

Olive Oil: Tapping into the Upcycled Beauty Trend to Embrace a More Sustainable Future

Catarina (Catherine) Cervasio

Italian Australian Foundation Fellowship, 2024

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First Published 2024

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Printed by MDM Copy Centre

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ISBN: 978-1-923027-50-3

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01

Acknowledgements

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The Fellow sincerely thanks The Italian Australian Foundation for providing funding support for the ISS Institute and for this Fellowship.

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The Italian Australian Foundation (previously the Italian Services Institute Inc.) is an association dedicated to providing welfare and education services for disadvantaged persons of Italian descent who are a resident of Australia who would not have access to these services.

Fellow's Acknowledgements

Australia

- Andrew Muir
- Australian Olive Association
 - Michael Southan
- Australian Olive Oil Association
 - Jan Jacklin
- Avenir Ingredients
 - Armelle Sebbag
- Cobram Estate
 - Andrew Burgess
 - Leandro Ravetti
- ICCI Melbourne
- Jordan Saw
- Kyneton Olive Grove
 - Salvatore Inturissi
 - Mick Labbozzetta
- Paul Duck
- City of Port Phillip
 - Heather Cunsolo
- Port Phillip Pickers
 - Isabel Gardner
- Segmento Magazine
 - Giovanni Butera
- Taralinga Estate
 - Salvatore (Sam) Tarascio

Italy

- Akott
 - Antonio Ciavola
- Buonamici
 - Cesare Buonamici
- Frantoio Pruneti
 - Gionni Pruneti
 - Katy Lapini
- International Olive Oil Council
- Matia Barciulli
- Maurizio Servili
- Mirella Ciccotelli



Figure 1. Childhood grape growing



Figure 2. Catherine with grape vines

02

Executive Summary

This Fellowship involved the idea of upcycling particular food waste – giving waste a second life and converting the waste material into innovative new products or novel ingredients, specifically for use in natural bath, body, beauty and spa products.

For the purposes of this Fellowship, the waste materials from three separate food industries were initially considered. Olive oil production, wine making and tomato passata production were of special interest.



Figure 3. Family heritage

Passionately connected to her Italian heritage – The Fellow was raised with a strong Italian influence, her father arrived from Avellino Campania in Southern Italy in the 1950s and transferred his knowledge of living off the land to his new home in Australia. He grew an abundance of vegetables and fruit for the family's consumption, including olives, grapes, and tomatoes. Participating in the family's growing, processing, preserving, cooking and of course eating of fruits and vegetables including eggplant, olives, tomatoes, onions and grapes evokes strong childhood memories for the Fellow to this day and is responsible for her love of all things food.



Figure 4. Passata making



Figure 5. Family olive trees

As the Fellow began to research the topic of waste generated by each of these three industries - wine, tomato passata and olive oil, it became apparent the olive oil industry was generating the highest amount of not only waste, but environmental headache for grove owners and oil producers alike. During the olive oil production process in fact, both forms of waste (olive oil pomace and olive mill wastewater) possess their own unique waste management challenges. The wet, sludge waste, can account for as high as 85% of the olive oil processing bulk and for this reason the Fellow decided on specifically exploring the opportunity to re-use or upcycle the non-water waste component from olive oil production know as pomace (OOP).

Expertise

The Fellow, Catarina (Catherine) Cervasio has an extensive career in the natural and organic skincare industry over more than thirty years. A passionate home-cook and freelance writer, she has interviewed numerous chefs and restaurant owners about food and cooking throughout her career. Knowing that food waste is not only a financial challenge but also an environmental one for restaurateurs, looking at ways to reduce waste has been a particular topic of personal interest to the Fellow over the past several years.



Figure 6. Family citrus



Figure 7. Catherine's handmade tagliatelle

The Benefit

By upcycling olive oil waste and in doing so, incorporating any beneficial properties which remain following the manufacturing process, the Fellow believed there could be positive outcomes in terms of both the physical reduction of the waste itself, as well as the creation of a secondary income stream for farmers and producers by way of diversification into novel personal care products or even cosmetic industry ingredients. Overarching these potential outcomes was ultimately, the positive impact on the environment.

Maximizing Trends

Since the pandemic, there has been a surge in search terms for self-care and wellness according to Google¹; there has been a greater awareness of natural and organic products over the past decade and sales in general for these types of products are increasing. Along with this growing trend around these products is a desire by consumers to choose more sustainable products, products which are eco-friendly, have a lower carbon footprint, contain upcycled ingredients or are more environmentally friendly in some way.

Travel

The Fellow travelled overseas to Italy and Spain to visit olive growers and ingredient manufacturers using olive waste, to gain an understanding of the olive oil industry's best practices including the level of interest around upcycling waste. The information gathered would then be disseminated to stakeholders in Australia, Italy and elsewhere in the world including in print (magazine) and online, through various olive oil associations and industry bodies.

The Fellowship has reinforced the Fellow's belief that there is both a need to reduce olive oil waste in its current form and an opportunity to conduct further investigation and testing with a view to build out a new stream of products using the olive oil waste in personal care.



