING

This table lists steps in the process outlined in the flowchart; any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed here:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: PREPARE AND PACKAGE IN A SIMPLE SALT BRINE						
Biological: Chance of microbial contamination from original processing brine being used for secondary packaging.					<p><i>Only use processing brine that is sound.</i></p> <p><i>Filter the processing brine and perform tests to gauge salt concentration, pH, and total acidity.</i></p> <p><i>Or prepare and use new brine to mix with vinegar and test salt concentration, pH and total acidity.</i></p>	
Chemical: Chance of chemical contamination from original processing brine, Chance of contamination from cleaning chemicals in packaging materials: pails, jars, lids.					<i>Ensure all packaging materials are cleaned and sanitised before use.</i>	
Physical: Chance of accidental contamination by foreign bodies, cross contamination for other batches, If packaging in glass jars, there is a chance of chipped jars and broken glass.					<p><i>Keep the containers covered.</i></p> <p><i>Keep batches separate.</i></p> <p><i>Check to ensure no broken glass.</i></p>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: PREPARE AND PACKAGE IN A SALT BRINE / VINEGAR MIXTURE (MARINADE)						
Biological: Chance of bacterial contamination from original processing brine and vinegar being used for secondary packaging.					<p><i>Only use processing brine that is sound.</i></p> <p><i>Filter the processing brine and perform tests to gauge salt concentration, pH, and total acidity.</i></p> <p><i>Or prepare 100% new brine and test salt, pH, and total acidity</i></p>	
Chemical: Chance of spoilage due to excessive amount of acid from the addition of vinegar, excessive salt.					<p><i>Perform tests on both brine and vinegar before mixing the two to ensure the correct amounts are used.</i></p>	
Physical: Chance of accidental contamination by foreign bodies, If packaging in glass jars, there is a chance of chipped jars and broken glass.					<p><i>Keep the containers covered.</i></p> <p><i>Check to ensure no broken glass.</i></p>	
MAJOR STEP: PREPARE AND PACKAGE IN A MARINADE WITH HERBS AND SPICES (AROMATISED)						
Biological: Chance of microbial contamination from original processing brine being used for secondary packaging, Chance of contamination from herbs and spices. Chance of contamination from workers.					<p><i>Only use processing brine that is sound.</i></p> <p><i>Filter the processing brine and perform tests to gauge salt concentration, pH, and total acidity.</i></p> <p><i>Only use herbs and spices from approved supplier; check best before dates. Ensure all hygiene protocols are kept.</i></p> <p><i>Or prepare 100% new brine and test salt, pH, and total acidity.</i></p>	
Chemical: Chance of chemical contamination from residues on herbs and spices.					<p><i>Only use herbs and spices from approved suppliers, wash and blanch all fresh herbs and spices before use, or use quality dried herbs and spices.</i></p>	
Physical: If packaging in glass jars, there is a chance of chipped jars and broken glass.					<p><i>Inspect jars before use.</i></p>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: DEHYDRATE SALTED OLIVES IN A WARM OVEN						
Biological: Chance of contamination from previous contents of the oven.					<i>Ensure the oven and all oven trays are thoroughly cleaned before use.</i>	
Chemical:						
Physical: Ensure the oven temperature is correct and the right length of time is set to avoid burning the olives.					<i>Monitor temperature, time.</i>	
MAJOR STEP: DEHYDRATE THE OLIVES BY MIXING WITH SALT						
Biological: Chance of introducing some biological contamination from the salt.					<i>Always use food grade salt from an approved supplier.</i>	
Chemical: Chance of introducing some chemical contamination from the salt.					<i>Always use food grade salt from an approved supplier.</i>	
Physical: Chance of contamination from foreign bodies.					<i>Cover the containers to avoid accidental contamination.</i>	
MAJOR STEP: REMOVE THE STONE FROM OLIVES USING A PUNCH						
Biological: Chance of contamination of olives if the destoning machinery is not clean.					<i>Clean and sanitise all surfaces and machinery before use.</i>	
Chemical:						
Physical: If the destoning process is not carried out correctly there is a chance of particles of stone remaining inside the olives.					<i>Take care to ensure the stones are not broken during the destoning process.</i>	
MAJOR STEP: INSERT INGREDIENTS INTO DESTONED OLIVES (STUFFED OLIVES)						
Biological: Chance of introducing bacterial contamination from other ingredients used to stuff the olives.					<i>Only use ingredients from an approved supplier.</i> <i>If fresh ingredients, blanch before use – hard to meet a standard! These should be avoided</i> <i>(Blanching: refer to <u>Table Olive Production Manual</u>)</i>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Chemical: Chance of introducing chemical contamination from other ingredients used to stuff the olives.					<p><i>Only use ingredients from an approved supplier.</i></p> <p><i>If fresh ingredients, blanch before use – hard to meet a standard!</i></p> <p><i>These should be avoided</i></p> <p><i>(Blanching: refer to <u>Table Olive Production Manual</u>)</i></p>	
Physical: If the destoning process is not carried out correctly there is a chance of particles of stone remaining inside the olives.					<p><i>Check olives to ensure no remnants of olive stone remain.</i></p>	
MAJOR STEP: SLICED DESTONED OLIVES						
Biological: Chance of contamination from unclean equipment used for slicing or cutting the olives.					<p><i>Clean and sanitise all equipment and surfaces before commencing operations.</i></p>	
Chemical: No food safety issues.						
Physical: If the destoning process is not carried out correctly there is a chance of particles of stone remaining inside the olives.					<p><i>Check olives to ensure no remnants of olive stone remain.</i></p>	
MAJOR STEP: PASTEURISE THE OLIVES IN A JAR OR OTHER SUITABLE CONTAINER						
Biological: correct temperature needs to be reached and maintained to effect pasteurisation.					<p><i>Olives in brine or marinade needs to reach 65°C and be held there for 20 minutes.</i></p>	
Chemical: No food safety issues						
Physical: once pasteurised the jars need to remain sealed to avoid contamination.					<p><i>Jars need to be allowed to cool down slowly, lids not to be removed once cooled until ready to eat.</i></p> <p><i>A test jar needs to be opened to test the temperature.</i></p>	
MAJOR STEP: VACUUM PACK OLIVES INTO PLASTIC POUCHES						
Biological: Chance of contamination from incorrect storage of the plastic pouches, anaerobic conditions being conducive to certain pathogens.					<p><i>Ensure all materials are stored in a manner that would preclude contamination, random testing of finished product.</i></p>	

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Chemical: Chance of contamination from cleaning chemicals used in the process.					<i>Ensure all surfaces and equipment is clean and sanitised.</i>	
Physical: Ensure pouches are air-tight. Chance of contamination from poor quality oil.					<i>Reject any pouches that leak.</i> <i>Ensure oil organoleptic quality eg rancidity</i>	
MAJOR STEP: PACK OLIVES IN OIL						
Biological: chance of anaerobic conditions being conducive to certain pathogens multiplying inside the jar.					<i>Random testing of finished product.</i>	
Chemical: Chance of contamination from cleaning chemicals used in the process.					<i>Ensure all surfaces and equipment is clean and sanitised.</i>	
Physical: Chance of contamination from broken glass, foreign objects. Chance of contamination from poor quality oil.					<i>Ensure all jars are sanitised and safe to use, keep covered when not in use.</i> <i>Ensure oil organoleptic quality eg rancidity</i>	
MAJOR STEP: PREPARE NON-FERMENTED TREATED OLIVES						
Biological: There is a chance of microbial spoilage if the olives are not stored in an appropriate medium, then refrigerated or pasteurised.					<i>Ensure a storage medium with a salt level of at least 6% and pH less than 4.2 is maintained.</i> <i>Refrigerate or pasteurise the olives (can use lower salt level GMP).</i> <i>Refer to voluntary standard</i>	
Chemical: unless all sodium hydroxide is rinsed from the olives correctly there is the chance that some could remain in the flesh.					<i>Test to ensure all sodium hydroxide has been neutralised.</i>	
Physical: no food safety issues						

