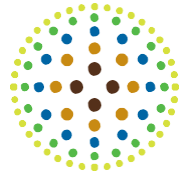




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# The Voluntary Industry Standard for Table Olives in Australia



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**Australian Government**  
**Rural Industries Research and  
Development Corporation**

# **The Voluntary Industry Standard for Table Olives in Australia**

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*The Voluntary Industry Standard for Table Olives in Australia*  
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# Foreword

The *Voluntary Industry Standard for Table Olives in Australia* (the Industry Standard) has been prepared by the National Table Olive Committee (NTOC) of the Australian Olive Association Ltd (AOA), with significant technical input by table olive specialist Professor Stanley Kailis from the [Australian Mediterranean Olive Research Institute Western Australia](#), and James (Jim) Smyth, food technologist and table olive processing expert from South Australia.

In developing the Industry Standard, the NTOC has liaised closely with Food Standards Australia New Zealand (FSANZ), to discuss the application of the Australia New Zealand Food Standards Code to ensure compliance with national food safety requirements.

The key objective of the Industry Standard is to ‘lift the bar’ for Australian table olive producers in terms of improved product quality, food safety and productivity, and to deliver associated benefits to Australian consumers.

The Industry Standard is based on the CODEX Alimentarius Commission (Codex) standards and other international and national technical standards, adapted to meet Australian requirements.

This project was funded from RIRDC core funds, which are provided by the Australian Government.

This report is an addition to RIRDC’s diverse range of over 2000 research publications, forms part of our Olives R&D Program, which aims to:

- provide information which establishes the benefits of Australian olive products
- maintain the current high quality product while improving productivity, profitability and environmental management through all stages of the supply chain
- develop strategies for existing and new olive producers to reduce the effects of climate change and variability
- build and educate, collaborative, innovative and skilled industry workforce and a cost effective, well funded RD&E program.

Most of RIRDC’s publications are available for viewing, free downloading or purchasing online at <https://www.agrifutures.com.au> . Purchases can also be made by contacting [publications@agrifutures.com.au](mailto:publications@agrifutures.com.au) .

**Craig Burns**  
Managing Director  
Rural Industries Research and Development Corporation

# Acknowledgments

## Document Preparation

The *Voluntary Industry Standard for Table Olives in Australia* (the Industry Standard) has been prepared by the National Table Olive Committee (NTOC) of the Australian Olive Association Ltd (AOA), with significant technical input by table olive specialist Professor Stanley Kailis from the [Australian Mediterranean Olive Research Institute \(WA\)](#), and James (Jim) Smyth, food technologist and table olive processing expert from South Australia.

## About the Authors:

**James (Jim) Smyth** has worked for more than 50 years in the food industry in South Australia and Victoria. He has tertiary qualifications in industrial chemistry with experience in the following industries: pharmaceutical (analytical chemistry and microbiology), wine (quality assurance), edible oil (research and development) and since the beginning of 1972 in the olive industry in general management involving table olives and olive oil. In 1979 and again in 1981, Jim received training in table olive production from Dr MJ Fernandez Diez, head of the Department of Food and Biotechnology Instituto de la Grasa (CSIC) Seville, Spain. Upon retiring in mid 2003 from Viva Olives Pty Ltd, Jim became a consultant to the olive industry, serving for a number of years on the Committee of Olives SA Inc and one year on the Board of the Australian Olive Association Ltd (AOA). Jim received a national award from the AOA in 2008 for his services to industry.

**Stanley (Stan) George Kailis** has undertaken teaching research in tertiary institutions, Curtin University of Technology and the University of Western Australia in the areas of food and drugs for over 50 years. He holds a Diploma in Pharmacy, a Bachelor of Science Degree with first class honours and Doctoral degree in Science. With respect to Curtin University he is a Fellow and with the University of Western Australia he is a past Professorial Fellow. He has been recognised by both the Australian Olive Association and Western Australian Olive Association for his developmental work in the establishment of the Australian Olive Industry. His expertise relevant to food is in nutrition, the Mediterranean Diet, and quality and safety of olive products especially table olives. Stan has also coauthored international reference books on table olives and Olive propagation as well as chapters in key texts on table olives and journal articles in refereed journals. He has collaborated with and/or delivered presentations in Greece, Italy, Spain, USA and New Zealand. He is currently a member of the National Table Olive Committee and the Director of the Australian Mediterranean Olive Research Institute.

## National Table Olive Committee

The National Table Olive Committee (NTOC) currently comprises:

- Peter McFarlane, McFarlane Strategic Services (SA) – Convenor
- Jim Smyth, table olive consultant (retired) (SA)
- Dr Michelle Wirthensohn, University of Adelaide (SA)
- Bob Gilliver, Talinga Grove (SA)
- Professor Stan Kailis, [Australian Mediterranean Olive Research Institute \(WA\)](#)
- Peter Herborn, Laguna Olives (NSW)
- Stephen Mitchell, Lisborne Grove (NSW)
- [Damien Vodusek, Rich Glen Olive Shop \(VIC\)](#)
- [Peter Reaich, The Australian Olive Company Pty Ltd \(SA\)](#)
- [Robert Whyte, Gooramadda Olives \(VIC\)](#)

## The Review:

RIRDC publication No. 12/100 *Voluntary Industry Standard for Table Olives in Australia* was reviewed and updated in January 2020 by one of the original authors, Professor Stan Kailis, making the following amendments:

- Foreword (updated – including new AgriFutures Australia contact details)
- Acknowledgments - About the authors (new), updated NTOC membership
- Executive summary (minor updating)
- Introduction (minor updating)
- Section 2 (minor updating)
- Section 3 (updated table 2)
- Section 4 (addition of seed oils)
- Section 5 (updated table 4)
- Section 10 (minor updating)
- References (minor updating including current links)

Professor Stan Kailis  
January 2020  
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- II. This publication review is funded as part of the olive levy project *Australian olive industry communications and extension program* (OL18000), using the Hort Innovation olive research and development levy, co-investment from the Australian Olive Association and contributions from the Australian Government.

# Abbreviations

<b>AOA</b>	Australian Olive Association Ltd
<b>C</b>	Number of units in the sample producing readings between ‘m’ and ‘M’
<b>Codex</b>	CODEX Alimentarius Commission
<b>CoP</b>	<i>OliveCare®</i> Code of Best Practice
<b>F<sub>0</sub></b>	Cumulative sterility value
<b>FSANZ</b>	Food Standards Australia New Zealand
<b>GMP</b>	Good manufacturing practice
<b>HACCP</b>	Hazard Analysis Critical Control Point
<b>INS No</b>	Codex Food Additive or Group Number
<b>IOC</b>	International Olive Council
<b>m</b>	Results that are equal or lower than ‘m’ are considered as being in conformity
<b>M</b>	Maximum allowable threshold beyond which the results are not in conformity
<b>MAT</b>	Modified atmosphere treatment
<b>MRL</b>	Maximum residue limits
<b>MSDS</b>	Material Safety Data Sheets
<b>n</b>	Number of units making up the sample
<b>NATA</b>	National Association of Testing Authorities
<b>NTOC</b>	<b>AOA’s</b> National Table Olive Committee
<b>OH &amp; S</b>	Occupational Health and Safety
<b>P</b>	Pasteurisation treatment
<b>PR</b>	Preservatives added
<b>PU</b>	Pasteurisation units
<b>R</b>	Refrigeration treatment
<b>RIRDC</b>	Rural Industries Research and Development Corporation
<b>rt</b>	Reference temperature
<b>S</b>	Sterilisation treatment
<b>SCC</b>	Specific chemical characteristics
<b>T.D.T.</b>	Thermal death times
<b>Z</b>	Z Curve Value



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# Executive Summary

## What the report is about

The *Voluntary Industry Standard for Table Olives in Australia* (the Industry Standard) has been prepared by the National Table Olive Committee (NTOC) of the Australian Olive Association Ltd (AOA). It is a voluntary industry standard that establishes an objective basis for the wholesale and retail trade of table olive products in Australia.

