

# OliveCare® Certification of EVOO



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# ***OliveCare*® Certification of EVOO**

This presentation will cover:

- What is *OliveCare*®?
- *OliveCare*® compliance requirements;
- What we test for and why?
- Factors that accelerate the breakdown of EVOO
- Olive oil defects and their causes
- Determining potential shelf life of EVOO
- *OliveCare*® certification of EVOO
- What do market surveys tell us?
- Some take home messages.



## What is *OliveCare*®?

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

The *OliveCare*® program coverage now extends from EVOO to include certification of table olives, flavoured olive oils, and other olive products.

*OliveCare*® also encompasses the entire olive supply chain from growers to the market place, including: grove management, olive processing, product storage, retail, food service and export marketing.

*OliveCare*® incorporates the provisions of the Australian Standard for Olive Oils and Olive Pomace Oils (AS5264-2011®), introduced in July 2011; and the Voluntary Industry Standard for Table Olives in Australia (RIRDC 12-111), introduced in 2012.



## What is *OliveCare*®?

The *OliveCare*® Code of Best Practice program provides a quality systems approach to manage risk, underpin product quality and providing tools to:

- Establish authenticity and quality of Australian olive products;
- Provide surety and build confidence of consumers in Australian olive products;
- Establish a framework that encompasses good business practice with HACCP-style production controls;
- Build olive industry skills and capacity;
- Deal effectively with complaints; and
- Establish a compliance culture within the industry in relation to industry voluntary standards, Australian Consumer Law (ACL), and the ANZFA Food Standards Code.



## What is *OliveCare*®?

AOA members who are *OliveCare*® Signatories are authorised to apply the following AOA trade marks to their certified products, POS materials and websites in accordance to the rules of use of these logos:



*OliveCare*® certified brands are listed by state of origin on the 'Everyday Australian Extra Virgin' website: [australianextravirgin.com.au/brands/](http://australianextravirgin.com.au/brands/).



## ***OliveCare*<sup>®</sup> Certification of EVOO**

Signatories to the *OliveCare*<sup>®</sup> Code of Best Practice for EVOO are required to undertake specified oil chemistry testing and sensory assessment for each product label to establish eligibility to apply the *Certified Australian EVOO*<sup>®</sup> Certification Trademark, in accordance with *The Australian Standard for olive oils and olive pomace oils (AS5264-2011)*, and *OliveCare*<sup>®</sup> certification requirements.



# OliveCare® Certification of EVOO

All Code Signatories are required to provide annually to the *OliveCare*® Administrator evidence 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, (template provided), this should include:
  - Use of a **Corrective Action Request** (CAR) procedure to deal with quality complaints, negative feedback, audit failures, on-farm inefficiencies, accidents or lapses in processes, procedures or performance (*template provided*);
  - Using a documented **product trace back system** including unique batch codes, supply chain records and a product recall system in place (*template provided*);
- Using product **Best Before Dates** supported by technical evidence (oxidative stability), and not exceeding 2 years;
- Compliance with Australia New Zealand Food Authority (ANZFA) Food Standards Code, Schedule 20 – **Maximum residue limits**, including keeping spray diary records, and observing Good Agricultural Practice (GMP);



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- Undertaking **annual product testing** (at NSW DPI or Modern Olives), meeting AS5264-2011 requirements for classification for each product certified as required under the *OliveCare®* Code of Best Practice, including:
  - **Minimum Oil Chemistry:** Free Fatty Acids (FFA), Peroxide Value (PV), Ultra-Violet Absorption (UV) - ( $\Delta K$ , K232 & K270). These parameters may be tested using NIR for Australian oils where the laboratory has achieved robust calibration;
  - **Highly recommended:** Oil Freshness Testing: Pyropheophytin A (PPP's), 1,2 Diacylglycerols (DAG's), tests which enable an objective calculation of BBD; plus
  - **Sensory assessment** undertaken by NSW DPI or Modern Olives (or through participation in a recognised olive competition);
- Providing a **declaration of EVOO storage conditions**, including control of Heat, Light and Oxygen;
- Having **product labels compliant** with AS5264-2011, Australian Consumer Law (ACL) and *OliveCare®* (*providing copies of all product labels to be certified*);
- All Signatories are encouraged to implement an **on-farm biosecurity plan** using the Farm Biosecurity Action Planner: <http://www.farmbiosecurity.com.au/planner/>