Figure 8. Catherine working abroad

03

Introduction



Figure 9. Aromababy Natural Skincare

The Fellow

The Fellow, Catarina Cervasio, is a passionate businesswoman, who launched an innovative natural and organic skincare brand for mothers and babies in 1994 called Aromababy. Whilst the Fellow's brand is specifically for mother and baby, her commitment to championing natural and organic ingredients

in the personal care category as a whole has benefitted the wider beauty and cosmetics and small business communities through her sharing expertise at numerous industry events, at universities and teaching institutions over thirty years.

With established networks around Australia and beyond, the Fellow is a strong supporter of fellow entrepreneurs having showcased their stories via various platforms including an online broadcast television show Women in Trade, her joint radio show, across social media platforms and in print through her writing magazine articles. Since launching Aromababy the Fellow has been a champion of female business owners in particular spending time mentoring others, presenting at conferences and identifying charities and community organisations which could benefit from the use of either her time or her innovative products which have proven successful especially for sensitive skin.

The Fellow has been able to adapt her business model over three decades, from manufacturer and wholesaler (B to B) to direct to consumer following the 'online shopping' boom post pandemic. The Fellow has formed commercial relationships for her products including with the likes of Myer, Qantas and Baby Bunting demonstrating a continuous willingness and ability to stay agile and adapt to sustain her business over a lengthy period of time. In recognition of her efforts, The Fellow was included in the Top 50 People in eCommerce twice, in 2024 and 2021, she won 2019 HKABA Exporter of the Year, CIBE Outstanding Person Award 2018 and National HKABA Export Award 2017.

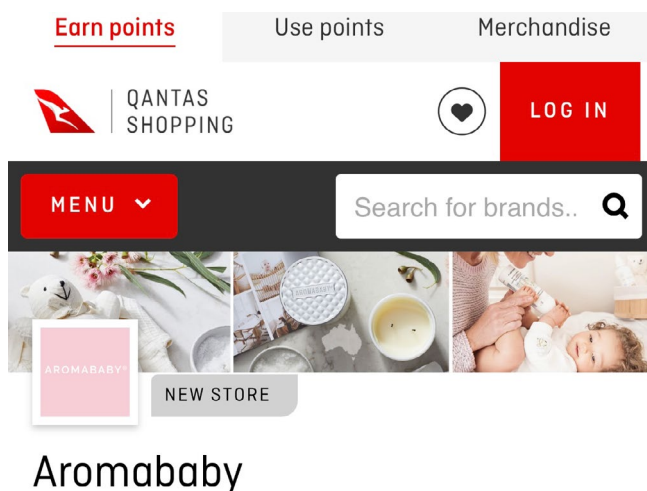


Figure 10. Aromababy on Qantas Marketplace

The Fellow has a warm and inclusive leadership style – which has enabled her to reach everyday parents, health professionals and high profile parents alike (including actor John Travolta, Queen Mary of Denmark, Jacinda Ardern and others, all of which have been gifted and acknowledged Aromababy afterwards) which enables her to share knowledge to a wider audience. Catarina has shared her story on the importance of natural and organic personal care on countless occasions to support and inspire other women on their small business journey, all the while, raising 2 sons as a sole parent.



Figure 11. Catherine and her sons

The Fellow has been a driving force behind the natural and organic skincare category for mother and baby in Australia. She is a long-time member of the ASCC, holds a Diploma in Aromatherapy and is a trained Infant Massage Teacher. Throughout her career she has stayed true to her focus, making petro-chemical/sulphate/parabe free gentle skincare products available to families not only in Australia, but around the world including in Hong Kong,

South Korea, Singapore, UAE and Taiwan where Aromababy is exported, driven she says, by a work ethic instilled in her largely by her Italian heritage.



Figure 12. Catherine with her father

With a long history of safety and efficacy, Aromababy is still produced in Australia and the Fellow regularly donates product to select maternity hospitals, women's health organisations and cancer care centres including ICON and Peter MacCallum, supporting both Breast Cancer Network and Treasure Chest Charity. The Fellow was Chairwoman for a fundraising event at The Royal Children's Hospital for almost a decade.

Whilst the Fellow champions the use of plant based and food derived ingredients including avocado oil through her brand Aromababy, she is also a freelance writer who is passionate about sharing stories around food and ingredients with articles published in several magazines. She is working on a collection of new, Australian made bath, body and spa products which hero Australian olive oil – a further nod to her late father's Italian heritage and his love of growing the family's own produce.

As a skincare brand owner, the Fellow can easily add innovative, new products to her existing range or develop products under a separate brand. Likewise, with her strong networks she can approach major raw material suppliers in Australia and abroad to support the commercialisation of stable OOP for use by brands in the personal care sector.

HISTORY AND BACKGROUND



Figure 13. Olive picking Bellarine Peninsula

OLIVE (OLEA EUROPAEA – European Olive)

Olives are the plump fruit from the olive tree, from which a viscous golden-green, nutrient-rich oil is extracted. Boasting a history as rich and complex as the oil itself, dating back many thousands of years, the olive was one of the first trees to be cultivated.