The Industry Standard is incorporated into the AOA's *Code of best practice for olive oil, table olives and other olive products (Revised 2012)* (the Code), which aims to guarantee the authenticity of Australian table olives and distinguish these from other products by providing consumers with a recognisable quality seal – *Certified Australian Table Olives*<sup>TM</sup> which is a certified trademark.

## Who is the report targeted at?

The Industry Standard will 'lift the bar' for Australian table olive producers, in terms of improved product quality, food safety and productivity. The benefits to producers, wholesalers and retailers in having a clear objective industry standard will also deliver associated benefits to all consumers of Australian table olives.

## Where are the relevant industries located in Australia?

The Australian table olive sector is largely a boutique industry, with 80% of table olive producers having less than 5 hectares, and only 5 known producers with more than 40 hectares – by far the largest being Tree Tops Plantation (Riverina Oils & BioEnergy Pty Ltd) situated in the NSW Riverina with 125,000 trees producing 1,000 tonne of table olives per year. The major olive production states are NSW, SA, WA and VIC.

Table olive production in Australia in 2019 is estimated to be 3,000 tonnes with a gross production value of A\$12 million (Source: AOA).

## A snapshot of the Industry Standard

The Industry Standard contains ten sections outlining the proposed testing regime for both Code of Practice certified and non-certified product for retail sale to the public, or wholesale to food service businesses. It also discusses the overarching application of the Australia New Zealand Food Standards Code to the production and sale of table olives in Australia.

- **Section 1: Scope**  
Establishes that the Industry Standard applies to the fruit of the cultivated olive tree (*Olea europaea* L.) which has been suitably treated or processed and which is offered for trade and for final consumption as table olives or table olive products.
- **Section 2: Description**  
Defines desired table olive characteristics of table olives; olive types and styles; treatments and trade preparations.
- **Section 3: Essential composition and quality factors**  
Firstly, describes the physico-chemical characteristics of packing brine or juice including minimum sodium chloride content, maximum pH, and minimum lactic acidity; as applying to various table olive preparation methods. Secondly, describes pasteurisation and sterilisation parameters for table olive products.

- **Section 4: Optional ingredients**  
Lists other ingredients that may be used in the preparation of table olives.
- **Section 5: Quality criteria**  
Provides trade descriptions and tolerances for defects that Australian producers should consider if exporting table olives.
- **Section 6: Food additives**  
Links the Industry Standard to the *Australia New Zealand Food Standards Code and Codex Stan.66-1981* for approved food additives, processing aids, and limits for contaminants.
- **Section 7: Hygiene**  
Establishes the general principles of food hygiene as established by the *Australia New Zealand Food Standards Code and Codex Stan.66-1981*.
- **Section 8: Microbiological criteria for processed table olives packed in bulk containers (non-pasteurised)**  
Establishes microbiological criteria for unpasteurised table olives that may be offered for wholesale distribution including to food services. This section is adapted from the *Federation of French Condiments Industries – Code of fair practice for table olives Dec 2000*.
- **Section 9: Microbiological criteria for processed table olives intended for sale to end users (usually pasteurised)**  
Establishes microbiological criteria for processed table olives intended for retail sale. This section is adapted from the *Federation of French Condiments Industries – Code of fair practice for table olives Dec 2000*, and incorporates *Food Standards Australia New Zealand – Guidelines for the microbiological examination of ready-to-eat foods*.
- **Section 10: Containers for retail sale**  
Establishes that container filling weights/volumes and container labelling must meet the appropriate sections of the *Australia New Zealand Food Standards Code*.

# Introduction

## Why a Voluntary Industry Standard for Table Olives in Australia?

The key objective of the Australian Olive Association Ltd (AOA) *Voluntary Industry Standard for Table Olives in Australia* (the Industry Standard) is to 'lift the bar' for Australian table olive producers, in terms of improved product quality, food safety and productivity, and to deliver associated benefits to Australian consumers.

The Industry Standard is a voluntary industry standard promulgated by the AOA that establishes an objective basis for the wholesale and retail trade in table olive products in Australia.

The Industry Standard draws on the following technical sources:

- International Olive Council (IOC) *Trade Standard Applying to Table Olives* COI/OT/NC No. 1 Dec 2004<sup>1</sup>
- *Codex Standard for Table Olives – Revision of CODEX STAN 66-1981 (1987, 2013)*<sup>2</sup>
- *Federation of French Condiments Industries – Code of fair practice for table olives Dec 2000*<sup>3</sup>
- *Australia New Zealand Food Standards Code*.<sup>4</sup>

The Industry Standard is incorporated into the AOA's *Code of Practice for olive oil, table olives and other olive products (revised 2012)*<sup>5</sup> (the Code), that aims to guarantee the authenticity of Australian table olives and distinguish these from other products by providing consumers with a recognisable quality seal – *Certified Australian Table Olives*<sup>TM</sup> which is a certified trademark (shown below).



<sup>1</sup> IOC *Trade Standard Applying to Table Olives* COI/OT/NC No. 1 Dec 2004:  
<http://www.internationaloliveoil.org/documents/viewfile/3626-normoteng>

<sup>2</sup> *Codex Standard for Table Olives – Revision of CODEX STAN 66-1981 (1987, 2013)*  
[www.fao.org/input/download/standards/243/CXS\\_066e.pdf](http://www.fao.org/input/download/standards/243/CXS_066e.pdf)

<sup>3</sup> *Federation of French Condiments Industries - Code of fair practice for table olives Dec 2000* (English translation available on request):[http://www.agrogrroupe.com/Documents/code\\_des\\_pratiques\\_loyales.pdf](http://www.agrogrroupe.com/Documents/code_des_pratiques_loyales.pdf)

<sup>4</sup> *Australia New Zealand Food Standards Code*:  
<http://www.foodstandards.gov.au/foodstandards/foodstandardscode.cfm>

<sup>5</sup> *Code of Practice for olive oil, table olives and other olive products (revised 2012)* Australian Olive Association (AOA): <http://www.australianolives.com.au/content/code-of-practice>

## Testing against the Industry Standard

Grower signatories to the Code will be required to undertake specified testing on a sample taken from each batch identified on table olive product labels to establish eligibility to apply the new *Certified Australian Table Olives*<sup>TM</sup> logo.

In addition, AOA will undertake random testing against the proposed Industry Standard, for the *OliveCare*<sup>®</sup> Code of Best Practice (CoP) accredited, and non CoP accredited table olive products.

The AOA may determine which testing bodies will carry out testing for the purposes of the Code, and may use bodies endorsed by the CODEX Alimentarius Commission (Codex), the National Authority for Testing Agencies (NATA)<sup>6</sup>, the International Olive Council (IOC), or other such relevant organisations as it may see fit.

## Australia New Zealand Food Standards Code

**Note 1:** Any business that processes or packs olive products in Australia is deemed a ‘food business’. All food businesses in Australia are already 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*.

**Note 2:** *Food Safety Standard 3.2.1: Food Safety Programs*, that sets out the requirements for the control of food safety hazards during the production, manufacture and handling of food, is not mandatory for all food businesses. It applies to certain industry sectors that have been identified as being high risk. In some state jurisdictions, such as Victoria, all food businesses (including olive processors) are required to have a food safety program (except retail businesses selling low-risk pre-packaged food).