6.6. Hazard Management – SECONDARY PROCESSING & PACKAGING

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Prepare and package olives in a simple salt brine.	Contamination of original processing brine.	Inspect the brine itself: test pH & salt levels.	<u>What:</u> pH & salt concentrations <u>How:</u> pH meter, refractometer <u>When:</u> start of preparation of the brine <u>Who:</u> supervisor	pH must be below 4.2, salt must be > 6%	Add acid, salt, fresh potable water if required.	9.8 Olive production record
Prepare and package olives in a vinegar / brine marinade. Add optional layer of EVOO or vegetable oil.	Contamination of original processing brine, Strength of acid in the vinegar.	Inspect the brine and vinegar: test pH & salt levels.	<u>What:</u> pH & salt concentrations <u>How:</u> pH meter, refractometer <u>When:</u> start of the preparation of the marinade <u>Who:</u> supervisor	pH must be below 4.2, salt must be > 6%	Add acid, salt, fresh potable water if required.	9.8 Olive production record
Prepare and package olives in marinade with herbs & spices. Add optional layer of EVOO or vegetable oil.	Contamination of original processing brine, Contamination of the herbs or spices.	Inspect the brine and vinegar: test pH & salt levels, ensure integrity of the herbs, spices.	<u>What:</u> pH & salt levels, quality of the other ingredients <u>How:</u> pH meter, refractometer, sight and smell of herbs, spices <u>When:</u> before packaging <u>Who:</u> supervisor	pH must be below 4.2; salt must be > 6%. All other ingredients must be food grade and safe to use.	Adjust salt, pH if required, reject any herbs and spices that are unsuitable.	9.8 Olive production record
Heat dried salted table olives	Cleanliness of the equipment.	Inspect the oven and oven trays.	<u>What:</u> Cleanliness <u>How:</u> Physical inspection <u>When:</u> before turning the oven on <u>Who:</u> operator	No signs of dirt or contamination in the oven or trays.	Clean if required.	9.8 Olive production record
Salt dried table olives	Quality of the salt, cleanliness of the trays.	Ensure food grade salt, cleanliness of the trays.	<u>What:</u> Salt integrity, cleanliness <u>How:</u> check packaging on the salt, inspect trays <u>When:</u> before mixing of salt and olives <u>Who:</u> operator	Food grade salt only to be used. No contamination of the trays.	Reject salt if it is not food grade, clean trays.	9.8 Olive production record
Destoning table olives.	Parts of stone remaining in the olive.	Random sampling of the olives for stone remnants.	<u>What:</u> remains of olive stone <u>How:</u> random physical inspection <u>When:</u> during the destoning process <u>Who:</u> supervisor	FSANZ Standard.	Reject batches with excessive amounts of stone remnants.	

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Stuffed table olives	Contamination introduced in the stuffing materials	Ensure only food grade stuffing materials	<u>What:</u> quality of stuffing materials <u>How:</u> check best before, food grade quality <u>When:</u> before starting to stuff olives <u>Who:</u> supervisor	Food grade stuffing materials to be used.	Reject any ingredients that are not food grade and within best before dates.	9.8 Olive production record
Pasteurise the olives in jars and other containers.	May have some residual microbes and toxins	Ensure packing brine and heat conditions meet the standard	<u>What:</u> temperature and time of pasteurizing <u>How:</u> probe thermometer <u>When:</u> after filling the jars <u>Who:</u> process operator	Olives must reach 65°C and stay there for 20 minutes.	Continue process until olives are pasteurised.	9.8 Olive production record
Slicing table olives.	Parts of stone remaining in the olive flesh.	Random sampling of the flesh for stone remnants.	<u>What:</u> remnants of olive stone <u>How:</u> random physical inspection <u>When:</u> during the slicing process <u>Who:</u> supervisor	FSANZ standard.	Reject batches with excessive amounts of stone remnants.	
Pack olives into jars with oil.	Anaerobic bacterial spoilage. Poor quality packing oil	Take and test random sample.	<u>What:</u> Microbial load of the packaged olives <u>How:</u> lab test <u>When:</u> after bottling of the olives <u>Who:</u> supervisor to select samples for testing	FSANZ standard.	Reject any batches that fail the testing criteria.	
Vacuum seal olives into plastic pouches.	Cleanliness of the machinery, pouches.	Inspect the equipment for cleanliness.	<u>What:</u> cleanliness of the machinery <u>How:</u> physical inspection <u>When:</u> before starting filling operations <u>Who:</u> supervisor	Any sign of discolouration of the pouches.	Reject any discoloured pouches.	9.8 Olive production record
Prepare non-fermented treated olives.	Microbial spoilage.	Store in prepared brine, refrigerate or pasteurise.	<u>What:</u> level of bacterial activity in the olives <u>How:</u> ensure brine is able to inhibit bacterial growth <u>When:</u> At the stage where the olives are bottled and after <u>Who:</u> production supervisor	Brine pH needs to be below 4.2, Salt concentration at least 6%, storage temperature below 4°C	Test and adjust brine to ensure within specs or pasteurise the olives.	9.8 Olive production record

SECTION 7 – Olive Paste and Tapenade

7.1 Overview

This section deals with the production of olive paste, made from the flesh of processed olives. Olive tapenade made using that paste as the principal ingredient.

Ref: *Producing Table Olives* edited by Stanley Kailis and David Harris 2007 (CSIRO Publishing)⁴⁹ – pp237-239

This Section includes:

- Manual removal of the flesh from the stone – using a knife.
- Manual removal of the flesh from the stone – using a cherry de-stoner.
- Mechanical removal of the flesh from the stone.
- Preparation of a traditional French style olive tapenade.

7.2 Product Description – Olive Paste and Tapenade

Olive paste is the crushed flesh of table olives, presented as coarse or smooth paste. Green, turning colour or black olives can be used for this process. It does not matter which processing technique (fermentation or sodium hydroxide treatment) was used to process the olives.

Olive tapenade uses this paste with the addition of other ingredients to make a popular dish. Traditionally anchovies, capers, garlic, olive oil and lemon juice are used, but there are many variations and recipes.

Olive tapenade needs to be pasteurised in the jar to ensure food safety. The suggested method is by immersing the jars in a water bath, but other technologies can be used.

⁴⁹ *Producing Table Olives* edited by Stanley Kailis and David Harris 2007 (CSIRO Publishing):
<https://ebooks.publish.csiro.au/content/producing-table-olives>

7.3 Procedure – Olive Paste and Tapenade

7.3.1. Major Steps

Major Steps	
1	Select table olives suitable for paste production.
2	Using a knife of hand de-stoner, remove the stone.
3	When using a mechanical de-stoner, deflesher or crushing device ensure machines are used according to manufacturer's specifications.
4	Drain paste to give the required consistency.
5	Assemble, measure and mix the ingredients.
6	Fill and seal jars with either olive paste or tapenade.
7	Pasteurise the jars of olive paste or tapenade in a water bath.

7.3.2. Detailed Steps

Detailed Steps

7.3.2.1. Choosing the Olives

- Select table olives suitable for olive paste or tapenade production.
- Olives can be generally processed as green, turning colour or black olives for paste or tapenade.
- Store olives in acid / salt brine composition as per Voluntary standard, until required.
- Drain olives and dispose of brine in an environmentally responsible manner. **Ensure you check with your local Environmental Protection Authority (EPA) as to the best method of disposal.**
- In the event of any yeast spores being present in the storage brine or on the olives themselves, the olives will need to be washed to remove the yeast.

7.3.2.2. Remove olive flesh from the stone by hand

- Slice table olive flesh away from the stone using a sharp knife, hand (cherry) de-stoner.
- Separate olive flesh and stone – discard the stones, ensuring no whole or broken stones become mixed with the flesh.

- If using a knife or hand de-stoner, crush the table olive flesh into a paste using a food processor.

7.3.2.3. If using a machine, process olives through the machine

- Using a commercial olive paste making machine, set the blades of the machine to the required distance from the perforated drum – this may vary with the olive cultivar, maturation state and processing method of the table olives.
- Process a batch of table olives into paste.
- Note: ear and eye protection will be required ([See 9.12 OH&S](#))

7.3.2.4. Drain paste to give correct consistency

- There is a chance that the paste is observed to be too wet for successful tapenade production.

Note if good quality olives are used the following steps are not required.

- If so, place an amount of the paste in a clean muslin bag and suspend the bag and paste, under hygienic conditions to allow the paste to drain as required.
- Mechanical aids such as spinning in a centrifuge can also be used to reduce the water content.

7.3.2.5. Assemble, measure and mix the ingredients

- Assemble the other ingredients and measure the appropriate amounts.
- Drain the oil from the anchovies: then using a food processor process the anchovies into a fine paste.
- Drain the brine from the capers: then using a food processor process the capers to a rough paste.
- Peel, blanch and roughly chop the garlic cloves, then process to a rough paste.
- Mix the predetermined proportions of olive paste, anchovy paste, capers and garlic.
- Taste, then add olive oil and lemon juice, mix again.
- Continue to adjust until the flavour and texture is acceptable.

Note: Several testers should be used.

- Note: If using fresh raw garlic there is a chance of botulinum spores being present, see [Table Olive Production Manual](#) for details of the procedure for blanching.

7.3.2.6. Fill and seal jars

- Sterilise / sanitise the jars and lids before starting to fill.
- Fill the jars using a piping bag – avoid air pockets in the paste.

- Close the jars with twist-top metal lids.

7.3.2.7. Pasteurise the olive paste or tapenade in the jars in a water bath

- Place a number of jars in a water bath.
- Submerge the jars in simmering water for 20 minutes.
- Allocate one jar for temperature testing, open the jar and test the temperature of the centre of the paste.
- In order for the olive paste or tapenade to be pasteurised effectively, the paste in the centre of the jar must reach 65°C for 20 minutes see Table Olive Production Manual for details.
- Once the required temperature has been reached, remove the jars from the water and allow them to cool.