# OliveCare® Certification of EVOO

## EVOO Limits: AS5264-2011

- Free Fatty Acid (FFA) %m/m:  $\leq 0.8$
- Peroxide Value (PV) meqO<sub>2</sub>/kg oil:  $\leq 20.0$
- Absorbency in UV K232:  $\leq 2.50$
- Absorbency in UV K270:  $\leq 0.22$
- Absorbency in UV delta K:  $\leq 0.01$
- *Pyropheophytins a (PPPs) %*:  $\leq 17$
- *1,2 Diacylglycerides (DAGs) %*:  $\geq 35$
- Median of Defects (MeD):  $= 0.0$
- Median of Fruitiness Attribute (MeF):  $> 0.0$

## EVOO (fresh & well processed): MO

- Free Fatty Acid (FFA) %m/m:  $\leq 0.4$
- Peroxide Value (PV) meqO<sub>2</sub>/kg oil:  $\leq 12.0$
- Absorbency in UV K232:  $\leq 2.00$
- Absorbency in UV K270:  $\leq 0.18$
- Absorbency in UV delta K:  $\leq 0.01$
- *Pyropheophytins a (PPPs)*: 1% increasing by 6%-8% pa
- *1,2 Diacylglycerides (DAGs)*: 90% decreasing by 20%-25% pa
- Median of Defects (MeD):  $= 0.0$
- Median of Fruitiness Attribute (MeF):  $> 0.0$



# OliveCare® Certification of EVOO

## Modern Olives: testing costs (single sample)

Basic Chemistry: \$32.00 (NIR), \$123.50 (wet chem)

- Free Fatty Acid (FFA)
- Peroxide Value (PV)
- Absorbency in UV K232
- Absorbency in UV K270
- Absorbency in UV delta K
- (plus total polyphenols by NIR)

Sensory: \$69.11

- Defects
- FBP

Optional Freshness testing: \$176.10

- Pyropheophytins a (PPPs)
- 1,2 Diacylglycerides (DAGs)



## DPI Wagga Wagga: testing costs (single sample)

Basic Chemistry: \$35.75 (NIR), \$108.50 (wet chem)

- Free Fatty Acid (FFA)
- Peroxide Value (PV)
- Absorbency in UV K232
- Absorbency in UV K270
- Absorbency in UV delta K
- (plus total polyphenols by NIR)

Sensory: \$111.00

- Defects
- FBP

Optional Freshness testing: \$152.50 *(New NIR method pending)*

- Pyropheophytins a (PPPs)
- 1,2 Diacylglycerides (DAGs)



# Factors That Accelerate the Breakdown of EVOO

Factors that accelerate the breakdown of EVOO are well established:

- **Exposure to air (oxidation)** – using permeable plastic bulk storage containers, or partially filled storage containers, without using a floating lid or inert gas blanket.
- **Heat** – using uninsulated tanks and storage sheds.
- **Light** – using transparent containers – don't use 1000 Lit IBC's to store olive oil.
- **Contact with sediments and water (hydrolysis)** – need to rack-off tanks regularly during settling.
- **Delayed processing of harvested fruit** – fermentation will occur over time (best if fruit harvested at night and processed within 4-12 hours).
- **Processing damaged (high FFA) fruit** (diseased, mummified, split, over-ripe, frosted) will result in defective oils.
- **Variety and style** – oxidative stability - mild (low polyphenol), low oleic acid olive oils are less stable, even under ideal storage conditions may not last a year!
- **Olio Nuovo (new oil) style** is freshly pressed olive oil with incomplete settling; the higher moisture content of these oils causes hydrolysis and a typical shelf life of only 3 to 6 months.
- **Time** – waiting for a better price? Unlike wine EVOO doesn't get better with age – best to move it as quickly as possible.