**Note 3:** Further details on specific standards under the *Australia New Zealand Food Standards Code* are available on the Australian Government ComLaw website.<sup>7</sup>

**Note 4:** Table olives as a fermented product are regarded as a medium food-safety risk. However, should there be a serious food-safety incident with table olives; regulation may be imposed on the industry.

**Note 5:** 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 their business is located.

\* To assist in implementing good agricultural practice (GAP), and good manufacturing practice (GMP), AOA has also developed a *Hazard Analysis Critical Control Point (HACCP) style Food Safety Plan for Table Olives*<sup>8</sup> template for the use of Code of Practice signatories.

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<sup>6</sup> National Authority for Testing Agencies (NATA): <http://www.nata.asn.au/>

<sup>7</sup> Australian Government ComLaw website: <http://www.comlaw.gov.au/Search/food%20standards%20code>

<sup>8</sup> The *HACCP style Food Safety Plan for Table Olives* is only available to AOA Code of Practice Signatories.

# Australian Olive Association Ltd.

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## Voluntary Industry Standard for Table Olives in Australia

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### Section 1: Scope of the Industry Standard

The *Voluntary Industry Standard for Table Olives in Australia* (the Industry Standard) applies to the fruit of the cultivated olive tree (*Olea europaea* L.) as defined in *Section 2*, which has been suitably treated or processed and which is offered for trade and for final consumption as table olives or table olive products. The Industry Standard also covers olives packed in bulk containers which are intended for repacking into consumer-size containers.

The Industry Standard is a voluntary industry standard promulgated by the Australian Olive Association Ltd (AOA) that establishes an objective basis for the wholesale and retail trade in table olive products in Australia.

### Section 2: Description

#### 2.1. Product definition for table olives

‘Table olives’ means the product:

**2.1.1.** Prepared from the sound fruits of varieties of the cultivated olive tree (*Olea europaea* L.), chosen for their qualities which make them particularly suitable for processing.

The specific qualities that are required of this fruit are essentially a ratio of flesh-to-stone (pit) typical of the variety; its refined nature; firmness; fine flesh; **flavor, texture and overall** taste; the ease with which the flesh can be separated from the stone (pit); thin skin; small stone (pit); quality of its surface; and ability of the fruit to undergo various trade treatments and preservation processes.

Olives intended for curing (processing) must be healthy, plump, firm, resistant to slight pressure; whole, not bumpy, deformed or squashed; of uniform colour (green olives in particular), without any blemishes other than natural pigmentation; and skin that adheres well, without holes, bruises or lesions, whatever their cause; and complying with tolerances as indicated later in the Industry Standard.

**2.1.2.** Treated to remove its bitterness and preserved by natural fermentation, or by heat treatment, with or without the addition of preservatives, or by other means so as to ensure stability and safety of the product under the appropriate storage conditions, room temperature or refrigeration (refer to *Section 3, Table 2*).

**2.1.3.** Packed with or without covering liquid in accordance with *Section 3.1*.

## 2.2. Types of olives

**2.2.1.** Table olives are classified in one of the following types according to the degree of ripeness of the fresh fruits:

**a. Green olives:** Fruits harvested during the ripening period, prior to colouring and when they have reached a size typical of the variety. 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 **and the flesh mostly unpigmented.**

**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 at least three quarters through the flesh. 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.

**2.2.2.** 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.

## 2.3. Trade preparations

**2.3.1.** The bitterness of the olives may be removed by **alkaline** treatment (alkali treated olives), by immersion in a liquid to dilute the bitter compound (soaking method), dehydration (heat or salt) or by biological processes (fermentation). The product so obtained may be preserved in brine according to its specific characteristics, in dry salt, in a modified atmosphere, by heat treatment, by preservatives, by acidifying agents, or by other means.

**2.3.2.** Olives shall undergo (processing into) the following trade preparations:

**2.3.3. 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:

**a.** Treated green olives in brine.

**b.** Treated olives turning colour in brine.

**c.** Treated black olives.

**d.** Non-fermented treated olives – these olives are treated immediately after removal of bitterness by either pasteurisation or by storing at a temperature of approximately 4°C, to prevent fermentation, microbiological or other forms of deterioration.

**2.3.3. 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. (**aerobic fermentation is used mostly for the processing of naturally black ripe olives**), preserved or not by the addition of acidifying agents:

**a.** Natural green olives.

**b.** Natural olives turning colour.

**c.** Natural black olives.

**2.3.4. Dehydrated and/or shrivelled olives:** Green olives, olives turning colour or black olives that have undergone or not mild-alkaline treatment, preserved in brine or partially dehydrated in dry salt and/or by heating or by any other technological process:

**a.** Dehydrated and/or shrivelled green olives.

- b. Dehydrated and/or shrivelled olives turning colour.
- c. Dehydrated and/or shrivelled black olives.

**2.3.5. Olives darkened by oxidation (California Ripe Process):** Green olives or olives turning colour preserved in brine, fermented or not, darkened by oxidation in an alkaline medium and preserved in hermetically sealed containers subjected to heat sterilisation (pasteurisation is ineffective); they shall be a uniform black colour.

**Note:** For colour stabilisation, iron salts are used – refer to *Section 6.1.7* of the Industry Standard.

**2.3.6. Specialties:** Olives may be prepared by means distinct from or additional to, those set forth above. Such specialties retain the name ‘olive’ as long as the fruit used complies with the general definitions laid down in the Industry Standard. The names used for these specialties shall be sufficiently explicit to prevent any confusion, in purchasers’ or consumers’ minds, as to the origin and nature of the products and, in particular, with respect to the designations laid down in the Industry Standard.

**2.3.7. Black olives without alkali treatment:** If an aerobic fermentation method is used on green or turning colour olives – because they are exposed to air during the process, they darken by oxidation. Such olives are then preserved as above.

**2.3.8. Natural olives without fermentation:** the olives may be partially debittered by successive changes of potable water or weak brine over a number of days after which the olives are stored in brine that has been acidified (refer to *Section 3, Table 2*).

## **2.4. Varietal types**

Any commercially cultivated variety (cultivar) suitable for processing eg *Manzanilla, Sevillana, Kalamon, Volos, Ascolana*

## **2.5. Styles**

Olives may be offered in one of the following styles.

### **2.5.1. Whole olives:**

**a. Whole olives:** Olives, with or without their stem, which have their natural shape and from which the stone (pit) has not been removed.

**b. Cracked olives:** Whole olives subjected to a process whereby the flesh is opened without breaking the stone (pit), which remains – whole and intact inside the fruit.

**c. Split olives:** Whole olives that are split lengthwise by cutting into the skin and part of the flesh – without removing the stone.

### **2.5.2. Stoned (pitted) olives:**

**a. Stoned (pitted) olives:** Olives from which the stone (pit) has been removed and which basically retain their natural shape.

**b. Halved olives:** Stoned (pitted) or stuffed olives sliced into two approximately equal parts, perpendicularly to the major axis of the fruit.

**c. Quartered olives:** Stoned (pitted) olives split into four approximately equal parts along and perpendicularly to the major axis of the fruit.

**d. Divided olives:** Stoned (pitted) olives cut lengthwise into more than four approximately equal parts.

**e. Sliced olives:** Stoned (pitted) or stuffed olives sliced into segments of approximately equal thickness.



**f. Chopped or minced olives:** Small pieces of stoned (pitted) olives of no definite shape and practically devoid (no more than 5 per 100 of such units by weight) of identifiable stem insertion units as well as of slice fragments.

**g. Broken-and-stoned (pitted) olives:** Olives accidentally broken while being stoned (pitted) or stuffed. They normally contain pieces of the stuffing material.