7.3.2.8. Pasteurise the olive paste or tapenade in the jars in an oven

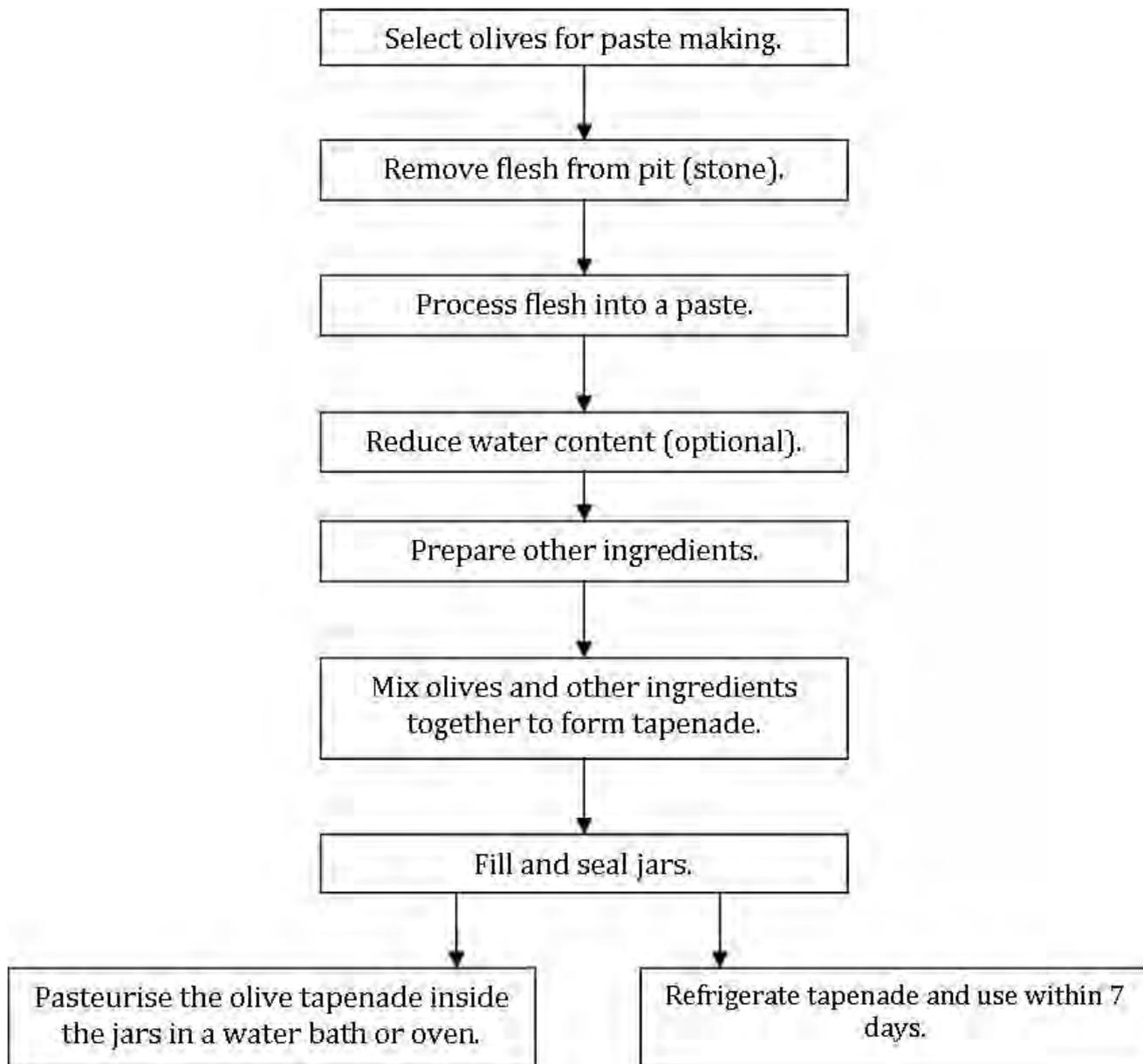
Note: This method has risks such as loss of moisture and jar breakage.

- Place a number of jars on an oven tray.
- Place in a preheated oven at 200°C for 20 minutes.
- Open a jar to test the temperature at the centre of the paste.
- In order for the tapenade to be pasteurised effectively, the paste in the centre of the jar must reach 65°C for 20 minutes see Table Olive Production Manual for details.
- Once the required temperature has been reached, remove the jars from the oven and allow them to cool.

7.3.2.9. Non-pasteurised tapenade

- If the tapenade is for immediate sale, it can be stored below 4°C and used within 7 days.

7.4 FLOW-CHART – Olive Paste and Tapenade



7.5 Hazard Analysis – OLIVE PASTE & TAPENADE – Food Safety

The table below lists steps in the process outlined in the flow chart on the previous page. In your document you will need to list any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed below:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

POTENTIAL HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: SELECT & PREPARE RAW OLIVES FOR PASTE PRODUCTION						
Biological: chance of microbial spoilage in the olives, brine.					<i>Reject any batches of olives that are not of sufficient quality to further process. Note: Best not to use poor quality raw olives.</i>	
Chemical: chance of contamination of work surfaces with cleaning chemicals.					<i>Sanitise all work surfaces before use.</i>	
Physical: chance of contamination with foreign objects.					<i>Inspect for foreign objects.</i>	
MAJOR STEP: REMOVE OLIVE FLESH FROM THE STONE						
Biological: chance of microbial contamination from unclean equipment.					<i>Clean and sanitise all equipment and work surfaces before use.</i>	
Chemical: chance of contamination by cleaning chemicals, oil and grease from de-stoning machine.					<i>Clean and sanitise all work surfaces and machinery before use, inspect machinery for oil, grease.</i>	

POTENTIAL HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Physical: chance of stones being cut / broken and being mixed with the flesh. Chance of injury from knives (OH&S).					<i>Monitor to ensure no particles of stones enter the next stages of processing.</i>	
MAJOR STEP: DRAINING THE PASTE						
Biological: chance of contamination by insects, vermin during draining process.					<i>Ensure the paste is kept away from any chance of contamination by erecting physical barriers.</i>	
Chemical: chance of contamination from cleaning chemicals.					<i>Rinse and sanitise before use</i>	
Physical: no food safety issues.						
MAJOR STEP: ASSEMBLE AND MEASURE INGREDIENTS						
Biological: chance of contamination from ingredients.					<i>Ensure all ingredients meet approved standards, check best before / use by dates.</i>	
Chemical: chance of contamination from cleaning chemicals.					<i>Rinse and sanitise before use.</i>	
Physical: no food safety issues.						
MAJOR STEP: FILLING OF THE JARS						
Biological: chance of contamination if jars are not adequately clean & sanitised.					<i>Ensure jars and lids are adequately cleaned and sanitised.</i>	
Chemical: chance of contamination from cleaning chemicals					<i>Clean, rinse and sanitise all surfaces jars and lids</i>	
Physical: chance of contamination from broken glass.					<i>Care needs to be taken to avoid any broken glass from entering the jars.</i>	
MAJOR STEP: PASTEURISING THE OLIVE PASTE OR TAPENADE						
Biological: correct temperature needs to be reached and maintained to effect pasteurization.					<i>Paste needs to reach 65°C and be held there for 20 minutes.</i>	
Chemical: No food safety issues.						

POTENTIAL HAZARD	L	S	R	C	CONTROL MEASURE	CCP
Physical: once pasteurised the jars need to remain sealed to avoid contamination.					<i>Jars need to be allowed to cool down slowly, lids not to be removed once cooled until ready to eat. A test jar needs to be opened to test the temperature.</i>	

7.6 Hazard Management – OLIVE PASTE & TAPENADE – Food Safety

Step	Hazard	Control Measure	Monitoring Procedures	Critical Limits	Corrective Action	Records
Select the table olives to be turned into paste.	Microbial contamination while in storage.	Inspect and reject any sub-standard olives.	<u>What:</u> inspection <u>How:</u> manual inspection <u>When:</u> prior to de-stoning <u>Who:</u> supervisor	Presence of fungal growths, mould.	Reject and dispose of unsatisfactory olives	8.8 Olive Production record
Removal of the flesh from the stone.	Chance of bits of broken stones getting mixed in with the flesh.	Keep stones away from quality olives and paste.	<u>What:</u> observation during processing <u>How:</u> random samples <u>When:</u> during processing <u>Who:</u> supervisor	FSANZ standards (1 fragment per 300 g)	Reject batch if stone fragments exceed the standard.	
Draining the paste.	Contamination during the draining process.	Ensure all equipment is sanitised and rinsed with potable water (depending on sanitising agent).	<u>What:</u> clean & sanitise equipment <u>How:</u> chemical sanitiser <u>When:</u> before starting operations <u>Who:</u> operator	Any visible signs of contamination.	Clean, sanitise and start again.	
Assemble the ingredients.	Use of ingredients that could contaminate the tapenade.	Only use ingredients from approved supplier.	<u>What:</u> check best before dates of ingredients <u>How:</u> manual inspection <u>When:</u> before use <u>Who:</u> supervisor	Any ingredient that is outside use by dates.	Reject any ingredient that is not within standards.	
Fill the jars	Contaminated jars, lids.	Clean and sanitise jars and lids.	<u>What:</u> inspect jars and lids <u>How:</u> physical inspection <u>When:</u> before filling <u>Who:</u> operator	Presence of any dirty or discoloured jars, lids.	Clean jars in a commercial dishwasher, sanitise before use.	