# Olive Oil Defects – The Big 5

**Fusty:** A flavour defect attributable to poor storage conditions of the olives, usually promoting the bacterial growth of the Clostridium and Pseudomonas genera.

**Muddy sediment:** A flavour defect caused by storage in contact with oil sediment for long periods of time.

**Musty - humid:** A flavour defect occurring when low temperatures and high humidity promote mould growth, mainly of the Aspergillus and Penicilium genera.

**Winey - vinegary:** A flavour defect caused by storage condition of the olives that causes aerobic fermentation by the growth of yeasts that produce ethanol, acetic acid, and ethyl acetate.

**Rancid:** A flavour defect caused by the oxidation of the oil and subsequent formation of aldehydes during the production process giving the oil an oxidized flavour and odour.

## Other common defects:

**Frosted (wet wood):** Characteristic flavour of oils extracted from olives which have been injured by frost while on the tree.

**Heated (Burnt):** Characteristic flavour of oils caused by excessive and/or prolonged heating during processing, particularly when the paste is mixed under unsuitable thermal conditions.

**Metallic:** Characteristic of oil which has been in prolonged contact with (new) metallic surfaces during crushing, mixing, pressing or storage.



# Olive Oil Defects – In The Grove

## c. Fruit diseases / environment conditions



- Diseases (i.e. anthracnose, olive fly)

High FFA

Musty, Humid,  
Grubby



- Environment  
conditions

High PV

Frozen, dried

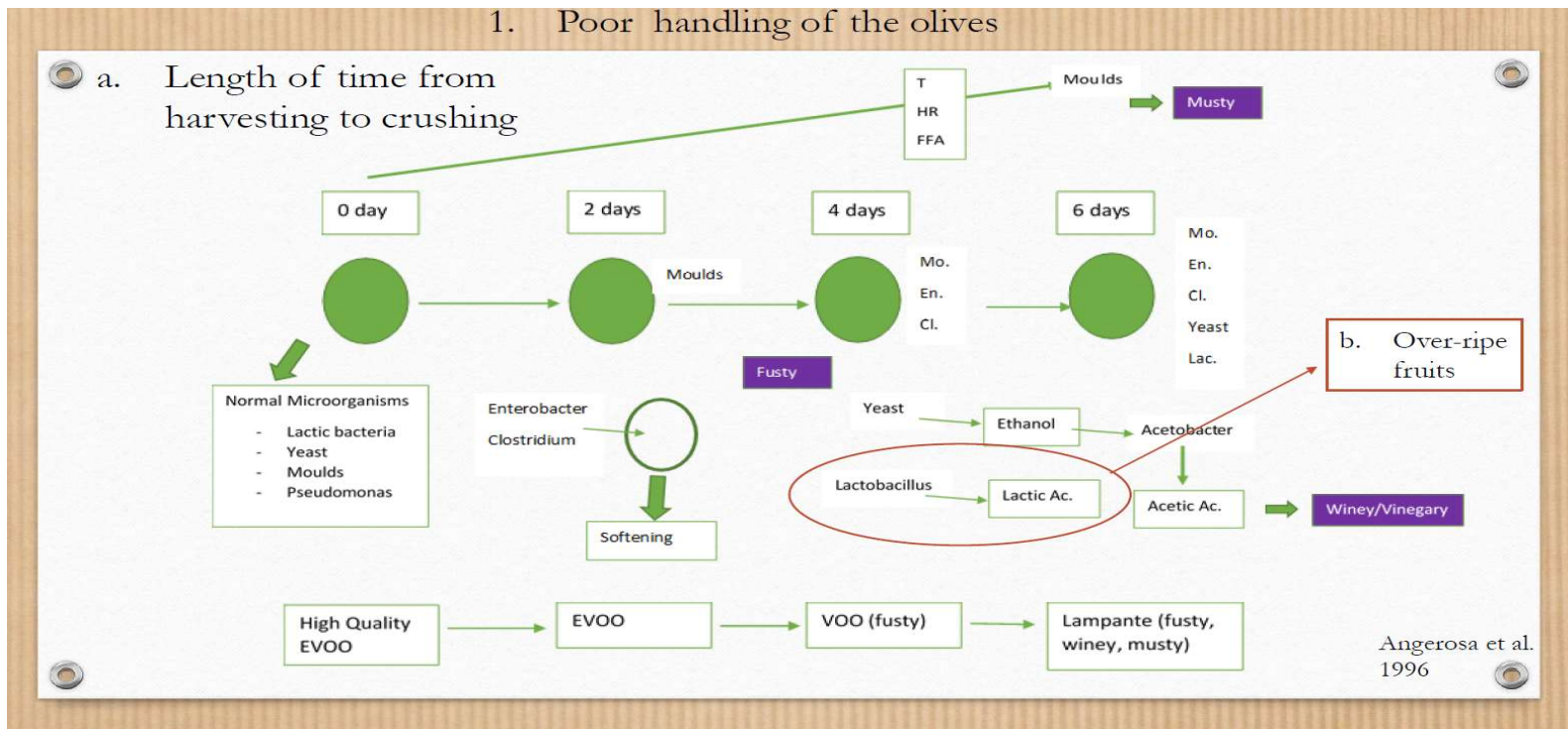
Defect	Origin	Microorganisms	Chemicals
FROST DAMAGE	<u>Fruit condition:</u> environment		Not yet identified
DRIED	<u>Fruit condition:</u> environment		Not yet identified