**2.5.3. Stuffed olives:** Stoned (pitted) olives stuffed either with one or more suitable products (pimiento, onion, almond, celery, anchovy, olive, orange or lemon peel, hazelnut, capers, etc.) or with edible pastes.

**2.5.4. Salad olives:** Whole broken or broken-and-stoned (pitted) olives with or without capers, plus stuffing material, where the olives are the most numerous compared with the entire product marketed in this style.

**2.5.5. Olives with capers or medley:** Whole or stoned (pitted) olives, usually small in size, with capers and with or without stuffing, packed with other edible pickled products such as pieces of onion, carrot, celery and other edible ingredients, where the olives are the most numerous compared with the entire product marketed in this style.

#### **2.5.6. Olive paste and tapenade:**

**a. Olive paste:** Exclusively olive flesh from processed green, turning colour, or black olives finely crushed.

**b. Tapenade:** Traditionally, tapenade is a paste made from black olives, anchovies, capers, olive oil and aromatic herbs, all of which have been finely ground. A variety of other suitable ingredients may also be included. Similar preparations can be made from processed green or turning colour olives.

#### **2.5.7. Other styles**

Any other presentation of the product shall be permitted provided that the product:

**2.5.7.1.** Is sufficiently distinctive from the other styles laid down in the Industry Standard.

**2.5.7.2.** Meets all relevant requirements of the Industry Standard.

**2.5.7.3.** Is adequately described on the label to avoid confusing or misleading the consumer.

#### **2.6. Sizing of olives for sale**

Table olives shall be size-graded according to the number of fruits per kilogram or hectogram (100 gram).

**2.6.1.** Olives should be of a uniform and commercially acceptable size range and of the same variety. Refer to *Table 1* below.

**2.6.2.** With specialty products, where different varieties are used, individual varieties should be of a uniform and commercially acceptable size range.

**2.6.3.** Specialty table olive products with two or more olive varieties, two or more trade preparations or having different size olives are not required to conform to size grades as per *Table 1*.

**2.6.4.** Olives intended for export should comply with Codex standards and/or other international standards as per importing country requirements.

**2.6.5** Olives are size-graded according to the number of fruits per kilogram or hectogram (100 gram) – refer to *Table 1*.

**Note:** Individual size scale as per *Table 1* to be included on label. Different scales may nevertheless be applied according to agreements between the buyer and seller. Solely where stuffed olives are concerned, as from size 201/220 the interval is 20 fruits up to size 401/420.

**Table 1: Table olive sizes scale**

The size scale, fruit in one kilogram		
60/70	121/140	261/290
71/80	141/160	291/320
81/90	161/180	321/350
91/100	181/200	351/380
101/110	201/230	381/410*
111/120	231/260	

\*above 410, the interval is 50 fruits.

**2.6.6.** In the case of stoned (pitted) olives or stuffed olives (after removing the stuffing), the size shown shall be the one corresponding to the original whole olive. For the purpose of checking, the number of stoned (pitted) olives in one kilogram shall be multiplied by a coefficient set by each producing country.

**2.6.7.** Within each size as defined above, it is stipulated that after having removed from a sample of 100 olives, the olive having the largest horizontal diameter and the olive having the smallest horizontal diameter, the difference between the horizontal diameters of the remaining olives may not exceed 4 mm.

## Section 3: Essential composition and quality factors

### 3.1. Composition

**3.1.1. Basic ingredients:** Olives as defined in *Section 2* of the Industry Standard with or without covering liquid.

**3.1.2. Packing brines:** This term applies to solutions of food-grade salts dissolved in potable water, with or without the addition of all or some of the ingredients listed under *Section 4* of the Industry Standard.

**3.1.3.** Brine shall be clean, free from foreign matter and shall comply with the hygiene rules laid down in *Section 7* of the Industry Standard. If fermentation brines are used for packing olives they should be **micro**-filtered to remove suspended solids before use.

**Note 1:** For information on brine filtration and other good manufacturing practice (GMP) pointers refer to the *Table Olive Production Manual*.<sup>9</sup>

**Note 2:** Where processed olives are placed in edible oil (e.g. olive or seed oil), the oil must meet FSANZ standards and the product must be approved as microbiologically safe by an approved laboratory.

**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)

**Note 3:** Preparation types in *Table 2*:

- Treated olives** covers all olives processed using **alkali eg** sodium hydroxide as the debittering agent.
- Natural olives** covers olives processed without using **alkali eg** sodium hydroxide, processed by fermentation or soaking with water or weak brine.
- Dehydrated and/or shrivelled olives** covers olives that have their moisture reduced by air drying, heat drying or are dried with coarse salt.

**Note 4:** Explanation of abbreviations in *Table 2* above:

- **SCC:** specific chemical characteristics
- **MAT:** modified atmosphere – carbon dioxide/nitrogen

<sup>9</sup> *Table Olive Production Manual*, by James Smyth (Publication 12/100 RIRDC 2012): <https://www.agrifutures.com.au/product/table-olive-production-manual/>

- **PR:** addition of preservatives sodium benzoate, potassium sorbate
- **R:** refrigeration 0°C to 4°C
- **P:** pasteurisation – indicative organism – propionic bacteria at 62.4°C and **z curve** of 5.25
- **S:** sterilisation – at conditions that will kill *Clostridium botulinum* spores
- **GMP:** good manufacturing practice

**Note 5: Other situations**

**a.** The Codex recommendation for **olives darkened by oxidation** is non-specific. All such products should be sterilised with a salt content determined by GMP (generally low, e.g. 2–3%) and pH 7 or less.

**b.** For specific table olive products that are intended to meet the Codex standard for pasteurisation or sterilisation, the precise methodology for production should be developed and authorised by an approved laboratory.

**c.** Where possible aromatised olives and olive salad mixtures should meet the requirements of *Table 2* above, especially pasteurisation.

**d.** **Table olive products which are made according to traditional methods and which do not comply with the above physico-chemical characteristics, must achieve equivalent safety and quality characteristics before sale.**

**Note 6:** The presence of propionic acid and of its salts may be observed in table olive trade preparations that have undergone fermentation in conformity with GMP.

**3.2. Thermal treatments**

**3.2.1.** Characteristics of the thermal pasteurisation and sterilisation treatment applied to table olives, as evaluated in the packing brine or flesh – refer to *Table 3* below:

**Table 3. Pasteurisation and sterilisation parameters for table olive products**

Preparation	Minimum microbially lethal units	
	5.25 PU 62.4°C	10 Fo 121°C
	P	S
Treated olives	15	-
Natural olives	15	-
Dehydrated and/or shrivelled olives	15	-
Olives darkened by oxidation	-	15

**3.2.2.** Explanation of thermal treatments:

Pasteurisation and sterilisation are thermal treatments designed to stabilise the finished product. Specific scales are used to ensure that the final product is innocuous.

### 3.2.2.1. Pasteurisation treatment ('P')

Indicative organism – propionic bacteria at 62.4°C and z curve of 5.25

**Z** 'Pasteurisation units' (PU), defined as the cumulative lethal rate during  
PU heat processes performed at temperatures below 100°C. Propionic bacteria  
**rt** shall be considered the reference microorganisms for table olives, for  
which the equation of the 'thermal death time' (T.D.T.) is defined by a  
'reference temperature' (rt) equal to 62.4°C and a z curve of 5.25.

**rt:** the reference temperature is the temperature corresponding to a decimal reduction time which, together with the z curve, defines the logarithmic representation of the thermal death times (T.D.T.) curve of a given microorganism.

**z curve:** plots the logarithmic representation of the thermal death times (T.D.T.), according to temperature (T.D.T. curve); it is equivalent to the number of degrees for the curve to traverse one log cycle.