Pasteurise the jars.	Pasteurisation not effective.	Immerse jars in a water bath to heat the tapenade.	<u>What:</u> temperature & time <u>How:</u> probe thermometer <u>When:</u> during the pasteurisation process <u>Who:</u> supervisor	Tapenade to be held at 65°C for 20 minutes.	If insufficient time / heat – continue the process	9.8 Olive production record
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SECTION 8 – Table Olive Distribution

8.1. Overview This section is relevant to *OliveCare®* signatories with their own brand, irrespective of whether they have own grove or production plant. This would apply to the numerous ‘private label’ brands available at a specialist retailer, deli or at farmers’ markets.

Note: Olive growers who contract out packaging operations but market under their own brand(s) need to obtain documentary evidence of HACCP Food Safety / Food Quality Plan(s) from their contract bottler.

These major steps are covered in this module:

1. A description of the product and an analysis of pre-harvest conditions identifying the areas that may require attention.
2. A detailed description of the procedure and processes involved
3. A flowchart of the steps involved
4. A hazard analysis for harvesting describing and examining Control Points.
5. A HACCP style table outlining areas or responsibility and preventative actions.

8.2. Product Description: Certified Australian table olive products ready for retail sale, complying with the specifications of the *Voluntary Standard for Table Olives in Australia (RIRDC 2012 – Updated January 2020)*; and the *FSANZ Food Standards Code*.

8.3. Procedure:

8.3.1. Major Steps:

Typically, the owner of a brand (merchant) decides to add table olives to his range of products but does not own an olive grove or processing / packaging plant. Table olives are a traded commodity and can be purchased in bulk amounts. Packaging contractors also offer the service to pack under contract for individual brands.

The merchant usually takes responsibility for arranging transport from the packaging plant to a warehouse, then on to retail or commercial outlets.

The merchant needs to be able to keep track of the stock, and to recall any batches that are subject to complaints.

This section covers the potential for spoilage of packaged product during storage, transport and distribution and the steps to recover table olives found to have a problem and needs to be recalled.

Note: A merchant using their own labels (house brand), **MUST NOT** apply the AOA Certification Trade Mark logo to their own products unless they are also Signatories to *OliveCare®*, and the product meets quality and labelling requirements.

Major Steps

1	Ensure the product is of a suitable standard
2	Confirm all packaging and labelling arrangements
3	Transport from the packaging plant to the warehouse and retail outlets
4	Retain samples for testing
5	Product traceability and recall procedure

8.3.2. Detailed Steps:

Detailed Steps

8.3.2.1 Ensure product is of a suitable standard

Table olives in storage will lose quality, even if stored under the ideal conditions. The best quality olives and best storage conditions will slow down the natural degradation.

Bulk table olives are best stored in brine at 8% to 10% sodium chloride. Then packaged for retail sale the brine strength can be lowered to 6% for natural table olives or lower for treated olives subject to GMP.

8.3.2.2 Confirm packaging and labelling arrangements

Table olives must be labelled in accordance with the Codex General Standard for the Labelling of Pre-packaged Foods (CODEX STAN 1-1985, Rev. 1-1991); Part 11 of the Voluntary Industry Standard for Table Olives in Australia, and consistent with Food Standards Australia New Zealand Food Authority - Food Standards Code, including providing a list of ingredients, the net drained weight, a batch code for traceability and product recall, plus the application of a 'Best Before' date (not exceeding 2 years) to be determined by the producer after which time undesirable changes to the odour, colour, texture or flavour of the product may occur (FSANZ – Food Standards Code Part 1.2.5.)

Ensure that product labels include the new mandatory Country of Origin Labelling (CoOL) logo⁵⁰.

Ref: Australian Product Label Guide: Table Olives (August 2020)⁵¹, available on the AOA website.

Note: Kalamata style olives is a protected Greek geographical designation. For Australian export producers the correct cultivar designation is Australian Kalamon olives.

⁵⁰ Country of Origin Labelling (CoOL) Factsheet: <https://www.accc.gov.au/publications/country-of-origin-food-labelling-factsheet>

⁵¹ Australian Product Label Guide: Table Olives (AOA August 2020): <https://australianolives.com.au/labelling-information/>

8.3.2.3 Transport and warehouse storage

Many packaging plants will pack the containers with table olives into cartons that are then stacked onto shipping pallets ready for transport – a fork-lift can place this pallet onto a truck for transport.

If the product is transported by a commercial transport contractor, the vehicle needs to be covered and shaded – refrigeration during transport is generally not practical.

Table olives are sensitive to heat, so efforts must be made to ensure the product is not allowed to get to 30°C. Thermal blankets may be an effective tool in some circumstances.

Long term storage in plastic containers is not recommended due to the high chance of oxidation and of contamination by phthalates.

The merchant should maintain a log of temperature in the storage facility, and ideally log temperatures during transportation.

8.3.2.4 Retain samples for re-testing

Once a batch of product is prepared for sale – retail or commercial sales – a representative sample of the batch (generally two retail packages) should be kept by the merchant for re-testing should the need arise.

A record of where each batch of product is sold to needs to be maintained by the merchant for the purposes of product traceability and recall (See **Section 8.2.5**)

It is also recommended that the merchant monitor stock in store to ensure appropriate storage conditions and stock rotation.

8.3.2.5 Product traceability and recall procedure

A system of product tracing is required to trace a problem back to its source.

- Growers need paperwork to identify the block(s) from where the batch originated.
- Processors need paperwork to identify the grove and date of delivery.
- Bottlers need to be able to identify the source of the table olive product.
- Wholesalers need to identify customers to whom bulk or packaged product is on-sold.
- Samples of each batch of table olive product should be retained for later testing.
- Packages of table olive product ready for sale to the public should be traceable to the source olive grove.

Ref 1: AOA *OliveCare*® – Product Guide for Olive Oil (First Edition); Section 3 –Product Traceability, available in the *OliveCare*® Members Area⁵² on the AOA website.

Ref 2: FSANZ - Conducting a food recall⁵³.

⁵² *OliveCare*® Members Area on the AOA website : <https://australianolives.com.au/olivecare-members-area/>

⁵³ FSANZ - Conducting a food recall:

<http://www.foodstandards.gov.au/industry/foodrecalls/conduct/Pages/default.aspx>

8.4 Distribution flowchart

5.4.1. Freight In:

- Taste the table olive product at the time of purchase to ensure it is suitable for the purpose
- In case of any doubt, send a sample of the table olive product to an approved laboratory for testing. The AOA website has contact details of laboratories that can do this testing.
- Testing should cover both chemical analysis and organoleptic evaluation.
- Once approved, arrange for the table olive product to be packed in a suitable manner for transport – generally bottled packed into cardboard cartons, then loaded onto a shipping pallet.
- Arrange transport of the table olive product in an enclosed vehicle at below 30°C, and cover the consignment with thermal blankets as appropriate.
- Unload and store the consignment of table olive products in a cool warehouse that is clean and well ventilated.
- Store the table olive product away from other goods that may affect its quality – e.g. fuel oil.
- Cover the consignment with thermal blankets as appropriate.
- Retain a representative sample of each batch of table olive product for later inspection in the event of a customer complaint or problem.
- Record table olive product batch numbers, dates, temperature of transport and storage conditions.

5.4.2 Freight Out:

- When delivering table olive products to customers: ensure the consignment is transported in cool conditions.
- Record details of table olive product deliveries to customers to allow batches to be traced in case of a **Product Recall**.

8.5 Hazard Analysis – PRODUCT DISTRIBUTION

This table lists steps in the process outlined in the flowchart; any potential hazards relating to each step, and a formula for assessing the risk in your particular situation. The column headings, and how you use them, are detailed here:

Key:

L = Likelihood: The team assesses the likelihood that the potential may occur on a scale of 1 (rare) to 5 (highly likely)

S = Severity (Consequence): The team assesses the impact of the hazard on food safety or food quality on a scale of 1 (insignificant) to 5 (extreme)

R = Risk: Multiply L x S to give a Risk Factor. A Risk Factor of 9 or over is significant; a Risk Factor of 20 or over is critical.

C = Consequence: Control measures must be applied to all significant or higher risks.

CP = Control Point (action needs to be taken)

CCP = Critical Control Point (tests need to be done to verify that there is no hazard)

QCP = Quality Control Point (a point in the process at which there is potential impact on product quality)

HAZARD	L	S	R	C	CONTROL MEASURE	CCP
MAJOR STEP: ENSURE OLIVES ARE OF A SUITABLE STANDARD						
Biological: contamination or spoilage of the product in storage					<i>Check the product by laboratory analysis and organoleptic evaluation to confirm product is suitable for its proposed purpose</i>	
Chemical, Quality: degradation of the product with time, rancidity, malodours, texture.					<i>Inspect and taste the product before distribution to ensure it is indicative of the label description. Have the product re-tested by an approved laboratory to ensure it is still suitable for purpose</i>	
Physical: no physical safety issues						
MAJOR STEP: CONFIRM PACKAGING AND LABELLING ARRANGEMENTS						
Biological: an administrative step not involving any food safety or food quality issues						
Chemical, Quality: Table olive product may be mislabelled					<i>Inspect and taste the product before distribution to ensure it is indicative of the label description.</i>	
Physical: record keeping					<i>Maintain accurate and detailed production records</i>	