Slide: Claudia Guillaume, Modern Olives



# Olive Oil Defects – Poor Handling

## 1. Poor handling of the olives



Slide: Claudia Guillaume, Modern Olives



# Olive Oil Defects – Poor Processing

## d. Time and temperature of the paste in the malaxer / Contamination



- Inadequate cleaning of equipment

- Inadequate malaxing conditions (time, temperature)

High PV

Fusty, Heated, Burnt, Cooked

High PV

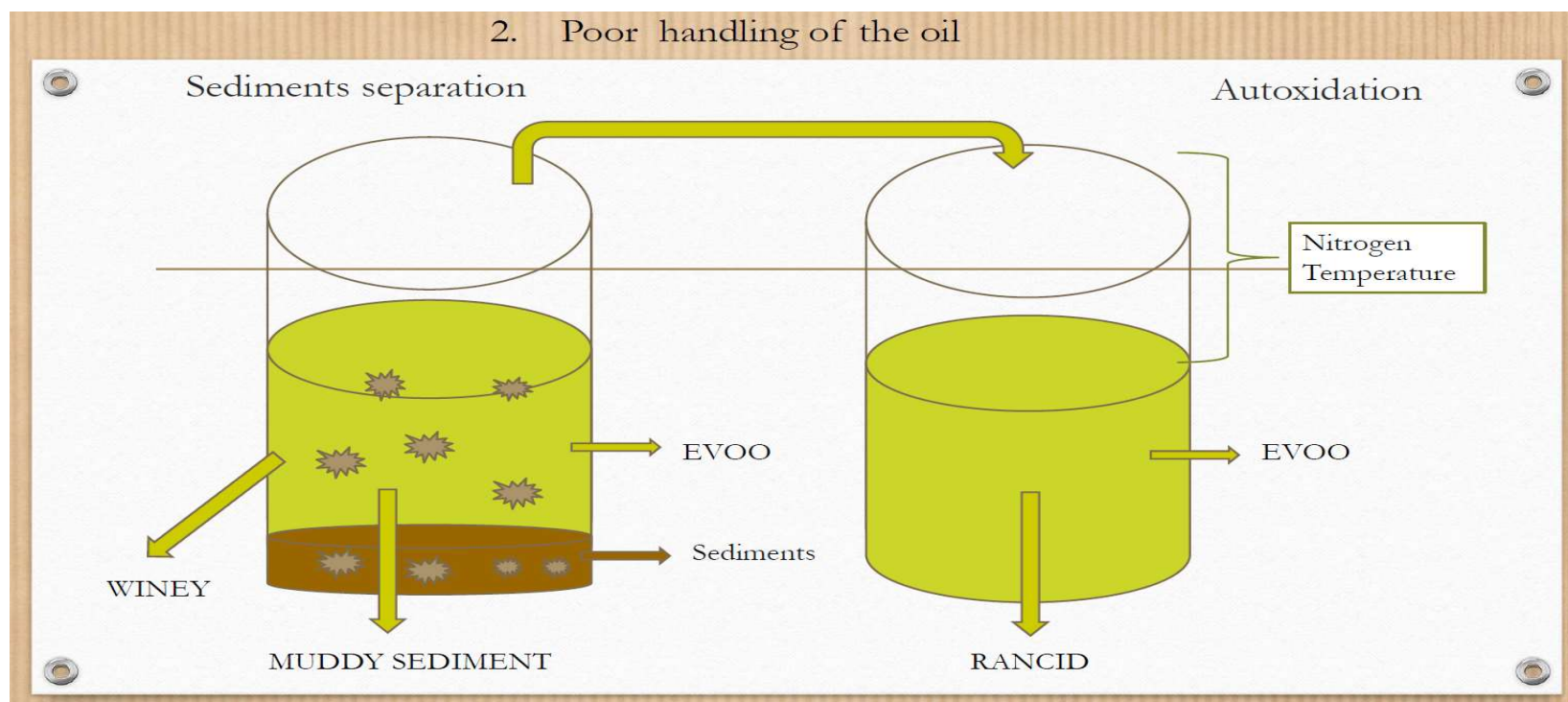
Metallic

Defect	Origin	Microorganisms	Chemicals
METALLIC	<u>Contamination</u>		1-octen-3-one; 1-penten-3-one; 1,5-octadien-3-one
HEATED/BURNT	<u>Processing condition</u>		2—hexen-1-ol; 1-hexanol; pentanal; nonanal; hexanal

Slide: Claudia Guillaume, Modern Olives

# Olive Oil Defects – Poor Oil Storage

## 2. Poor handling of the oil



Slide: Claudia Guillaume, Modern Olives





# OliveCare® declaration of EVOO storage conditions

## Taking into account current concerns regarding olive oil storage conditions:

Before issuing EVOO Compliance Certificates based on current season oil laboratory test reports, Signatories are required to complete the following declaration covering each EVOO product to be certified:

### For storage of bulk olive oil:

Do you store your oil in stainless steel tanks? (YES / NO) – If not what storage vessels do you use? – Provide details