For **alkali** treated olives, natural olives (untreated), dehydrated and/or shrivelled olives a minimum of 15 pasteurisation units are required. In practical terms this is achieved by heating the table olives to 62.4°C for 15 minutes. If higher temperatures are used, the exposure time can be reduced. All pasteurisation procedures should be validated by an approved microbiological laboratory.

### 3.2.2.2. Sterilisation treatment ('S')

At conditions that will kill *Clostridium botulinum* spores.

**Z** 'Cumulative sterility value' (F<sub>0</sub>), is the integral or sum of the partially  
F<sub>0</sub> lethal rates obtained during sterilisation and expressed as exposure time at a  
**rt** reference temperature. When the reference temperature rt is fixed at 121°C  
and the z curve at 10°C, the F<sub>0</sub> value applicable to olives darkened by  
oxidation is obtained.

**Lethal rate:** reciprocal of the number of minutes of heat exposure required to destroy a given microorganism at a specific temperature.

**Thermal death time:** heating time, at a specific temperature and in specific conditions, required to reduce the initial microbial population by a factor of 10<sup>12</sup>.

**Decimal reduction time:** heating time, in minutes, required to reduce the active population of a bacterial suspension by one tenth.

## Section 4: Optional ingredients

Other ingredients may be used such as:

1. Water (potable or suitably treated to potable water standards)
2. Food grade salts
3. Vinegar – all food grades
4. Edible oil - olive oil as defined in the *Australian Standard® for olive oils and olive-pomace oils AS 5264-2011* (Standards Australia)<sup>10</sup>, or other edible vegetable oils as defined in the *Standard for Named Vegetable Oils* (Codex Stan. 210-1999)<sup>11</sup>, or in the equivalent Australian standards

**Note 1:** Edible oils with higher levels of polyunsaturated fatty acids will have lower oxidative stability and as a consequence a shorter potential shelf life. The oxidative stability of any edible oil used needs to be tested using Rancimat® and FAP analysis, and taken into account when determining the product Best Before Date (BBD)

**Note 2:** Where edible seed oils are used, the GMO status of these oils must be known and declared on the label.

**Note 3:** Where flavoured edible oils are used, the flavourings must comply with the requirements of point 8 below.

5. Sugars
6. Any single or combination of edible material used as an accompaniment or stuffing such as, for example, pimiento, onion, almond, celery, anchovy, capers, or pastes thereof
7. Dried food-grade spices and aromatic herbs or natural extracts thereof
8. Authorised food additives (including colourings and flavourings) (refer to *Australia New Zealand Food Standards Code – Standard 1.1.1, and the General Standard for Food Additives* (Codex Stan. 192-1995)<sup>12</sup>)

## Section 5: Quality criteria

Table olives must be considered as edible and shall have the characteristic taste, smell, colour and texture of the product and shall comply with the hygiene rules laid down in *Section 7* of the Industry Standard.

### 5.1. Qualitative classification

**Note:** The following descriptions are adapted from the *IOC Trade Standard Applying to Table Olives*, and Australian producers should consider using these especially if intending to export table olives.

Subject to the defects and allowances mentioned below in *Section 5.1.3* of the Industry Standard, table olives are classified in one of the following trade categories.

#### 5.1.1. Trade categories

**5.1.1.1. Premium (equivalent to ‘Extra’ or ‘Fancy’):** This category is for the best-quality fruit that exhibits above-average to excellent visual, textural and other organoleptic characteristics, specific to the variety and trade preparation and having a cumulative maximum of tolerances for defects of 12%;

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<sup>10</sup> *Australian Standard® for olive oils and olive-pomace oils AS 5264-2011* (Standards Australia): <https://australianolives.com.au/australian-standard-5264-2011/>

<sup>11</sup> *Standard for Named Vegetable Oils* (Codex Stan. 210-1999)

[https://mvo.nl/media/voedselveiligheid/codex\\_standard\\_named\\_vegetable\\_oils.pdf](https://mvo.nl/media/voedselveiligheid/codex_standard_named_vegetable_oils.pdf)

<sup>12</sup> *General Standard for Food Additives* (Codex Stan. 192-1995) [http://www.fao.org/gsfonline/docs/CXS\\_192e.pdf](http://www.fao.org/gsfonline/docs/CXS_192e.pdf)

providing this does not affect the overall favourable aspect or organoleptic characteristics of each fruit, they may have very slight colour, shape, flesh-firmness or skin defects. Whole, split, stoned (pitted) and stuffed olives of the best varieties may be classified in this category, providing their size exceeds 351/380.

**5.1.1.2. Choice (equivalent to ‘First’ ‘1st’ or ‘Select’):** This category is for good-quality fruit that exhibits good or average visual, textural and other organoleptic characteristics specific to the variety and trade preparation, and having a cumulative maximum of tolerances for defects of 17%; providing this does not affect the overall favourable aspect or organoleptic characteristics of each fruit, they may have very slight colour, shape, flesh-firmness or skin defects. All the types, preparations and styles of table olives may be classified in this category, except for chopped, or broken olives and olive pastes.

**5.1.1.3. Standard (equivalent to ‘Second’, ‘2nd’ or ‘Regular’):** This category is for reasonable-quality fruit that is still edible that exhibits below-average visual, textural and other organoleptic characteristics, and having a cumulative maximum of tolerances for defects of 22%.

**5.1.1.4. Substandard:** This category is for table olives that have more than 22% physical defects, do not comply with the general conditions defined for table olives in *Section 2.1* of the Industry Standard, including olives that exhibit poor visual or textural characteristics but still meet minimum organoleptic characteristics, e.g. no mould, rancidity, zapatera. This fruit is not **suitable** as a table olive but might still be used in a chopped medley or for olive paste or tapenade production.

## 5.1.2. Definitions of defects

### 5.1.2.1. Visual

**a. Harmless extraneous material:** Any vegetable matter not injurious to health, nor aesthetically undesirable, for example leaves, separated stems, but not including substances the addition of which has been authorised in the Industry Standard.

**b. Blemished fruit:** Olives with marks on the skin that are more than 9 mm<sup>2</sup> in surface area and that may or may not penetrate through to the flesh.

**c. Mutilated fruit:** Olives damaged by tearing the epicarp to such an extent that a portion of the mesocarp (**flesh**) becomes visible.

**d. Broken fruit:** Olives damaged to such an extent as to affect their normal structure.

**e. Shrivelled fruit:** Olives which are so abnormally wrinkled as to affect their appearance. The slight superficial wrinkles displayed by certain trade preparations **eg dried olives** shall not be considered a defect.

**f. Abnormal colour:** Olives the colour of which is distinctly different from the characteristic colour of the **variety and trade** preparation in question and from the average of a representative sample of the lot.

**g. Stems:** Stems attached to the olives and which measure more than 3 mm in length when measured from the shoulder of the olive. Not considered a defect in whole olives presented with stem attached.

**h. Defective stuffing:** Olives presented in the stuffed olive style which are totally or partly empty in comparison with the trade preparation in question and with the average of a representative sample of the lot.

**i. Stone (pit) or stone (pit) fragments (except for whole olives):** Whole stones (pits), or stone (pit) fragments measuring more than 2 mm along their longest axis.

### 5.1.2.2. Textural

**a. Abnormal texture (kinaesthetic sensations):** Olives which are excessively or abnormally flabby

or tough in comparison with the **variety and trade** preparation in question and with the average of a representative sample of the lot.

### 5.1.2.3. Gustatory

**a. Abnormal taste:** Residual bitterness, salty, acidic, poor balance between the various olive flavours and tastes in comparison with the **variety and trade** preparation in question and with the average of a representative sample of the lot – refer to *Section 5.3*.