The olive tree was an iconic plant for most of the past Mediterranean civilizations, for which it had important economic value. According to a 2022 study, the earliest use of fruits and wood from olive trees in Africa so far, is reported to be around 100,000 years ago.

A sign of both power and wisdom, olive branches have also long been a part of religious ceremonies, referred to in the bible - revered and considered sacred. The saying to offer an 'olive branch' still refers today to a symbol of extending peace and a willingness to resolve conflict. The olive trees at Saint Remy de Provence, were immortalised by artist Van Gogh who was inspired to paint more than a dozen works featuring the trees outside his window during his institutionalisation in the village, including Olive Trees with Yellow Sky and Sun.



Figure 14. San Polo in Chianti

In recent years the humble olive tree along with its fruit and oil have gained enormous momentum and, are as 'on-trend' as a fruit could possibly be; olive trees were gifted by the likes of Oprah Winfrey, olive oil is used for eye makeup removal and featured in skin care products, there is olive oil cake, olive oil ice-cream and even Starbucks jumped on board, launching a range of olive oil infused coffee in 2023.

Found in abundance around the world, almost 2,000 varieties of olives exist within the Mediterranean basin alone. It is thought olives were first cultivated by the ancient Greeks, then adopted by Italy following the takeover of Greece. The Romans grew fond

of olive oil and so its extraction and consumption spread.



Figure 15. San Casciano olive trees



Figure 16. Van Gogh's olive tree inspiration, St-Remy, France

Today olives come in a wide variety of fruit size, in varying shapes, and range in colour from bright green to deep purple and almost black. Similar to wine, olive oil can vary in both aroma and taste - from robust and spicy, to earthy, light and fruity depending on which variety of olives were used, the climate and even the soil. Extremely hardy once established, olive trees thrive in sunny positions and are relatively drought resistant, able to produce abundant fruit when planted in well-drained, dry and even rocky soil.

Around the globe, olive trees are grown on every single continent except for Antarctica. Currently the global mass of land used for olive groves is said to be more than 11 million hectares. This is estimated to be a “kind of manmade forest that removes 4.5 tons of carbon dioxide per hectare from the atmosphere on a yearly basis.” According to International olive Council executive director, Jaime Lillo López. The fruit of the olive tree, in its native state, is virtually inedible by humans, although domestic animals like cattle and goats seem unoffended by the bitter flavour. Once cured in brine (made up of a water and salt mixture) which can take up to 12 weeks, much of the bitterness caused by oleuropein is removed. The olives are then ready for consumption or further preparation for example, marinating with herbs, garlic, lemon and more. According to history, extracting the oil was a later use of the fruit. It was then discovered that olive oil,² which is virtually smoke-free, could be used in cooking and to power lamps, as well as in many other ways.

Currently The International Olive Council (IOC), is the only international body dedicated to olive oil and table olives, created under the auspices of the United Nations in 1959.

EARLY OLIVE OIL

At the time of this Report, the earliest evidence of olive oil comes from an archaeological dig which took place between 2011-2013 near Nazareth in Israel. Scientists at the time made an important discovery³ at the site which was being excavated during a road widening project. The pottery fragments were then sent by scientists to a laboratory where they evaluated the organic remains that had been

absorbed by the clay. It was then that evidence of the remains of ancient olive oil was found which was thought to date back approximately 8,000 years.

OLIVE OIL IN AUSTRALIA



Figure 17. Community olive picking

Olive oil has for centuries been a part of numerous cultures around the world, the earliest olive oil production in Australia can be traced back to Adelaide, South Australia as recent as the 1800s.

Whilst olive trees were introduced to Australia in around 1800, it wasn't until the 1840s that experiments in commercial olive oil production began. A commercial oil press operated briefly in South Australia from 1864, but the first successful operation began in earnest around 1870. Based at Adelaide Gaol,⁴ the prisoners were employed to undertake the olive tree planting, tending, harvesting and ultimately processing of the olives into oil.

The South Australian Register⁵ reported in October 1870 that “First class olive oil is being made by the prisoners at the Adelaide Gaol under the direction of the Sheriff and the Keeper of the Gaol.” The Sheriff was William Boothby, who originally encouraged the planting of olive trees as a way to keep prisoners

occupied. After five or six years he acquired a press and began extracting oil, which was sold for between ten and twelve shillings a gallon.

Boothby became a promoter of olive oil, touring Europe to learn more, and importing new cuttings of European olive varieties. Other growers in South Australia followed his example. The first large-scale commercial olive enterprise was established by Stonyfell at Magill in 1873. By 1882, they had 100 acres under cultivation.

Although South Australia was the main producer of olive oil, there were also plantations in other states – for example, at Mildura and at Dookie Agricultural College in Victoria. However, during the depression of the 1890s, local demand for olive oil fell and export efforts were unsuccessful.