Do you use an inert gas blanket or a floating lid? (YES / NO) – If not how do you control exposure to air? – Provide details

Do you store your oil <18 degrees C ? (YES / NO) – What is the storage temperature range for your EVOO – Provide details

Does your EVOO contain >70% Oleic Acid? (YES / NO) - Have you tested the fatty acid profile (FAP) of your EVOO products? (YES / NO), list varieties grown:

Do you 'rack-off' sediments and water when settling your new season olive oil? (YES / NO) – What is your 'rack-off' schedule? – Provide details

### For storage of pre-packaged olive oil:

Warehouse storage conditions - do you store your oil <18 degrees C ? (YES / NO) – What is the storage temperature range for your EVOO – Provide details

What steps do you take to manage product exposure to heat during road / air/ sea freight? Eg do you use temperature controlled transport, thermal blanket protection and temperature logging?

### Olive oil sourced from:

### Certified Product Labels:

Signatory Name:

Date:

Please complete and return to the OliveCare® Administrator at:  
[peter@mc.com.au](mailto:peter@mc.com.au)



# OliveCare® Determining EVOO Shelf Life

Shelf-life is the length of time, under normal storage conditions, within which no off-flavours or defects are developed and quality parameters such as peroxide value and specific absorbance are retained within accepted limits of the Australian Standard (AS5264-2011).