MAJOR STEP: TRANSPORT PACKED PRODUCT TO WAREHOUSE STORAGE & RETAIL OUTLETS					
Biological: the table olive product is already fully packaged and sealed, so is not subject to any biological contamination					
Chemical, Quality: storage in plastic containers is not recommended Chance of product picking up off flavours from other goods in the warehouse					<i>Contamination by phthalates and the increased chance of oxidation Store away from other substances likely to cause cross contamination of flavours and malodours</i>
Physical: protect against poor handling and undesirable conditions – high temperature and light					<i>Log temperatures Check storage / display conditions and stock rotation</i>
MAJOR STEP: RETAIN SAMPLES FOR TESTING					
Biological, Chemical, Quality: this is purely an administrative step with no food safety or food quality issues					<i>Store table olive product samples in a cool, safe place that can be accessed if required – retained samples may be required in the future for further laboratory testing</i>
Physical: record keeping					<i>Ensure retained table olive product samples are labelled and logged and kept under optimum storage conditions</i>
MAJOR STEP: PRODUCT TRACEABILITY AND RECALL PROCEDURE					
Biological: the table olive product is already fully packaged and sealed, so is not subject to any biological contamination					<i>n.a.</i>
Chemical, Quality: defective table olive product is returned to supplier					<i>Check returned product and a retained sample by laboratory analysis and organoleptic evaluation to confirm if the product remains suitable for purpose.</i>
Physical: accelerated deterioration of the table olive product due to poor handling conditions in the distribution centre or retail outlet due to – high temperature and light, and poor stock rotation					<i>Check storage / display conditions and stock rotation If product is confirmed as defective activate your food recall plan.</i>

SECTION 9 – Record Keeping

This section contains forms which may be used as is, or modified to more adequately meet the needs of each operation.

Major Steps	
1	Assemble a team
2	Record of Soil Assessment.
3	Contractor Declaration.
4	Harvest Operations Run Sheet.
5	Grower Declaration Form.
6	Pre-production Cleaning Checklist.
7	Olive Delivery Record.
8	Olive Production Records.
9	Monthly Maintenance Checklist.
10	Verification Table.
11	Corrective Action Request Form
12	Internal Audit Checklist.

Detailed Steps

9.1 Assemble a team

A HACCP style Food Safety Program requires the organisation implementing a program to nominate who is responsible for the development and maintenance of the program. Generally there are three roles to be filled: Overall Management; Implementation; Verification.

HACCP – FOOD SAFETY TEAM	
Name of the business:	
<i>Address of the business:</i>	
<i>Team members, their experience and responsibilities:</i>	

Once the Food Safety / Food Quality Program is implemented and the paperwork is drawn up, it is the role of the Production Manager to maintain this paper trail. This can be printed or on computer file.

A HACCP consultant would assist in getting the process up and running but would not generally be required after the initial set up period.

9.2 Record of Soil Assessment

In the event of any historical evidence of soil contamination being discovered, samples of the soil need to be sent to a NATA registered laboratory for testing.

SOIL ASSESSMENT RECORD	
Name of the business	
Address of the business:	
Date that soil samples taken:	
Location of where soil samples taken:	
Samples taken by:	
Dates samples sent to laboratory:	
Name and address of laboratory:	
Results received:	
Samples passed for harvesting / processing:	

9.3 Contractor Declaration

To be filled in and signed by all contractors coming onto a farm or into a plant to carry out contract work. This may also be used as an alternative to a Spray Diary.

CONTRACTOR DECLARATION	
Name of the business:	Location of the business:
Contractor ABN, name & address:	Date(s) of contract work:
e of contract work:	

Details required for spraying contact work:

Chemicals applied:		Rate / 100 L:	
Target of the spray:		Volume applied:	
Weather conditions:		Wind direction:	
Operator name:		ChemCert number:	

I certify that all work carried out today is under my supervision and I accept responsibility for the actions of my employees.

Signed:..... Date:

9.4 Harvest Operations Activity Sheet

HARVEST OPERATIONS ACTIVITY SHEET	
Name of the grove:	
Location of the grove:	
Owner / contact at the grove:	
Wash Room Checked:	
Date of harvesting:	
Olive cultivar to be harvested:	
Batch identification:	
Harvesting technique:	
Harvest supervisor:	
First aid kit:	
Weather conditions:	
Pickers:	
<i>Start time:</i>	<i>Finish time:</i>
<i>Expected volume:</i>	<i>Actual volume:</i>
<i>Destination Plant:</i>	<i>Dispatch to Plant:</i>
<i>Vehicle checked:</i>	<i>Driver:</i>
<i>Comments:</i>	

9.5 Grower Declaration Form

This form is to be filled in at the grove and is to accompany the fruit to the processing plant.

Note: Harvest date & time” - being able to calculate harvest-processing delay using this information is important for processors can shed useful light in cases where oil did not end up having the expected quality.

GROWER DECLARATION FORM				
<i>Name of Grower</i>		<i>Contact Phone</i>		
<i>Grove Location</i>		<i>Harvest Contractor</i>		
<i>Harvest Date & Time</i>		<i>Weather conditions</i>		
<i>Comments</i> <i>(Fruit description)</i> <i>(Processing requirements)</i>				
Bin Number/s	Olive cultivars	Approx. weight	Growers Batch No.	Processing request

To be checked and signed by an authorised person:

I certify that I have checked all harvesting bins before they were filled and that they were clean.	
I certify that no chemical sprays have been applied outside the APVMA regulations.	
I certify that I have checked the transport vehicle and that it is clean and there are no chemicals or fuel containers being carried in same area as the fruit.	
I certify that I have checked that the load is adequately covered and I have done all in my power to ensure the fruit arrives at the processing plant in sound condition.	

Authorised by: (name)

Signature:..... Date:

NOTE: The processors may also wish to sight a spray diary/record of chemicals applied to the trees harvested.

9.6 PROCESSING PLANT – Pre-production Cleaning Checklist

Complete at the commencement of each shift or day.

Indicate Satisfactory (S) Unsatisfactory (U) and complete corrective action/comments column

PROCESSING PLANT - DAILY CLEANING CHECKLIST						
Dates						Corrective Action
Premises clean and tidy?						
Processing areas clean and tidy?						
No evidence of pests?						
Hand washing facilities clean and accessible with soap and paper towels available?						
Alcohol gel / hand sanitiser available?						
Food contact surfaces clean?						
All equipment clean?						
Garbage bins emptied and liners replaced?						
Spillage clean up material on hand?						
All packaging material stored correctly?						
Protective clothing clean and satisfactory?						
Food transport vehicles clean and tidy?						

Completed by: (name)

Signature:..... Date:

Note: Unscented, food grade hand sanitiser is strongly recommended.

9.7 Olive Delivery Record

This form records in spreadsheet form information about the olives delivered to the plant to be processed:

- *Date and time the raw olives were delivered.*
- *The name of the grower.*
- *The olive cultivar delivered.*
- *The gross and net weight of the raw olives in individual bins or crates.*
- *The total net weight of the batch.*
- *The overall condition of the olives.*

There will be a unique identifying batch code issued by the processing plant and a quick visual inspection of the fruit to look for the presence of sooty mould, anthracnose, and extraneous foreign material such as twigs, olive lace bug or an excessive amount of leaves.

Whoever inspects and records these details should then initial the line to say they have approved it for processing.

OLIVE DELIVERY RECORD								
Date / Time	Grower	Olive cultivar	Gross weight of bin	Net weight of raw olives	Batch number	Raw olivet condition	% MOO	Accepted (initials)

In the instance of a batch of fruit not reaching acceptable standards the batch may be re-sorted or rejected. The standards are those of the processor.

Olives affected by sooty mould / anthracnose / frost damage will need to be separated out and rejected.

9.8 Olive Production Record

This will give information in a spreadsheet format of the actual production run.

9.8.1 Processing Record – Natural Olives

PROCESSING RECORD - NATURAL OLIVES								
Date	Start time	Finish time	Batch No.	Kg raw olives sorted	Kg rejected raw olives leaves	Kg raw olives accepted	Processing vessel ID	Initials

9.8.2 Processing Record – Treated Olives

(Ref: *Table Olive Production Manual*)

PROCESSING RECORD - TREATED OLIVES								
Date	Start time	Finish time	Batch No.	Kg raw olives sorted	Kg rejected raw olives leaves	Kg raw olives accepted	Processing vessel ID	Initials

9.8.3 Post Production Record Sheet

POST PRODUCTION RECORD SHEET								
Date	Start time	Finish time	Vessel ID	Kg accepted	Kg for darkening	Kg to tapenade	Kg rejected	Initials

Example...

For each batch of olives packaged an entry needs to be made to record details for traceability purposes.

POST PRODUCTION REGISTER								
Date	Start time	Finish time	Vessel ID	Kg accepted	Kg for darkening	Kg to tapenade	Kg rejected	Initials
1 Apr	0900	1300	GS031	87	12	8	3	Mw

9.8.4 Packaging Register

PACKAGING REGISTER								
Date	Start time	Finish time	Batch No	Jar type / size	Customer	Marinade	Labels	Initials

9.9 Monthly Maintenance Checklist

This needs to be consistent with FSANZ Standard 3.2.3.

Indicate Satisfactory (S) Unsatisfactory (U) and complete corrective action/comments column.