In the early part of the 20th century, locally produced oils could not compete in price with imported oils. Despite the influx of Southern European migrants after WWII, the revival of Australian olive oil production did not begin until the 1980s. In the intervening years, olive oil for most Australians was something you bought from the chemist as a remedy for earache.⁶

EXTRA VIRGIN OLIVE OIL

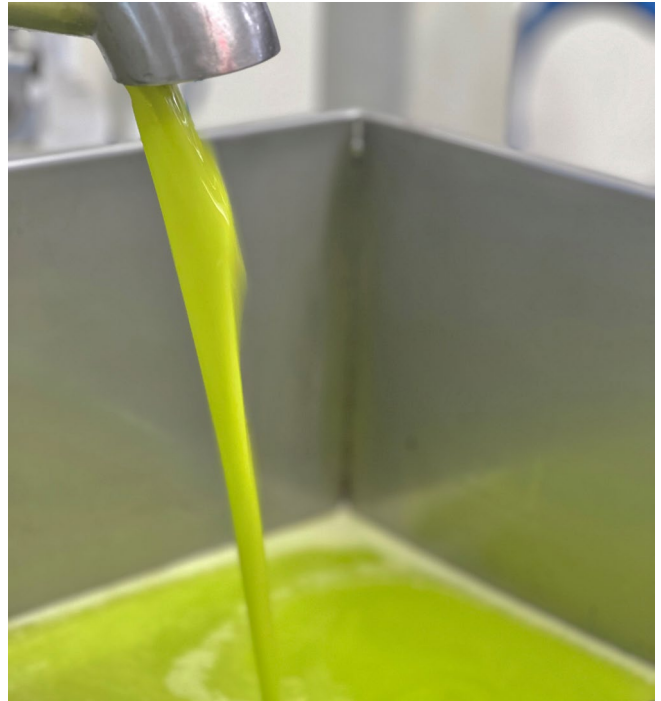


Figure 18. Pruneti fresh olive oil

According to global standards, extra virgin olive oil must have a free acidity, expressed as oleic acid, of not more than .8% and must contain the other physiochemical and organoleptic characteristics (for example, relating to taste, mouth feel and aroma), which correspond to those fixed for this category in the Standard set by I.O.C. This is the only legislated standard in the world for olive oil trade both in Australia and Internationally.⁷ It is the only legislated standard in the world for olive oil trade in Australia and Internationally.

Olive oil is produced by harvesting the olives (in modern times, using a machine which shakes the fruit from its branches) and processing the fruit - generally within 24 hours, which maximizes fruit aroma, antioxidant levels and flavour. This process includes malaxation/churning, pressing and refining.

Firstly the olives are picked mostly whilst still green or turning from green to purple. Extra virgin olive oil made from unripe olives is thought to have the highest concentration of polyphenols (antioxidants) and other beneficial bioactive compounds⁸ compared to oils made from fully mature, darker coloured olives. The olive fruit is then separated from its leaves



Figure 19. An example of a flow chart showing olive trees and fruit picking through to oil processing and upcycled beauty products available for sale.

and branches often using a blower. The olives are put onto a conveyor belt, washed to remove any dirt or remaining debris and then crushed into pulp using the more advanced steel hammermill which replaced the old method of using a stone mill. The mixture is then churned until it becomes a thick paste. Water is then added to the paste (which now consists of the crushed olive fruit and pit) to thin out the consistency of the mixture. The paste is then churned through a machine called a malaxer, slowly and using low heat of less than 27 degrees centigrade (the world standard for EVOO), so that the olive oil droplets can separate from the water/remainder of the mixture. Both the temperature and time are carefully controlled by sophisticated machines to ensure the quality of the olive oil is both optimised and antioxidant levels maintained. The oil is then separated from any solids or waters, and any remaining sediment is removed. Finally, the olive oil is decanted into a stainless-steel holding tank. Tanks are often topped up with inert gas such as

nitrogen which blocks any oxygen and helps retain the integrity of the oil. The oil remains in the tanks until it is required to be decanted or bottled. It is only the oil resulting from first pressing which can be referred to as EVOO.

As with times gone by, in modern day manufacturing, extra virgin olive oil still undergoes very little processing compared to other cooking oils. In early olive oil processing, stone mills were used to crush the fruit. The paste was then placed into fabric bags and those bags were then pressed. Hot water was poured over the pressed bags to wash out the remaining oil. The liquid was typically drained into a stone settling tank where the oil would rise to the top and separate from any remaining water and solid particles. The olive oil was then skimmed off the top – a time consuming and painstaking task, before being stored in terracotta pots for later use in cooking, medicinal purposes, in religious ceremonies, and more.

GROWTH OF OLIVE OIL PRODUCTION/CONSUMPTION



Figure 20. Ocean Grove olives

The demand for superior quality olive oil has been growing considerably over the past decade in Australia. This growth is due to several factors. One of the main drivers of the growth is the increasing awareness of the health benefits linked to consuming nutrient-rich oils in general, including olive oil. Consumers are seeking minimally processed edible oils which has also contributed to the growth of the olive oil market.⁹ Consumers have a greater understanding and awareness also of the benefits of cooking with olive oil. More consumers are experimenting with using olive oil outside the traditional ways, for example in baked goods including bread and cakes, for dips in place of cream and as a butter or other vegetable spread substitute. Avocado and olive oil chocolate mousse for example, is now a popular, healthy alternative to the traditional chocolate mousse many people had been previously familiar with.