Suggested evolution of BBD based on FFA and EVOO storage in SS tanks and under N and oleic acid above 70%

FFA Oil (%)	Just Pressed	After 3 months	After 6 months	After 9 months	After 12 months	After 15 months	After 18 months	After 21 months	After 24 months
< 0.2	24 (34)	24 (31)	24 (28)	24 (25)	22	19	16	13	10
< 0.3	24 (31)	24 (29)	24 (26)	23	20	17	14	11	8
< 0.4	24 (28)	24 (26)	23	20	17	14	11	8	5
< 0.5	24 (25)	22	19	16	13	10	7	4	N/A
< 0.6	21	18	15	12	9	6	3	N/A	N/A
< 0.7	18	15	12	9	6	3	N/A	N/A	N/A
< 0.8	15	13	10	7	4	N/A	N/A	N/A	N/A

*Suggested evolution of potential BBD (months) based on FFA where EVOO storage is in Stainless Steel tanks <18°C, under Nitrogen gas and oil oleic acid (C18:1) >70% (L. Ravetti, Modern Olives Laboratory).*

*Figures in brackets represent predicted shelf life as calculated, however expectations over two years are limited to 24 months under AS 5264-2011 requirements.*



# OliveCare® Determining EVOO Shelf Life

## Variables impacting on shelf life:

**Factor A:** *plastic containers and/or pallets.* Research data and real evidence suggest shelf life expectations drop by between 15-120% of that for oil stored in stainless steel tanks.

- metallised and silver lining nylon and polyethylene bags provide the best conditions, with drops between 15-30%
- high density polyethylene containers typically show drops between 60-90%, depending on oxygen permeability and UV filters
- plain polyethylene bags and containers provide the worst results up to 120%.

**Factor B:** *temperature.* Research data suggests shelf life expectations drop by 7% for every 1°C above 18°C.

**Factor C:** *Nitrogen (or floating lid).* Research data indicates shelf life expectations drop by 25% when there is no controlled atmosphere during storage.

**Factor D:** *Oleic Acid content.* Technical evidence suggests shelf life expectations drop by 3% for every 1% of Oleic Acid under 70%.

**Shelf life correcting factor** =  $[(1+A) \times (1+B) \times (1+C) \times (1+D) - 1]$



## OliveCare® Determining EVOO Shelf Life

*Example: Oil “C” with a FFA of 0.22% has been stored in a high density polyethylene container without UV filter at a temperature of 23°C, without nitrogen and with an oleic acid content of 68% for 9 months and we want to know its current shelf life expectation.*

*Shelf life correcting factor:  $[(1 = \text{shelf life under ideal conditions} + 90\% \text{ for reduction for storage in high density polyethylene container without UV filter}) \times (1 + 35\% \text{ for reduction for storage temperature above } 18^{\circ}/\text{temp } 23^{\circ} \text{ so } 5 \times 7\%) \times (1 + 25\% \text{ of reduction for no nitrogen/cover}) \times (1 + 6\% \text{ for reduction for oleic acid below } 70\% \text{ ie } 2 \times 3\%)]$ .*

*So:  $[(1.9) \times (1.35) \times (1.25) \times (1.06) - 1] = 2.399$  or 239.9%.*

Using this correcting factor, 9 months of storage under these conditions is equivalent to 21.6 months of storage under ideal conditions ( $9 \times 239.9/100$ ). The differential of 12.6 ( $21.6 - 9$ ) represents the reduction in shelf life.

If we refer to the original table, nine months after processing an oil with this level of FFA should have a shelf life of 23 months. We can then deduct the 12.6 months of additional life lost and this gives us a predicted shelf life of 10.4 months.



# OliveCare® Certification of EVOO



**AUSTRALIAN  
EXTRA VIRGIN<sup>®</sup>**  
*Certified*

This certificate confirms that:

**Cape Schanck Olive Estate Pty Ltd**

Is a signatory to the Australian Olive Association's Code of Best Practice (*OliveCare®*).

The Extra Virgin Olive Oil that accompanies this certificate, identified as:

**"Cape Schanck EVOO – Coratina, Frantoio, Leccino Picholine, and Picual" varietals**

These olive oils meet the specifications of Australian Extra Virgin Olive Oil under the Australian Standard (AS5264-2011<sup>®</sup>) and *OliveCare®*.