**b. Abnormal olfactory:** Abnormal fermentation (putrid, butyric, zapatera), musty, rancid, ‘cooked’, soapy, metallic, earthy, winey-vinegary – refer to *Section 5.3*.

### 5.1.3. Tolerances for defects

The maximum defect tolerances for each trade category, by type of olives and for olives darkened by oxidation, are given in *Table 4*.

**Table 4: Tolerances for defects whole, stoned (pitted) or stuffed olives**

	Premium category			Choice category			Standard category		
	Green olives	Olives darkened by oxidation	Olives turning colour and black olives	Green olives	Olives darkened by oxidation	Olives turning colour and black olives	Green olives	Olives darkened by oxidation	Olives turning colour and black olives
<b>Whole olives, stoned (pitted) or stuffed olives</b>									
<b>Maximum tolerances as % of fruit:</b>	%	%	%	%	%	%	%	%	%
Stones (pits) and/or stone (pit) fragments	1	1	2	1	1	2	1	1	2
Broken fruit	3	3	3	5	5	5	7	7	7
Defective stuffing:									
– Place-packed	1	1	1	2	2	2	5	5	5
– Random-packed	3	3	3	5	5	5	7	7	7
Blemished fruit*	4	4	6	6	6	8	10	6	12
Mutilated fruit	2	2	3	4	4	6	8	8	10
Shrivelled fruit	2	2	4	3	3	6	6	6	10
Abnormal texture	4	4	6	6	6	8	10	10	12
Abnormal colour	4	4	6	6	6	8	10	10	12
Stems	3	3	3	5	5	5	6	6	6
<b>Cumulative maximum tolerances of these defects as % of fruit</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>22</b>	<b>22</b>	<b>22</b>
<u>Maximum tolerance as units per kg or fraction</u>									
Harmless extraneous material	1	1	1	1	1	1	1	1	1

**Note 1:** Tolerances shall be assessed in a minimum sample of 200 olives taken in accordance with *Codex General Guidelines on Sampling CAC/GL 50-2004*.<sup>13</sup>

<sup>13</sup> *Codex General Guidelines on Sampling CAC/GL 50-2004*:



**Note 2:** Olives presented in the halved, quartered, divided, sliced, chopped or minced, broken, salad olive (except when prepared with whole olives) and olive paste styles: the presence of a stone (pit) or stone (pit) fragment shall be tolerated in every 300 grams of net drained content of olive flesh.

## 5.2. Lot acceptance

A lot should be considered as meeting the applicable quality requirements referred to above in *Section 5.1.3.* of the Industry Standard, when the requirements which are based on sample averages are complied with.

## 5.3. Organoleptic assessment

Organoleptic characteristics shall be determined in accordance with *IOC Method Sensory Analysis of Table Olives* COI/OT/MO No 1/Rev.2, November 2011.<sup>14</sup> For further explanation of organoleptic assessment of table olives see pp 263–273 of *Producing Table Olives* by Stan Kailis and David Harris.<sup>15</sup>

# Section 6: Food additives and processing aids

## 6.1. Food additives<sup>16</sup>

All 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* and *Codex Stan.66-1981*.

### 6.1.1. Acidity regulators

INS No.	Name of food additive	Maximum level (expressed as m/m weight of flesh)
260	Acetic acid	Limited by GMP
270	Lactic acid	
330	Citric acid	
334	L (+) tartaric acid	

### 6.1.2. Antioxidants

INS No.	Name of food additive	Maximum level (expressed as m/m weight of flesh)
300	L-ascorbic acid	Limited by GMP

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[http://www.codexalimentarius.org/download/standards/10141/CXG\\_050e.pdf](http://www.codexalimentarius.org/download/standards/10141/CXG_050e.pdf)

<sup>14</sup> *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>

<sup>15</sup> *Producing Table Olives* by Stan Kailis and David Harris, ISBN 978 0 643092 03 7 2007, Landlinks Press 150 Oxford street (PO Box 1139), Collingwood Vic 3066. <http://www.scribd.com/doc/46731972/Producing-Table-Olives>

<sup>16</sup> *Australia New Zealand Food Standards Code – Food Additives:*

<http://www.foodstandards.gov.au/consumerinformation/additives/>

### 6.1.3. Firming agents

INS No.	Name of food additive	Maximum level (expressed as m/m weight of flesh)
327	Calcium lactate	Limited by GMP
333	Calcium citrate	
509	Calcium chloride	

### 6.1.4. Flavour enhancers

INS No.	Name of food additive	Maximum level (expressed as m/m weight of flesh)
621	Monosodium glutamate	500 mg/kg

### 6.1.5. Flavouring agents

INS No.	Name of food additive	Maximum level (expressed as m/m weight of flesh)
	Natural flavours as defined by the Codex <i>Guidelines for the Use of Flavourings</i> <sup>17</sup>	Limited by GMP

### 6.1.6. Preservatives

INS No.	Name of food additive	Maximum level (expressed as m/m weight of flesh)
200	Sorbic acid and its sodium and potassium salts (expressed as sorbic acid)	1000 mg/kg under the Industry Standard (Note 1) 500 mg / kg under Codex (Note 2)
210	Benzoic acid and its sodium and potassium salts (expressed as benzoic acid)	1000 mg/kg

**Note 1:** For the Australian market the use of sorbic acid or benzoic acid is approved under the *Australia New Zealand Food Standards Code* to a maximum level of 1000 mg/kg.

**Note 2:** If exporting table olives under the Codex standard the use of sorbic acid is approved to a maximum level of 500 mg/kg.

### 6.1.7. Colour retention agents (to maintain the colour of olives darkened by oxidation)

INS No.	Name of food additive	Maximum level: g/kg (expressed as m/m weight of flesh)
579	Ferrous gluconate	150 mg /kg as total Fe
585	Ferrous lactate	(Note 3)

**Note 3:** Use of ferrous lactate (INS No 585 – 150 mg/kg as total Fe) is approved for use under Codex, but is not permitted under the *Australia New Zealand Food Standards Code*.

<sup>17</sup> Codex *Guidelines for the Use of Flavourings* (CAC/GL 66-2008)  
[http://www.codexalimentarius.org/download/standards/11020/cxg\\_066e.pdf](http://www.codexalimentarius.org/download/standards/11020/cxg_066e.pdf)

### 6.1.8. Processing aids (maximum level limited by GMP)

Function	Substance (s)
Fermentation control	Cultures of lactic microorganisms
Prevention of the presence of O <sub>2</sub>	Nitrogen
Prevention of the presence of O <sub>2</sub> and	Carbon dioxide
Homogenisation and improvement of colour development	Manganese lactate Manganese gluconate
Debitting and darkening (ripe olives)	Sodium or potassium hydroxide
Control of pH	Hydrochloric acid Carbon dioxide

### 6.2. Contaminants:

**6.2.1. Heavy metals:** Table olives shall comply with the contaminant limits as stipulated by the *Australia New Zealand Food Standards Code (Standard 1.4.1)*. For export to countries where the *Codex Table Olive Standard* is accepted, then additives must meet Codex standards.

**6.2.2. Pesticide residues:** Products covered by the Industry Standard shall comply with those maximum pesticide residue limits (MRLs) established by the *Australia New Zealand Food Standards Code (Standard 1.4.2)* for these commodities.

## Section 7: Hygiene

**7.1. Australia New Zealand Food Standards:** Table olives must be prepared and handled in accordance with the appropriate sections of the *Australia New Zealand Food Standards Code*.