Due to the restrictions placed on consumers as a result of the pandemic, people who were regularly dining at restaurants for example, were suddenly confined to their homes. People began to spend more time learning to cook and researching recipes online; eating at home more frequently also meant there were savings, some of which were being used to purchase more premium ingredients including olive oil also adding to the upward trend in olive oil consumption.

According to the International Olive Council¹⁰, the world's production of olive oil during the 2021/2022 crop year was almost 3,300,000 metric tons resulting in a yield of approximately three million litres of oil.

Olive oil is one of the world's most valuable fruit outputs – a major export commodity for countries including Syria¹¹ steadily growing in population globally¹² in part due to consumers seeking a healthier lifestyle and diet.

For countries including Spain, Italy, and Morocco (the top three olive oil producing countries), olive oil is a major export and source of revenues. In Spain, almost 6 million tons of olive oil is produced annually – compared to Australia's mere 20,000 tons.¹³

HEALTH BENEFITS



Figure 21. Taralinga fresh olive oil

Extra-virgin olive oil is obtained from the first pressing of the fruit, with any subsequent pressings coming from a blend of EVOO and a subsequent pressing referred to simply as olive oil. Olive oil is a key ingredient in the Mediterranean diet, which expert panellists voted No. 1 on U.S. News' 2023 Best Diets list.¹⁴ This is the Mediterranean diet's sixth consecutive win. In fact, an extensive review of a large body of academic research has placed higher significance of the Mediterranean diet. "People adhering to the Mediterranean diet tend to lose weight over a long period of time. Furthermore, they show that adhering to the Mediterranean diet usually prevents someone from becoming overweight or obese." Ligia J. Dominguez, professor, University of Enna faculty of medicine and surgery.



Figure 22. Olives for sale Uzès market, France

Boasting a wide variety of benefits ranging from a reduction in mortality due to cardiovascular disease to extended longevity, the consumption of olive oil has long been a topic of research interest. In fact, in a Harvard study conducted over a 28-year period, scientists found that people who consumed the most olive oil — a little more than half a tablespoon per day — had a 19% lower risk of death from any cause over that 28-year period, compared with those who rarely or never consumed olive oil.¹⁵

Participants of the Harvard study were asked how often they used olive oil for example in dressings, added to food or bread or in cooking (baking and frying). According to the findings people in the highest category of olive oil consumption — more than 7 grams per day, also had a 17% lower risk of cancer mortality and 18% lower risk of respiratory mortality compared with those who never or rarely consumed olive oil.¹⁶

Similarly, a study led by La Trobe University and published in *Nutrients*, involved 50 healthy adult participants with diverse backgrounds and dietary habits who took part in the clinical trial. The results showed that you don't have to have a Mediterranean heritage to benefit from olive oil consumption.

Just four tablespoons of extra virgin olive oil per day can reduce central systolic blood pressure by 2.5 per cent; and peripheral systolic blood pressure by 2 per cent.¹⁷

Olive oil is rich in a compound called phenols, or polyphenols, which are a type of antioxidant found in plant matter. As an antioxidant, polyphenols have protective properties by neutralizing free radicals, which can damage your body's cells and contribute to the development of certain types of health conditions. It is these phenols which need to be properly protected for the benefits to be maintained and for this reason, storage of olive oil should always be in a dark place for example in a cupboard, away from air, light (including sunlight) and away from heat.

Aside from the numerous scientific research studies around consumption, olive oil is also widely regarded as a 'healthy' oil to cook with¹⁸ with one of the highest smoke points at between 390 and 468 degrees.

In the *Acta Scientific Nutritional Health*¹⁹ study, 10 of the most commonly used cooking oils were selected from the supermarket and heated in two different trials. In the first, the oils were heated for about 20 minutes until they reached 464 degrees. In the second trial, the oils were heated in a deep fryer to 356 degrees, the highest temperature recommended for deep-frying foods,²⁰ for six hours.

In both tests, extra-virgin olive oil displayed the greatest oxidative stability, producing lower levels of polar compounds, trans fats and other byproducts when compared with other oils that had higher smoke points.

While olive oil has a moderate smoke point, its stability may be due to its high levels of antioxidants, as well as monounsaturated fats.

Extra-virgin olive oil was the most stable oil when heated, while coconut and other virgin oils – such as avocado – followed closely behind.

Interestingly, in a 2010 *Food and Chemical Toxicology* (TT) study, when researchers fried various types of olive oil, only after 24 to 27 hours of frying were the oils considered to be harmful. And in a 2015 *Food Chemistry* study, when researchers deep fried and sautéed potato, tomato, eggplant and pumpkin, antioxidant levels of the foods actually increased, showing that olive oil continues to deliver nutritional benefits even when cooked at a high heat.²¹

WHY OLIVE OIL WASTE?