**Certificate issued by:**  
Australian Olive Association Ltd (AOA).  
A.B.N. 57 072 977 489  
PO Box 6661  
Baulkham Hills, NSW 2153

**AOA Office:**  
Phone: 0478 606 145  
E: [secretariat@australianolives.com.au](mailto:secretariat@australianolives.com.au)  
**Code Administrator:**  
Phone: 0418 839 836  
E: [peter@au-thentic.net](mailto:peter@au-thentic.net)

**Certificate No. 1065**

Expires: **31 May 2020**

COP ID #: **205**

Harvest Year: **2018**

AOA Membership #: **A2801**

Laboratory Test Results: **R18-00660/61,  
R18-00904,  
R18-01125/26**

Signed:   
**CHIEF EXECUTIVE OFFICER**



**Australian  
Extra  
Virgin  
olive oil  
Everyday<sup>®</sup>**



**AS 5264 - 2011<sup>®</sup>**



# OliveCare® Certification of EVOO

## FRESHNESS TESTING:

Shelf-life is the length of time, under normal storage conditions, within which no off-flavours or defects are developed and quality parameters such as peroxide value and specific absorbance are retained within accepted limits of the relevant standards.

Potential BBD is best determined from the lowest value derived from the following 3 estimations: Rancimat® (Induction time), PPP and DAG testing:

- Hours of induction time (IND) at 110°C x 1 = expected shelf life (in months)
  - (17.0% - PPPs) / 0.6% = expected shelf life (in months)
  - (DAGs – 35.0%) / \*FFA factor = expected shelf life (in months)
- \*FFA factor = 1.7% (if FFA < 0.4%); 2.1% (if 0.4% < FFA < 0.6%); or 2.5% (if FFA > 0.6%)

**Note 1:** A new cheaper NIR ‘freshness testing’ method is in development.

**Note 2:** Under the Australian Standard, the stated BBD may not exceed 2 years.



# OliveCare® Certification of EVOO

## FRESHNESS TESTING:

*Example:* Oil “A” was analysed prior to being bottled and showed the following analytical results:

IND (@ 110°C):	21 hours
PPPs:	5.1%
DAGs:	63.0%
FFA:	0.24%

Applying the above formula we would have the following analysis:

IND:	$(21 \times 1) = 21;$	predicted 21 months
PPPs:	$(17.0\% - 5.1\%) / 0.6\% = 19.8;$	predicted 20 months
DAGs:	$(63.0\% - 35.0\%) / 1.7\% = 16.4;$	predicted <b>16</b> months.

The DAGs prediction is the lowest figure, therefore this oil should have an expected shelf life of 16 months from the date of testing (providing the oil is stored under optimal conditions).





# OliveCare® Certification of EVOO



**AUSTRALIAN L<sup>o</sup> EXTR<sup>o</sup> VIRGIN<sup>®</sup> Certified**  
**FRESHNESS TESTED™**

This certificate confirms that:  
**Saluté Oliva Pty Ltd**  
Is a signatory to the Australian Olive Association's Code of Best Practice (OliveCare®).  
The Extra Virgin Olive Oil that accompanies this certificate, identified as:  
**"Saluté Oliva EVOO Harvest 2018"**  
This olive oil meets the specifications of Australian Extra Virgin Olive Oil under the Australian Standard (AS5264-2011®) and OliveCare®.