**7.2. Microbiological criteria<sup>18</sup>:** The products must also comply with any microbiological criteria established by the *Australia New Zealand Food Standards Code*. Microbiological criterion for food defines the acceptability of a product or a food lot, based on the absence or presence, or number of microorganisms, and/or quantity of their toxins/metabolites, per unit(s) of mass, volume, area or lot.

**7.3. Foreign matter:** To the extent possible in good manufacturing practice, the olives shall be free from any objectionable matter. Foreign visible contaminants – cracked or slit olives may have cloudy brines; herbs and spices have particulate properties.

**7.4. Microbiological deterioration:** The olives and brine shall be devoid of any microbiological deterioration caused in particular by putrid, butyric or zapatera fermentation.

**7.5. Sampling and testing:** When tested by appropriate methods of sampling and examination of table olives (refer to *FSANZ Guidelines for the microbiological examination of ready-to-eat foods*)<sup>19</sup>.

**7.6.** Olives shall be free from **pathogenic and/or contaminant microorganisms** likely to develop in the product in normal storage conditions; and olives shall be free from substances from microorganisms in amounts which may represent a hazard to health.

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<sup>18</sup> *Principles for the Establishment and Application of Microbiological Criteria for Foods* CAC/GL 27-1997: [http://www.codexalimentarius.org/download/standards/394/CXG\\_021e.pdf](http://www.codexalimentarius.org/download/standards/394/CXG_021e.pdf)

<sup>19</sup> *FSANZ Guidelines for the microbiological examination of ready-to-eat foods* [http://www.foodstandards.gov.au/\\_srcfiles/Guidelines%20for%20Micro%20exam.pdf](http://www.foodstandards.gov.au/_srcfiles/Guidelines%20for%20Micro%20exam.pdf)

**7.7 Fermented olives held in bulk** in a covering liquid may contain microorganisms used for fermentation, notably lactic bacteria and yeasts. The number of such microorganisms (lactic bacteria and/or yeasts) in a selective culture medium may, for each one, be up to  $10^9$  colony-forming units per ml of brine or per gram of flesh, depending on fermentation level.

**7.8. Olives preserved by heat sterilisation** (such as olives darkened by oxidation) shall have received a processing treatment sufficient both in time and temperature to destroy spores of *Clostridium botulinum*.

## Section 8: Microbiological criteria for processed table olives packed in bulk containers (non-pasteurised)

### 8.1. Microbiological criteria

This section establishes microbiological criteria for **non-pasteurised** table olives packed in bulk containers that may be offered for wholesale distribution including to food services.

**Table 5: Microbiological criteria for processed table olives in bulk containers (non-pasteurised)**

Products	Microorganism	Test criterion	n	c	m (cfu)	M (cfu)
All table olive trade products (Section 2.2) and styles (Section 2.3)	Salmonellas	Compulsory	5	0	Not detected in 25g	-
	<i>Escherichia coli</i>	Indicative	5	0	1.10 <sup>2</sup> /g	
	Staphylococci (coagulase-positive)	Compulsory	5	2	1.10 <sup>2</sup> /g	1.10 <sup>3</sup> /g
	<i>Clostridium perfringens</i>	Compulsory	5	2	1.10 <sup>2</sup> /g	1.10 <sup>3</sup> /g
	Aerobic micro-organisms tested at 30°C	Indicative	5	2	5.10 <sup>6</sup> /g	5.10 <sup>7</sup> /g
	Lactic Bacteria	Indicative	5	2	1.10 <sup>9</sup> /g	1.10 <sup>10</sup> /g
	<i>Listeria monocytogenes</i>	Compulsory	5	0	1.10 <sup>2</sup> /g	-
	Faecal coliforms*	Indicative	5	2	1.10 <sup>2</sup> /g	1.10 <sup>3</sup> /g
	Sulphite-reducing anaerobes	Indicative	5	2	1.10 <sup>2</sup> /g	1.10 <sup>3</sup> /g
	Yeasts	Indicative	5	2	5.10 <sup>5</sup> /g	5.10 <sup>6</sup> /g
	Moulds	Indicative	5	2	5.10 <sup>2</sup> /g	5.10 <sup>3</sup> /g

\*Testing for faecal coliforms may replace testing for *Escherichia coli*.

### 8.2. Interpretation

The **microbiological criteria** quoted in *Table 5* above and in *Section 9* below are to be interpreted as follows:

**Indicative:** Organisms where numbers exceeding the microbiological criteria points to inadequate processing for safety. A positive test for indicator organisms does not necessarily point to the presence of pathogenic organisms in the same product.

**Compulsory:** Organisms where numbers exceeding the microbiological criteria points to contamination of the product by pathogenic organisms in the same product.

**cfu:** Means colony-forming units.

**c:** Means the maximum-allowable number of defective sample units producing readings between ‘m’ and ‘M’ as specified in this Industry Standard.

**M:** Means the microbiological level where exceeded in one or more defective sample units would cause the lot to be rejected as specified in this Industry Standard.

**m:** Means the acceptable microbiological level in a sample unit as specified in this Industry Standard.

**Microorganism:** Means a microbiological agent as specified in this Industry Standard.

**n:** Means the minimum number of sample units which must be examined from a lot of food as specified in this Industry Standard.

A batch that is sampled is considered to be **non-satisfactory** for consumption when the following occurs:

**a.** The number of sample units with a microbiological level between ‘**m**’ and ‘**M**’ is greater than ‘**c**’;  
or

**b.** A sample unit exhibits a microbiological level that is higher than ‘**M**’, or includes *Salmonella* in 25 g.

**Note 1:** The microbiological criteria listed in *Table 5* and in *Section 9* are to be assessed using recognised methods for *Bacillus cereus*, *Clostridium perfringens*, *Escherichia coli*, *Staphylococcus aureus*, *Listeria monocytogenes* and *Salmonella*. The size of the sample subjected to microbiological analysis (‘**n**’) must not be less than 5 units.

**Note 2:** In *Table 5* testing for faecal coliforms may replace testing for *Escherichia coli*.

**Note 3:** Suggested limit for in-house laboratory testing is  $1.10^3$  cfu/ml of brine or per gram of flesh.

**Note 4:** *Table 5* also includes the requirements for non-fermented olives that have been produced by multiple water or weak brine changes to debitter before placing in suitable acidified brine.

**Note 5:** Brines and packing solutions must meet the criteria of *Section 3* of the Industry Standard.

**Note 6:** When ‘sold on’, purchasers shall:

**a.** Not dilute or alter the brine or packing solution without reference to the requirements of this Industry Standard.

**b.** Store the bulk olives away from heat in a cool place, preferably at 4°C.

**c.** Before serving the olives for immediate consumption, rinse the olives in potable water and embellish as required (e.g. olive oil, wine vinegar, herbs and spices).

**Section 8** content is adapted from the *Federation of French Condiments Industries – Code of fair practice for table olives Dec 2000*.

## Section 9: Microbiological criteria for processed table olives for sale or distribution to end users

This section establishes microbiological criteria for table olives offered for retail sale to the public, including table olives with or without packing solution, olive pastes and tapenades. These products would usually be pasteurised.

**9.1. Table olive products given thermal treatment (pasteurisation but not sterilisation) to ensure biological stability for storage (when stored) at room temperature:** After steam treatment (pasteurisation) stability of the product is attained, after 7 days storage at 37°C.

**9.1.1. Testing criteria:** For olives pasteurised in final containers, allow at least 7 days to stabilise the product, then test for effectiveness of pasteurisation using an indicator organism – suggest *Lactobacillus*. Additional tests could be for yeast/moulds and *E. coli* or faecal coliforms.

**9.1.3. All pasteurised olives:** Must meet the microbiological requirements of *Section 9.3* of the Industry Standard, including table olives with or without packing solution, olive pastes and tapenades.