Figure 23. OOP Taralinga

The International Olive Council (IOC) estimates for every 1 litre of olive oil 11kg of CO₂ can be captured from the atmosphere. As part of their millennial photosynthesis (the process by which plants use sunlight, water, and carbon dioxide to create oxygen and energy), olive trees capture and absorb carbon,

storing it in the soil. According to a 2017 study developed by the IOC, the world olive-growing area spans approximately 10.5 million hectares, meaning it could remove around 47 million tons of CO₂ per year. The data sustains that, on average, one hectare of olive grove can capture 4.5 tons of CO₂ per year. Considering the total life cycle of olive oil, this means that the production of 1 kg of olive oil can remove up to 10 kg of CO₂ from the atmosphere.²²

Together with the positives of olive oil however comes the huge environmental headache – namely, the amount of waste generated including environmental pollutants (in the form of gas) along with solid waste (from the pip, skin, and pulp) known as ‘pomace’ (OOP) and olive mill wastewater (OMWW).

If waste from olive oil processing accounts for as much as 85% of the production output, this poses challenges for the industry as a whole – with the waste itself an environmental menace to both soil and waterways due to its composition of alkaline pH and high phytotoxicity. The OMWW and OOP is therefore potentially toxic to plants and cannot be easily disposed of. The solid waste, OOP,

contains antimicrobials which are substances that can inhibit the growth of microorganisms such as bacteria. While antimicrobials can be beneficial in certain contexts, they can also be harmful to the environment. In the case of OMWW, the phenolic compounds that exhibit antimicrobial properties are considered an environmental threat. The waste produced from olive oil production exhibits highly phytotoxic and antimicrobial properties, mainly due to phenols. Phenols are a poisonous caustic crystalline compound. These effluents unless disposed of properly can result in serious environmental damage.²³

Upcycling olive oil waste has the potential to not only reduce the olive oil industry’s carbon footprint and move close to a circular economy, but also to capture the valuable antioxidants which remain within the waste and give them a purpose of their own. Upcycling of waste from this industry offers wide scope for investigation and ultimately, benefit.

Figure 24. Dried OOP Kyneton (below)



04

Learnings In Market Knowledge Acquired

For the purposes of this Fellowship, the Fellow travelled to Tuscany, Italy and Barcelona, Spain. The Fellow met with olive oil producers in Italy to discuss their olive oil processes and waste management systems, and to Spain to seek out cosmetic raw material suppliers who were using olive oil waste to produce novel ingredients. The Fellow was provided with unique access to several industry specialists.

SPAIN



Figure 25. Visiting Akott, Barcelona

In Barcelona, Spain, the Fellow attended In-Cosmetics Global – a cosmetic raw material/ingredient trade show which attracts both industry suppliers and formulation chemists together with beauty industry specialists including brand owners and innovators from around the globe. In-Cosmetics Global is regarded as the leading event for personal care ingredients world-wide.

The 2023 event attracted more than 10,000 visitors from around the world – a 33% increase on the previous year, showing both a strong interest in novel ingredients for personal care products and a return to pre-pandemic, international travel.²⁴

Amongst the exhibitors, companies from Italy ranked 5th highest, behind France, China, Spain and Germany respectively, showing the region's strength in innovation and expertise in this area. And it was here that the Fellow visited the booth of Akott Evolution – a specialist manufacturer of sustainable active ingredients for the beauty and personal care industry.

Based in Milan, Italy, Akott is a leader in upcycled ingredients, offering actives derived from blueberry, artichoke, tomato, red grape and olive. All these ingredients have been derived in part of waste substance. The olive oil pomace concentrate together with olive mill waste water have both been used in the case of Akott's Italine O ingredient, which utilises upcycled ingredients from the olive oil industry.

Akott's representative explained to the Fellow that the Italine O ingredient is the result of a complex process. The ingredient is inspired by the Umbrian village of Otricoli, situated in the central region of Italy, approximately 70km north of Rome. This area is renowned for its high quality olive oil even boasting its own DOP (Protected Designation of Origin) classification Umbria Olive Oil P.D.O. - Dop Italian Food. It is in part from this region that olive waste in both solid form (OOP) and liquid (OMWW) are collected from growers following harvesting and processing. The Italine O ingredient is produced by turning the OOP into a concentrated, dry, active powder then combining it with glycerine.

The OOP and OMWW used in the Italine O ingredient contain valuable elements which are suitable for cosmetics including biophenols such as tyrosol, hydroxytyrosol and oleuropein. An Akott study has found that together these elements can help provide protection against UV rays and shield from environmental pollutants including dust particles. In vitro studies carried out by Akott on reconstructed human skin also showed a reduction of UV and ROS production in the control group. The study was conducted using the Italine O product vs a placebo with positive results, demonstrating skin lipid peroxidation protection and an overall improvement of the skin's brightness and tone. Lipids are molecules which comprise of fats and fat-soluble vitamins including A, D and E. These molecules act to guard the cell membrane integrity and therefore any increase of lipid protection is seen to be important.

The Fellow learnt from the Akott representative that their upcycled olive waste ingredient is yet to be used in a personal care product to their best knowledge by an Australian based organisation at the time of writing.