MONTHLY MAINTENANCE CHECKLIST		
Item	S/U	Corrective action/Comment
Processing Area		
Ceiling, walls and floors free from cracks and other signs of damage.		
Food processing benches free from rust, damage and deterioration.		
All equipment free from rust, damage and deterioration - no exposed wood present.		
Lights above processing area covered.		
All sinks (including hand washing) accessible and in working order, soap and towels available.		
Other fitting and fixtures in good condition and in working order.		
Cool-rooms/Storage		
Walls, floors and ceiling clean and in good condition.		
Shelving free from rust and kept cleaned.		
Lights covered.		
Seals clean and in good condition.		
Cooling units free from rust and corrosion.		
Storage Areas		
Chemicals stored separately to food and packaging material.		
All food and packaging material stored in a manner to prevent contamination.		

Staff Amenities (eg. toilets, staff rooms)		
Staff amenities kept clean and tidy.		
Hand washing facilities accessible and in good order.		
Pest Control		
No sign of pest within processing area, storage area or staff amenities.		
Rodent and insect bait stations maintained and correctly situated.		
Insect controllers / zapper installed and working.		

9.10 Verification

Verification is required to help identify any weaknesses and deficiencies in a Food Safety Plan. There are three main activities:

1. Re-validation – obtaining scientific evidence that the control methods are working and that the system is producing safe food.
2. Auditing – the gathering of objective evidence that demonstrates that the Plan has been implemented and is being followed.
3. Review – a regular check to ensure that there have not been changes to the system outside the existing operations.

Example only...

Verification Chart					
CCP or Support Program	Verification Activity	Frequency	Person Responsible	Records	Corrective Action/Comments
2.2 On-farm procedure	Testing for residues of chemicals on fresh olives.	Annually	Grower	9.2 Record of Soil Assessment	

9.11 Corrective Action Request Form

Corrective Action Request Form.

Page 1

Title:	Grove Code:	CAR No:
--------	-------------	---------

1. Problem Statement or Improvement Opportunity *What's wrong? What effects did it have?*

<i>Raised by:</i>	<i>Phone:</i>	<i>Date:</i>
<i>E-Mail:</i>		

2. Acknowledgement and Allocation. *Who is best placed to analyse this issue?*

<i>Acknowledged by:</i>	<i>Position:</i>	<i>Date:</i>
<i>Comments:</i>		
<i>Allocated to:</i>	<i>Accepted (sign)</i>	<i>Date:</i>

3. Analysis. *What is/are the root cause(s) of any irregularities or deficiencies?*

	<i>Signed:</i>	<i>Date:</i>

4. Implementation/Response *What short/medium/long term improvements have been implemented*

<i>Date</i>	<i>Action taken</i>	<i>Actioned by</i>

5 Record of Changes *How have the changes been incorporated into the company documentation?*

<i>Type</i>	<i>Action taken</i>	<i>Change Note No.</i>
<i>Procedural</i>		
<i>Behavioural</i>		
	<i>Any training recommended?</i>	
<i>Tools and Equipment</i>		

6. Review *Has the issue been addressed to the satisfaction of company management?*

<i>Date</i>	<i>Reviewed by (Name)</i>	<i>with (Name)</i>	<i>Closed (Y / N)</i>
<i>Notes/ Further action required</i>			
			<i>New CAR No:</i> <input type="text"/>

7. Originator Acknowledgement *Please acknowledge receipt and add your comments*

<i>Date</i>	<i>Acknowledged by (Name)</i>
<i>Comments:</i>	

9.12 Internal Audit Checklist

The Internal Audit Checklist should be completed annually. Indicate either Satisfactory (S) Unsatisfactory (U) and complete corrective action/comments column

Completed by: (name)

Signature:..... Date:

INTERNAL AUDIT CHECKLIST		
Section	S/U	Corrective Action
<p>1. <u>Management responsibility</u></p> <ul style="list-style-type: none"> • Is the food safety statement still current? • Is the scope and purpose still current? • Are the members of the team still current? 		
<p>2. <u>Hazard Analysis Plan</u></p> <ul style="list-style-type: none"> • Are the product specifications still valid? • Is the flow chart still correct? • Is the Risk Analysis still valid? 		
<p>3. <u>Premises and Equipment</u></p> <p>Has the Monthly Maintenance Checklist been completed?</p>		
<p>4. <u>Supplier Approval Program</u></p> <ul style="list-style-type: none"> • Is the Supplier Approval List up to date? 		
<p><u>Food Handling Procedures</u></p> <p>Are these all still valid – <u>Ref FSANZ</u></p> <p>Have the Distribution Record Sheets been completed?</p>		
<p><u>Testing and Calibration</u></p> <p>Have any test results which exceed the Standards been reported to the relevant State Food Authority?</p> <p>Have all thermometers and scales been calibrated each alternate year?</p>		

<p><u>Cleaning and Sanitation</u></p> <p>Has the Pre-Operational Checklist been completed?</p> <p>Are the chemicals listed still used?</p>		
<p><u>Pest Control</u></p> <p>Are procedures still correct?</p> <p>Are pest company records available?</p>		
<p><u>Personal Hygiene</u></p> <p>Have all staff been briefed on personal hygiene?</p>		
<p>D. <u>Product Traceability</u></p> <p>Is the list of customers up to date?</p> <p>Are invoices for each sale available?</p>		
<p>L. <u>Food Recall</u></p> <p>Is there a copy of the Australian Olive Association's or Food Standards Australia and New Zealand Food Recall Protocol available?</p> <p>Are the contact numbers up to date?</p>		
<p>2. <u>Staff Training</u></p> <p>Is the Staff Training Matrix up to date?</p>		

Comments/Further Action:

SECTION 10 – Related Documents

Further documentation related to HACCP-style Food Safety programs and Food Quality aspects of production of premium quality table olives.

The following documents will assist growers/producers/bottling operators to reach a standard similar to that of a HACCP style program.

Major Steps	
10.1	Maintenance Program
10.2	Approved Supplier Program
10.3	Good Food Handling
10.4	Waste Management, disposal and recycling
10.5	Storage of Packaging Materials
10.5	Cleaning and Sanitation
10.6	Pest Control Program
10.7	Personal Hygiene Program
10.8	Staff Training
10.9	Calibration Program
10.10	Internal Audit Schedule
10.12	References

Detailed Steps

10.1 Maintenance Program

Food Standards Australia New Zealand require that the building(s) and food handling equipment need to be designed and maintained in a manner that will reduce the chance of food becoming contaminated. This will require:

- A diagram of the layout of the building(s) and location of equipment.
- A regular review of the building structure to ensure that established standards are maintained. This includes any changes to the building.
- A regular review of equipment to see if things can be improved or need to be replaced.
- Preventative maintenance and servicing of equipment.
- Documentation to record that this has been done.
- Changes to building or equipment may also require changes to the standard operating procedures, calibration, etc.

In addition many cleaning products will have Material Safety Data Sheets (MSDS) issued. These should be printed off from the supplier website and filed for easy reference.

See 8.9 - Monthly Maintenance Checklist.

10.2 Approved Supplier Program

All businesses need a list of suppliers of their ingredients. This will help with traceability. In the instance of high-risk ingredients this may well require purchases from suppliers with their own food safety plan in place.

If suppliers are HACCP approved a copy of their certification should be obtained and filed.

If suppliers are not HACCP certified it may be necessary to arrange for testing of ingredients, with test results filed for later audit.

Date	Supplier	Product	Batch Number	Use before

10.3 Good Food Handling

10.3.1. Overview

Note: Some state jurisdictions require olive producers to be registered with their local government authority as a food business.

All food businesses need to have a policy and sound handling practices in place to cover:

- Safe food handling practices – to ensure food does not become contaminated - covered under **Section 10.3.2 Safe food handling practices**
- Use of personal protective equipment (PPE), hand washing policy, etc. – covered under **Section 10.8 Personal hygiene**
- Temperature monitoring of goods - covered under **Section 10.3.3 Temperature monitoring of goods**
- Waste management and disposal / recycling. - covered under **Section 10.4 Waste Management**
- Storage of packaging materials – free from contamination - covered under **Section 10.5 Storage of Packaging Materials.**

10.3.2. Safe food handling practices

The major risks to table olive safety and quality:

Stage	Physical	Chemical	Microbiological
Preprocessing	yes	<ul style="list-style-type: none"> • Non-potable water • Agricultural Chemicals • Contamination 	<ul style="list-style-type: none"> • Natural Biota + Potential Pathogens & spoilage organisms
Processing	yes	<ul style="list-style-type: none"> • Non-potable water • Non-food grade inputs • Poorly controlled processing • Production of biogenic amines and toxins 	<ul style="list-style-type: none"> • Natural biota + Potential pathogens & spoilage organisms • Contamination • Addition of uncontrolled starter cultures • Spoilage
Packaging	yes	<ul style="list-style-type: none"> • Poor cleaning of containers • Inappropriate packaging solutions and methods 	<ul style="list-style-type: none"> • Cloudy brines • Contamination • Unfiltered fermentation brine • Inadequate preservation
Preservation			<ul style="list-style-type: none"> • Inappropriate methods
Storage		Poor storage eg Temp	<ul style="list-style-type: none"> • Overgrowth of microbes

Slide: Professor Stan Kailis, Australian Mediterranean Olive Research Institute

10.3.3. Temperature monitoring of table olive goods

Temperature and Table Olive Processing:

- Optimum for fermentation 15 - 30°C
 - Use a digital thermometer
- High temperatures
 - Can lead to anomalous fermentation
 - Heat drying of olives - 50°C (prolonged high temperatures can cook olives)
 - Pasteurisation (Approx 80°C) - kills most microorganisms
 - Steam sterilization (121°C) – destroys microorganisms and spores
- Low temperatures
 - Retards activity of most microorganisms but not *Listeria monocytogenes*.
 - Refrigeration increases shelf life.
 - Slows olive processing activity.
- Pathogenic and non pathogenic bacteria are mesophilic (prefer moderate temperatures) with a maximum temperature tolerance of 35-50°C.
- Spore forming bacteria from soil and water are thermophilic (tolerate heat) with a maximum temperature tolerance of 70-90°C.