**9.1.4. Brines and packing solutions:** Must meet the criteria of *Section 3* of the Industry Standard.

**9.2. Table olive products not given thermal treatment:** Applies to all packed table olive products of this group.

**9.2.1. Compulsory criteria:**

Salmonellas: not detected in 25 g	n=5, c=0, m=0 cfu/g
Staphylococci (coagulase-positive)	n=5, c=2, m=1.10 <sup>2</sup> cfu/g, M=1.10 <sup>3</sup> cfu/g
<i>Clostridium perfringens</i>	n=5, c=2, m=1.10 <sup>2</sup> cfu/g, M=1.10 <sup>3</sup> cfu/g
<i>Listeria monocytogenes</i>	n=5, c=0, m=1.10 <sup>2</sup> cfu/g

**9.2.2. Indicative criteria:**

<i>Escherichia coli</i>	n=5, c=0, m=1.10 <sup>2</sup> cfu/g
Faecal coliforms*	n=5, c=2, m=1.10 <sup>2</sup> cfu/g, M=1.10 <sup>3</sup> cfu/g

\*Testing for faecal coliforms may replace testing for *Escherichia coli*.

Aerobic Micro-organisms tested at 30°C:

<b>a.</b> Fermented green olives, green stoned (pitted) olives, olives stuffed with vegetable matter and black olives in brine	n=5, c=2, m=5.10 <sup>6</sup> cfu/g, M=5.10 <sup>7</sup> cfu/g
<b>b.</b> Cured black olives, Greek-style olives and green olives stuffed with fish paste or with matter of animal origin	n=5, c=2, m=1.10 <sup>6</sup> cfu/g, M=1.10 <sup>7</sup> cfu/g
Yeasts	n=5, c=2, m=5.10 <sup>5</sup> cfu/g, M=5.10 <sup>6</sup> cfu/g
Moulds	n=5, c=2, m=5.10 <sup>2</sup> cfu/g, M=5.10 <sup>3</sup> cfu/g

**9.2.3. All non-pasteurised olives:** Must meet the above compulsory and indicative microbiological requirements as well as those in *Section 9.3* of the Industry Standard, including table olives with or without packing solution.

**9.2.4. Brines and packing solutions:** Must meet the criteria of *Section 3* of the Industry Standard.

### 9.3. Categories of microbiological quality

FSANZ *Guidelines for the microbiological examination of ready-to-eat foods* identify four categories of microbiological quality for ready-to-eat foods based on levels of indicator organisms and the number or presence of pathogens. These are satisfactory, marginal, unsatisfactory and potentially hazardous – refer to *Table 6*.

**Satisfactory:** Results indicate good microbiological quality. **No action** required.

**Marginal:** Results are borderline in that they are within limits of acceptable microbiological quality but may indicate possible hygiene problems in the preparation of the food. **Action:** Re-sampling may be appropriate. Premises that regularly yield borderline results should have their food-handling controls investigated.

**Unsatisfactory:** Results are outside of acceptable microbiological limits and are indicative of poor hygiene or food handling practices. **Action:** Further sampling and re-testing, including the sampling of other foods from the food premise may be required and an investigation undertaken to determine whether food-handling controls and hygiene practices are adequate.

**Potentially hazardous:** The levels in this range may cause food-borne illness and immediate remedial action should be initiated. **Action:** Consideration should be given to the withdrawal of any of the food still available for sale or distribution and, if applicable, recall action may be indicated. An investigation of food production or handling practices should be instigated to determine the source/cause of the problem so that remedial actions can commence.

**Table 6: Guideline levels for determining the microbiological quality of ready-to-eat foods**

Microorganism	Microbiological quality (cfu per gram)			
	Satisfactory	Marginal	Unsatisfactory	Potentially hazardous
Salmonellas	Not detectable in 25 g			detected
<i>Escherichia coli</i>	< 3 cfu/g	< 10 <sup>2</sup> cfu/g	> 10 <sup>2</sup> cfu/g	pathogenic strains of <i>E.coli</i> should be absent
Coagulase +ve staphylococci	< 10 <sup>2</sup> cfu/g	10 <sup>2</sup> –10 <sup>3</sup> cfu/g	10 <sup>3</sup> –10 <sup>4</sup> cfu/g	> 10 <sup>4</sup> cfu/g SET +ve
<i>Clostridium perfringens</i>	< 10 <sup>2</sup> cfu/g	10 <sup>2</sup> –10 <sup>3</sup> cfu/g	10 <sup>3</sup> –10 <sup>4</sup> cfu./g	> 10 <sup>4</sup> cfu/g
<i>Listeria monocytogenes</i>	Not detectable in 25 g	Detected but < 10 <sup>2</sup> cfu/g		> 10 <sup>2</sup> cfu/g

*Table 6* is adapted from FSANZ *Guidelines for the microbiological examination of ready-to-eat foods*.

### 9.3. Justification of microbiological criteria

*Table 7* presents the justification of threshold levels for microorganisms of interest.



**Table 7: Justification of microbiological criteria**

Microorganism	Threshold	Justification
Salmonellas	Absent in 25 g	Pathogen. testing is desirable even though risk is minimal due to fact that product is not particularly susceptible to its development
Staphylococci (coagulase-positive)	<1.10 <sup>2</sup> /g	Pathogen. minimal risk but good indicator for contamination of human origin during handling of product
<i>Escherichia coli</i> and faecal coliforms	<1.10 <sup>2</sup> /g	Tracers for faecal contamination. Testing for <i>Escherichia coli</i> is best performed on vegetable matter since populations of faecal coliforms are not always synonymous with faecal contamination
Aerobic mesophilic microorganisms	1.10 <sup>6</sup> to 5.10 <sup>6</sup> /g depending on the type of product	Indicators for pilot-testing (figures reported by professionals, based on good quality products)
Lactic bacteria	1.10 <sup>9</sup> /g	Presence in unpasteurised products
Yeasts	<5.10 <sup>5</sup> /g	Presence in unpasteurised products
Moulds	<5.10 <sup>2</sup> /g	Presence in unpasteurised products
Sulphite-reducing anaerobes	<1.10 <sup>2</sup> /g as indicative or compulsory depending on type of trade style	Good indicator for colonies of bacillus
<i>Clostridium perfringens</i>	<1.10 <sup>2</sup> /g as indicative or compulsory depending on type of trade style	Pathogen. Indicator of anaerobic flora. Threshold figure applies to commercial treatments for raw semolina and/or cooked vegetables
<i>Listeria monocytogene</i>	<1.10 <sup>2</sup> /g	Pathogen. Widespread in the environment. Organism can survive in fermented olives.

*Section 9* content is adapted from the *Federation of French Condiments Industries – Code of fair practice for table olives Dec 2000*.

## Section 10: Containers and labelling of containers for retail sale

Containers' filling weights/volumes, and container labelling must meet the appropriate sections of the *Australia New Zealand Food Standards Code and Codex Stan. 66-1981*.

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## The Voluntary Industry Standard for Table Olives in Australia

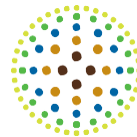
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The Voluntary Industry Standard for Table Olives in Australia (the Industry Standard) has been prepared by the National TableOliveCommittee (NTOC) of the AustralianOlive Association Ltd (AOA). It is a voluntary industry standard that establishes an objective basis for the wholesale and retail trade of table olive products in Australia.

The Industry Standard will 'lift the bar' for Australian table olive producers, in terms of improved product quality, food safety and productivity. The benefits to producers, wholesalers and retailers in having a clear objective industry standard will also deliver associated benefits to all consumers of Australian table olives.

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