ITALY



Figure 26. Tuscan landscape

Italy is one of the world's main producers of olive oil, globally behind only Spain. The export of olive oil is one of the main sources of revenue for Italy, derived from its land (which equates to in excess of 1 million hectares) dedicated to farming olives. Approximately 2/3 of Italy's olive oil production hails from the South, specifically the Puglia region, which boasts more than 900 olive mills scattered throughout the countryside, making it by far the most significant producing region in Italy. Several other areas in Italy are also renowned for their olive oil including Sicily and Umbria.

In Italy there are 42 Protected Designations of Origin (PDO) and 8 Protected Geographical Indications (PGI) regions made up of more than 23,000 processors. The top 5 PDOs and PGIs of Bari, Puglia, Tuscany, Sicily and Val di Mazaro (Palermo area) and Liguria make up 75% of the total olive oil value.

Matia Barciulli



Figure 27. Tuscany by night

Not only highly regarded for its state of the art groves and premium quality of olive oil, the Tuscany region is also home to chef and extra virgin olive oil specialist Matia Barciulli. For this reason the Fellow headed to a small town called San Casciano in Val di Pesa located a short distance southwest of Florence, to meet with Barciulli and discuss the topic of extra virgin olive oil.



Figure 28. Olive oil expert, chef Matia Barciulli

Barciulli had spent more than two decades working for Marchesi Antinori, 26th generational wine makers with a network of vineyards, restaurants and cooking schools. During that time Barciulli's passion for extra virgin olive oil flourished and together with several fellow enthusiasts they created the Florence-based Il Magnifico (olive oil) Awards. The Fellow met with Barciulli at Fonte de Medici - a small village whose history dates back to the fifteenth century. Situated in the heart of Chianti Classico, the property is bordered by vineyards and olive trees and offers a restaurant, accommodation and cooking school. The Fellow was invited to join a private cooking class which featured olive oil. During the class the Fellow discussed the history of olive trees in the region, olive oil and thoughts around using OOP with Barciulli, providing an insightful, unique hands on experience.

Buonamici



Figure 29. Buonamici OOP (top left), tour (bottom left), olive oil tanks (top right)



Together with Barciulli, the Fellow visited the Buonamici olive processing mill. Perched high on the hills of Fiesole, where the family has resided for more than two hundred years, a state of the art ‘oleotourismo’ centre and olive processing mill has been built. Complete with function centre and tasting room, guests are able to participate in a visit to the biodiversity olive grove and oil mill. The spectacular building is surrounded by approximately 30,000 olive trees over 250 ha. The grove features Frantoio, Moraiolo, Leccino, Pendolino, Maurino and Leccio del Corno varieties – olives typical of the Fiesole region which thrive, in harmony with both the land and each other.

In cooperation with CNR-IBE, (Institute of Bioeconomy – part of the National Research Institute of Italy which has several olive-based projects) the University of Florence and the Academy of Georgofili, (an educational institution promoting the study of agriculture) strong values around research

and sustainability are evident. Organic certification for their olive groves dates back to 1995. At the facility olive waste is collected in tanks below the floor and pumped away to holding catchment areas; pruning waste becomes wood chips and used to fuel boilers in favour of diesel from a distance of 600m to eliminate any potential to contaminate the mill. OMWW and other food wastewater is also used, stored and allowed to ferment to create gas which is then used for energy. Crushed olive pit becomes biofuel for the mill.

Whilst the Buonamici operation does produce skincare, olive oil is the main ingredient from their grove. In fact the highest level of oleuropein used in their cosmetics are from the Moraiolo olive – which provide up to 50g per 1 kg of fruit. Polyphenols are also abundant in their Coratino variety according to mill Director Cesare Buonamici. He explained to the Fellow that whilst he believes olive oil and waste has an important role to play in the personal care sector, much of the beneficial polyphenol content is lost in a water based product due to the molecules' water as opposed to lipid loving behaviour. Some work has been carried out successfully using finely crushed, upcycled olive pit which is then added to both face and body scrubs.



Figure 30. Buonamici testing (bottom left), Buonamici visit (top right), Buonamici bottling (bottom right)

Aside from Buonamici's interest in upcycling OOP in the future, he also expressed his concern around climate change to the Fellow, sharing that short spring seasons and long summers were negatively impacting all groves in the Tuscan region. With Buonamici's last strong year of fruit yield being in 2020 in terms of both quality and quantity of oil output, heavy and constant rain led to a lower than usual yield of fruit the following year as pollination had been challenging.

Pruneti



Figure 31. Pruneti (top), Tuscan olive grove (bottom)

During the Fellow's visit to Tuscany, far up in the hills of Chianti, she visited the small town of San Polo. Here is the home of olive oil producer Pruneti – located on the aptly named Via Dell'Oliveto (which loosely translates to 'street of olives').

Olives have been part of the Pruneti family's life for more than 4 generations. In excess of 30,000 olive trees sprawl across the land behind the processing plant and office buildings, covering the countryside as far as the eye can see.