**Certificate issued by:**  
Australian Olive Association Ltd (AOA).  
A.B.N. 57 072 977 489  
PO Box 6661  
Baulkham Hills, NSW 2153

**AOA Office:**  
Phone: 0478 606 145  
E: [secretariat@australianolives.com.au](mailto:secretariat@australianolives.com.au)  
Code Administrator:  
Phone: 0418 839 836  
E: [peter@au-thentic.net](mailto:peter@au-thentic.net)

**Certificate No. 1039**  
**Expires: 30 November 2020**  
**COP ID #: 148**  
**Harvest Year: 2018**  
**AOA Membership #: A2758**  
**Laboratory Test Results: AU 18/0669/1**  
**Signed:**  
  
**CHIEF EXECUTIVE OFFICER**

**Australian Extra Virgin olive oil Everyday**





# **OliveCare® Why Certified 'Freshness Tested'?**



# Australian Market Survey Results

Cumulative results of over 5 years of Australian 'off the shelf' market survey testing, undertaken from July 2012 to July 2017, reveal a disappointingly high product failure rate:

- 26 (22%) of the 129 OliveCare® Certified brand samples tested failed to meet the requirements for EVOO classification under AS5264-2011.
- 42 (41%) of the 102 Australian non- certified brand samples tested failed to meet the requirements for EVOO classification under AS5264-2011.
- 135 (89%) of the 151 Imported brand samples tested failed to meet the requirements for EVOO classification under AS5264-2011.



# Australian Market Survey Results

## Failed Parameters:

**Sensory Defects (all standards):** A total of 139 (36%) of the 382 products (42 (22%) Australian and 97 (51%) imported) exhibited negative sensory attributes (defects).

**Chemical Analysis (all standards):** A total of 56 (15%) of products (29 (15%) Australian and 27 (14%) imported) failed one or more of the chemical test parameters.

**Freshness Analysis (Australian standard only):** A total of 121 (32%) products (46 (24%) Australian and 75 (39% imported) failed freshness testing: Pyropheophytin A (PPP's), and / or 1,2 Diacylglycerols (DAG's).



## Take Home Messages

- *Olivecare*® Certified EVOO products have a superior record of compliance with olive oil standards over other Australian or imported products, however there is plenty of room for improvement.
- The industry practice of routinely applying a 2 year 'Best Before Date' on EVOO products without supporting test data is potentially misleading and is strongly discouraged.
- The use of harvest year on product labels is strongly encouraged to guide consumers in their choice of the freshest EVOO product.
- Australian market of the shelf survey testing of EVOO products has found that many products have less than 12 months of potential shelf life, sometimes as low as only 1 month.
- 'Freshness testing' of new season Australian EVOO products found that some products have less than the stated 24 months of potential shelf life, sometimes as low as 12 months.



## Take Home Messages

- The application of ‘freshness testing’ of EVOO is strongly encouraged to assist producers in providing a ‘cast iron’ guarantee to consumers that their product meets the requirements for EVOO classification under AS5264-2011, up to the stated BBD.
- **Note:** A new cheaper NIR ‘freshness testing’ method is in development.
- The *OliveCare*® Administrator works closely with all Signatories including those with test failures to help identify causal factors and set rectification requirements, as well as providing constructive feedback to other brand owners.
- *OliveCare*® Signatories receive a monthly newsletter packed with useful information and tips on product certification, grove management best practice, olive oil and table olive processing best practice, product storage best practice, and product distribution and handling best practice.



## OliveCare® Training Program

In addition to offering workshops and seminars, AOA working with River Murray Training (RMT) have developed 'e-learning' modules (comprising a total of 10 on line interactive presentations) with the aim of building industry skills and facilitate implementation of the *OliveCare®* Code of Best Practice.

Modules include Food Safety & Quality, Export Readiness and Sensory Training.

These 6 e-learning modules are linked to Units of Competency from the National Training Framework (NTF), and can lead to a recognised VET qualification or Statements of Attainment eg from the *Certificate III in Food Processing*, or *Certificate IV in Production Horticulture*.

To access the *OliveCare®* e-learning modules, participants need to firstly register with Gillian Ireland at River Murray Training [gillian.ireland@r-m-t.com.au](mailto:gillian.ireland@r-m-t.com.au) or [admin@r-m-t.com.au](mailto: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>



# MAKE A COMMITMENT TO OLIVE OIL QUALITY

Join the Australian Olive Association's  
OliveCare® Code of Best Practice



For more information see:  
[www.australianolives.com.au](http://www.australianolives.com.au) OliveCare®



Thank You !