Ref: Professor Stan Kailis, Australian Mediterranean Olive Research Institute

Table olive storage:

- The storage of table olives is not likely to require refrigeration. Temperature logging along the supply chain is recommended to ensure product is kept within recommended storage temperatures.
- Table Olives in bulk storage should be stored in a temperature controlled environment – no more than 20C.
- Bottles / cartons of table olives in warehouse storage should be held in temperature controlled conditions – no more than 20C.
- Bottles / cartons of table olives in transit from bottling plant to warehouse and on to retailers should be transported in temperature controlled conditions – no more than 20C.

10.4 Waste Management - Disposal and Recycling

10.4.1. General:

Olive processors may require EPA registration, and should enquire with their relevant state authority.

Each local government jurisdiction regulates the disposal of processing plant waste products. Compost facilities are regulated to minimise odours and leachate runoff.

All food handling premises will have lined waste bins provided for the easy disposal of any waste food or other material that is not able to be recycled. Cardboard, glass and certain plastics may be recycled and separate receptacles should be provided for their collection. All waste bins will be emptied at the end of each day if filled during the day.

The washing out of spray tanks on the farm may involve disposal of excess chemicals. In each state there are stringent regulations in place to ensure no environmental damage takes place.

10.4.2. Processing waste:

An olive processing plant will generate a significant amount of leaf waste. This can be composted and is generally not regarded as a pollutant.

The process of washing down of processing machinery may involve the use of chemicals such as sodium hydroxide or food acids. Great care needs to be taken and protective clothing worn while dealing with these substances. The resulting waste water may not be suitable for disposal in a conventional septic system.

The production cycle of a table olive processing plant will generate a significant amount of dirty water and surplus sodium hydroxide solution. This is a potential pollution problem and needs to be disposed of in an appropriate manner.

10.5 Storage of packaging materials

The packaging process involves the delivery and storage of bottles, cartons, cardboard dividers, caps, tins, lids, wrapping, labels and other related material. This type of material is generally delivered on pallets and needs to be unloaded by forklift and stored undercover in a dry place, free from dust and other contaminants.

Care and thought needs to be taken to allow easy access to this material once packing is scheduled.

Storage of FSANZ approved additives requires checks for proper stock rotation to ensure products are used before the “Best Before” date.

10.6 Cleaning & Sanitation



10.6.1 Cleaning

Cleaning removes dirt and dust using a detergent – a chemical used to clean equipment and surfaces by dissolving grease and removing food residues and other waste.

10.6.2 Sanitation

Sanitation reduces the number of microorganisms by use of a chemical or heat (very hot water or steam) to destroy microbes on clean equipment or surfaces.

It is important that cleaning and sanitising chemicals and equipment are stored away from food processing and storage areas.

A schedule and checklist need to be established to cover:

- Processing areas and work surfaces.
- Utensils & equipment.
- Storerooms.
- Protective equipment.
- Floors, walls & drains.
- Washrooms & toilets.
- Storage of chemicals.
- Transport vehicles.
- See Form: 8.6 - Daily Cleaning Checklist (Processing Plant).

10.7. Pest Control Program

10.7.1. Overview

Animals and pests including insects and rodents must be excluded from the premises.

10.7.2. Regulatory Requirements

Ref: Australia New Zealand Food Standards Code – Standard 3.2.2 – Food Safety Practices and General Requirements

Food businesses that operate from a farm, vineyard, orchard or aquaculture facility and are involved in the substantial transformation of food or the sale or service of food directly to the public then they must comply with this Standard.

Section 24: Animals and pests

(1)A food business must –

- (b) take all practicable measures to prevent pests entering the food premises; and
- (c) take all practicable measures to eradicate and prevent the harbourage of pests on the food premises and those parts of vehicles that are used to transport food.

10.7.3. Further Considerations

10.7.3.1. Prevention & Control of Rats & Mice:

Ref: [NSW Food Authority: Pest Control in Food Businesses](#)

Ref: [SA Health: Rats and Mice - Prevention and Control](#)

10.7.3.2. Chemical control

Chemical control should only be considered as part of a broader control program of eliminating food sources and rodent harbourage. Chemical control is generally short-term and rodents will return if food and shelter are still available.

Rat poisons or rodenticides containing an anti-coagulant can be purchased from hardware stores or supermarkets.

If you have questions regarding chemical control measures or are uncomfortable using chemical baits contact a licensed pest control operator.

Chemical control may not be appropriate in all situations. Before using poison, consider the following:

- If rodents die and decay in hard to reach places they may cause an offensive odour.
- Pets and children may eat toxic baits or poisoned rodent bodies.
- Some individuals are sensitive to rodent control chemicals in their environment

10.7.3.3. Warning

Extreme care must be taken when storing and using poisons (read instructions carefully) to prevent the danger of children or pets being accidentally poisoned.

Note: Rat poisons or rodenticides containing an anti-coagulant are commonly used to control rodents around farm sheds and packing / processing establishments – the use of these control agents are currently under review by the regulator APVMA.

10.7.4. Records

As an example, any evidence of pests can be recorded on the 9.6 Daily Cleaning Checklist as well as on 9.9 Monthly Maintenance Checklist.

A map of the layout of the building showing the location of any bait stations should be developed.

In many instances the Pest Control will be outsourced to operators such as Rentokil Ltd. They will provide a regular monitoring and reporting service, replace any exhausted baits, etc. This report will need to be filed for audit.

e	Station inspected	lled	alled

10.8. Personal hygiene program

10.8.1. Good Hygiene Practice (GHP)

Professor Stan Kailis in his 2018 AOA conference presentation “*Food safety for table olives*”⁵⁴ noted that for production of safe table olives, producers need to diligently attend to the following requirements for **Good Hygiene Practice (GHP)**:

Ensure good personnel hygiene

- Report – vomiting, diarrhoea, fever, open sores
- Avoid direct contact with olives
- Ensure easily accessible hand washing facilities are available
- Prevent cross contamination
- Use potable water for all cleaning, processing & packaging
- Treat non-potable water – filtration, UV radiation, heat
- Implement a cleaning and sanitizing program - use soaps and detergents for cleaning - use sanitisers and disinfectants for antimicrobial control.

10.8.2 Requirements for food handlers:

General requirement: a food handler must take all reasonable measures not to handle food or surfaces likely to come into contact with food in a way that is likely to compromise the safety and suitability of food.

Personal hygiene is a vital part of minimizing the risk of food poisoning or a contamination incident affecting the business. Many training companies offer training programs for basic food handling cover personal hygiene. Much of this is common sense, but it does need to be documented and enforced.

COVID-19 requirements also need to be implemented. Further information on undertaking a COVID-19 risk assessment can be found on the Safe Work Australia website⁵⁵.

Wall posters covering all aspects of personal hygiene are available from many sources such as Health Departments and the Training Providers.

Personal protective equipment will be required. This may include: gloves, hairnets, aprons, shoes, overalls, eyewear, etc.

Australian Standard 3.2.2 Food Safety Practices and General Requirements sets out the requirements for the safe handling of food.

⁵⁴ Food safety for table olives (Stan Kailis 2018): <https://olivebiz.com.au/wp-content/uploads/2018/12/Stan-Kailis-Food-Safety-for-Table-Olives.pdf>

⁵⁵ Safe Work Australia - Risk Assessment: <https://www.safeworkaustralia.gov.au/covid-19-information-workplaces/industry-information/agriculture/risk-assessment>

10.8.3. Health of food handlers:

A food handler that has a symptom that indicates the handler may be suffering from a food-borne disease, or knows he or she is suffering from a food-borne disease, or is a carrier of a food-borne disease must, if at work:

- Immediately notify his or her supervisor if the food handler knows or suspects he or she may have contaminated food whilst handling food.
- Report that he or she is or may be suffering from the disease, or knows that he or she is carrying the disease, to his or her supervisor;
- Not engage in any handling of food where there is a reasonable likelihood of food contamination as a result of the disease: and
- If continuing to engage in other work on the food premises – take all practicable measures to prevent food from being contaminated as a result of the disease.
- If continuing to engage in the handling of food or other work – take all practicable measures to prevent the food from becoming contaminated as a result of the condition.

10.8.4. Conduct of food handlers:

A food handler must, whilst engaging in any food handling operation:

- take all practicable measures to ensure his or her body, anything from his or her body, and anything he or she is wearing does not contaminate food or surfaces likely to come into contact with food.
- take all practicable measures to prevent unnecessary contact with ready-to-eat food.
- ensure outer clothing is of a level of cleanliness that is appropriate for the handling of food that is being conducted.
- use only on exposed parts of his or her body bandages and dressings that are completely covered with a waterproof covering.
- not eat over unprotected food or surfaces likely to come into contact with food.
- not sneeze, blow or cough over unprotected food or surfaces likely to come into contact with food.
- not spit, smoke or use tobacco or similar preparations in areas in which food is handled.
- not urinate or defecate except in a toilet.

A food handler must wash his or her hands in accordance with 9.7.4 Hand Washing:

- whenever his or her hands are likely to be a source of contamination of food.
- immediately before working with ready-to-eat food after handling raw food.
- immediately after using the toilet.

A food handler must, when engaging in a food handling operation that involves unprotected food or surfaces likely to come into contact with food, wash his or her hands in accordance with Section 9.7.4 Hand Washing;

- before commencing or re-commencing handling food.
- immediately after smoking, coughing, sneezing, using a handkerchief or disposable tissue, eating, drinking or using tobacco or similar substances.
- after touching his or her hair, scalp or a body opening.

10.8.5. Hand washing:

Whenever washing his or her hands, a food handler must:

- use the hand washing facilities provided.
- thoroughly clean his or her hands using soap or other effective means and warm running water; and
- thoroughly dry his or her hands on a single use towel or in another way that is not likely to transfer pathogenic micro-organisms to the hands.

10.9 Staff Training

All staff must be trained to enable them to perform their job safely and competently. All staff members are to be trained for their appropriate work activity, which may include at least:

- Good personal hygiene (see 10.7 - Personal Hygiene Program)
- Food handling procedures (see 10.3 - Good Food Handling)
- Cleaning and sanitation (see 10.5 - Cleaning and Sanitation)
- Occupational Health & Safety (see 1.6.2 -OH&S)

In addition, specialist training will be required for some specific tasks:

- Application of chemical sprays on the farm – requires ChemCert.
- Operation of a forklift truck – requires a forklift licence if a ride-on style forklift.
- Delivery of fruit to the processing plant – requires a driving licence appropriate for the size and weight of the vehicle.
- Operation of the olive processing machinery – training generally provided by the manufacturer of the machinery or experienced operator.
- Operation of the packaging equipment – training generally given by the manufacturer of the machinery or experienced operator

Overall there needs to be a culture of product quality developed with all staff understanding the critical control points at which product quality may be compromised.

10.9.1 Staff Training Register

Record all food safety training conducted by staff involved in the business.

STAFF TRAINING REGISTER					
Date	Staff member	Type of training/course	Trained by	Staff signature	Competency Level

10.10 Calibration Program

10.10.1 Calibration of measuring instruments

Several pieces of equipment will be used for measuring (scales) or will require regular calibration (spray nozzles, irrigation emitters).

In some instances a calibration program can be done in-house once a year, but for other pieces of equipment it may be best to have an independent, third party carry out the calibration. This is especially important if customers are to be billed / paid for what they deliver and exact amounts need to be recorded.

Results need to be recorded.

EQUIPMENT CALIBRATION RECORD			
Date	Equipment	Calibrated by	Checked

10.10.2 Servicing measuring instruments

Standards Association of Australia licences service organisations that specialise in servicing scales, petrol pumps and weighing equipment, to assist businesses to keep their measuring instruments accurate.

For your nearest licensed service organisation within NSW, contact Fair Trading on (02) 8467 4400.

Businesses are required by law to have instruments checked for accuracy on a regular basis, and if necessary repaired and corrected. This is usually done in the one visit to avoid paying for evaluation and repair separately. By doing so, you can confidently expect the goods you sell are accurately measured to a precise standard and your customers get exactly what they paid for.

The benefits of Trade Measurement to business include the following:

- everyone competes on an equal basis;
- it assists you in your stock control;
- you do not lose product through poor or inaccurate measurement, which means loss of money or profits;
- it safeguards you from potential prosecution;
- it promotes customer confidence in your trade with repeat business.

A certificate of verification can be issued under the National Measurement Regulations, which makes the standard legally valid throughout Australia.

10.11 Internal Audit Schedule – complete annually

Internal audits are conducted to ensure that procedures and practices used at the business are being controlled adequately according to what is documented in this manual and in the records associated with this manual.

Where non-conformities are found, corrective actions are taken and recorded.

The suggestion is that a six-monthly internal audit is carried out using this form, indicating either Satisfactory (S) or Unsatisfactory (U) and complete corrective action/comments column:

Internal Audit Checklist		
Section	S/U	Corrective Action
<p>1. <u>Management responsibility:</u></p> <ul style="list-style-type: none"> • Have there been any significant changes to the operation of the business. • Is the food safety / food quality statement still current? • Is the scope and purpose still current? • Are the members of the team still current? 		
<p>2. <u>Hazard Analysis Plan</u></p> <ul style="list-style-type: none"> • Are the product specifications still valid? • Is the flow chart still correct? • Is the Risk Analysis still valid? 		
<p>3. <u>Premises and Equipment (See 9.9)</u></p> <ul style="list-style-type: none"> • Has the Monthly Maintenance Checklist been completed? 		
<p>4. <u>Approved Supplier Program (See 10.2)</u></p> <ul style="list-style-type: none"> • Is the Supplier Approval List up to date? 		
<p>5. <u>Good Food Handling Procedures (See 10.3)</u></p> <ul style="list-style-type: none"> • Are these all still valid? • Have the Distribution Record Sheets been completed? 		
<p>6. <u>Testing and Calibration (See 10.9)</u></p> <ul style="list-style-type: none"> • Have all tests been carried out and the results examined, filed? • Have any test results which exceed the Standards been reported to the relevant State Food Authority? • Have all thermometers and scales been calibrated each year? 		

<p>7. <u>Cleaning and Sanitation (See 10.5)</u></p> <ul style="list-style-type: none"> • Has a record of cleaning been maintained? • Has the Pre-Operational Checklist been completed? • Are the chemicals listed still used? 		
<p>8. <u>Pest Control (See 10.6)</u></p> <ul style="list-style-type: none"> • Are procedures still correct? • Are pest company records available? 		
<p>9. <u>Personal Hygiene (See 10.7)</u></p> <ul style="list-style-type: none"> • Have all staff been briefed on personal hygiene? 		
<p>10. <u>Product Traceability (See 8.3.2.5)</u></p> <ul style="list-style-type: none"> • Is the list of customers up to date? • Are invoices for each sale available? 		
<p>11. <u>Food Recall (See 8.3.2.5)</u></p> <ul style="list-style-type: none"> • Is there a copy of the Australian Olive Association's or Food Standards Australia and New Zealand Food Recall Protocol available? • Are the contact numbers up to date? 		
<p>12. <u>Staff Training (See 10.8)</u></p> <ul style="list-style-type: none"> • Have new staff been through the correct induction • Is the Staff Training Matrix up to date? 		
<p>13. <u>Service Contract Agreements</u></p> <p>Is there a harvesting, processing and bottling contract?</p> <p>Evidence of service provider food safety / food quality programs?</p>		

Completed by: Date:

Comments/Further Action:

10.12 References

This is a record of the references that apply to various aspects of the *FSANZ Food Standards Code*:

FOOD SAFETY REFERENCES		
Hazard/Control Measure	Critical Limit	Reference/Justification
Residual soil contamination.	Presence of heavy metals, fuel or chemical residue in sufficient amounts to affect the integrity of the crop.	<u><i>FSANZ Standard - Section 1.4.1</i></u>
Chemical residues on fruit.	Presence of any chemical residues outside APVMA guidelines.	<u><i>FSANZ Standard - Section 1.4.2</i></u>
Microbiological contamination from disease, fertiliser, mulch.	Presence of sooty mould, olive lace bugs.	<u><i>FSANZ Standard – Section 1.6.1</i></u>
Contamination of transport bins, vehicle.	Presence of dirt, water, mould in the bins, chemical or fuel drums on the vehicle tray.	<u><i>FSANZ Standard – Section 1.4.3</i></u>
There is a chance of contamination of olives from incorrectly cleaned tanks, hoses, bottles, buckets, barrels, operating surfaces, crates and other equipment. A visual inspection of all equipment is required before use of equipment.	Any visual sign of dirt, water or mould is not acceptable and the vessels / equipment must be cleaned, rinsed sanitised and dried before use.	<u><i>FSANZ Standard – Section 1.4.3</i></u>
While olives are exposed to the air during the sorting and grading process there is a chance of contamination by insects, spiders and other vermin.	Presence of flies or other insects, spiders in the sorting area.	<u><i>FSANZ Standard – Section 1.4.3</i></u>
All ingredients other than olives need to be food grade and supplied by approved suppliers.	If ingredients are supplied by non-HACCP compliant suppliers, all efforts need to be made to verify the suitability of the ingredients before use.	<u><i>FSANZ Standard – Section 3.2.2</i></u>
Breakage of bottles during filling / labelling processes.	All breakages should be cleaned up immediately.	<u><i>OH&S - Individual State Regulations apply</i></u>
Chemical or hot water burns from cleaning chemicals.	Protective clothing needs to be worn during all cleaning processes.	<u><i>OH&S - Individual State Regulations apply</i></u>

END