It was explained to the Fellow that without easy access to water or lakes for irrigation, the stoney ground here forces the olive trees to grow their roots deep into the earth in search of moisture - partly responsible for the award-winning olive oil's unique aroma and flavor.

Although the Pruneti heritage has been entrenched in olive oil production for more than 160 years, the family business includes cultivating saffron and growing iris (a symbol of Tuscany). Like the olives, all of the crops at Pruneti are planted and harvested using organic principals, ensuring even the waste is kept free from unnecessary chemicals and pesticides.



Figure 32. Iris fields Pruneti

The Fellow was given a tour of the property, tasting room and production facility. The equipment – the most recent addition being a state-of-the-art centrifugal machine (used to split the liquid from



solids) was one of only a handful in the world at that time, sourced from one of Italy's leading olive oil equipment manufacturers Pieralisi. Ensuring minimum time between harvesting and processing at Pruneti not only maximizes the antioxidants and ensures optimum flavor and aroma but provides premium waste materials, ideal for upcycling.



Figure 33. Pruneti equipment (top left), meeting (bottom left), antique perfume book (top right)

In terms of using waste for personal care products at Pruneti, the olive pits are rinsed, dried and crushed, then used as a gentle exfoliant in facial scrub. At this time no further foray into upcycling the olive waste has taken place however Director Gianni Pruneti explained to the Fellow that there is a desire to do more with OOP and that they are currently working on a project with the Florence University around this topic.

Cosmoprof



Figure 34. Cosmoprof Bologna, Italy

The Fellow attended Cosmoprof in Bologna, one of the largest exhibitions dedicated to not only raw materials but all facets of the beauty industry from packaging to finished product.

Operating for more than 50 years and boasting more than 250,000 attendees to the 2023 event the Fellow's visit was specifically in search of novel ingredients made using upcycled food waste and/or OOP.

Whilst the Fellow was unable to identify any specific exhibitor offering these kinds of products, she was able to talk to several cosmetic manufacturers who did use olive oil in their formulations. The Fellow had a number of conversations with exhibitors around using OOP as a potential ingredient which she believes planted a seed for further discussion.

AUSTRALIA

According to Horticulture.com.au²⁵ the total olive harvest in Australia year ending June 30, 2022, was 77,000t valued at \$95.5M with 98% of the harvest sent for oil production, resulting in more than 12,000t of olive oil.

The most common varieties of olives grown in Australia include Frantoio, Picqual, Arbequina and Coratina which equate to approximately 80% of the total planted area. Hojiblanca, Koroneiki and Manzanillo are also grown in smaller quantities, selected for high yields and the resulting premium quality oils.

Whilst olives are grown across much of Australia, Victoria has the highest number of trees. In fact, with more than 12,000 ha planted with groves, Victoria has almost double that of NSW and SA with just over 6,000 ha each. Followed closely is WA with just under 6,000 ha, QLD has close to 3,000 ha and Tasmania groves are hovering around the 200 ha mark.*²⁶

In Australia the largest groves belong to Cobram Estate, who are the main producer of olive oil in the country. Based in Victoria, Cobram operate from several state-of-the-art facilities across the State including a world-class bottling production plant located in Lara. Cobram had an estimated olive oil yield of 9.5 million litres in 2022, which clearly indicates they are the largest producers of OOP in Australia.

Across Australian the following year however, the olive industry has faced challenging weather which ultimately negatively impacted the 2023 harvest. According to the President of the Australian Olive Oil Association, David Valmorbida, unseasonably cold and wet weather resulted in a shorter growing season, slower ripening of fruit, and a delayed harvest.

The Fellow spoke to AOA CEO Michael Southan who explained the 2023 harvest year generated approximately 17 million litres of olive oil and that exports were in the vicinity of 4,600t. He suggested Australian olive oil exports were not expected to

increase as currently only 60% of the consumption is met by local supply.

With yields at around 17% this leaves a little more than 80% of OOP which is a enormous amount of waste for Australian olive growers to dispose of. This in itself represents a huge opportunity for Australian olive growers to think outside the square - upcycling more of their OOP into novel ingredients and/or products. Southan agreed with the Fellow that Australian olive oil consumption sits around 2lt per capita. Compared to Europe's 10lt, together with the increase in awareness and growth in appeal, the Fellow surmises that along with Australia's olive oil consumption increase, the OOP challenge will also increase.

To learn more from olive oil producers in Australia, and to better understand the topic of OOP generation and the level of interest in upcycling the waste, the Fellow made several site visits and spoke with a number of industry stakeholders in Victoria.

The Fellow met with industry representatives from the private groves of Kyneton Olive Oil and Taralinga Estate and also from Australia's largest olive oil producer, Cobram Estate.

DISCUSSION - KYNETON OLIVE OIL



Figure 35. Fresh EVOO (bottom left), Kyneton Head processor and Director (top)

Situated north of Melbourne, bordering 'suburbia' yet still cradled by the natural landscape of neighbouring vegetation, is Kyneton Olive Oil. From humble beginnings, olive trees were first planted here 17 years ago by the Inturissi family. Without sophisticated equipment, back then the fruit was harvested by hand and had to be then transported elsewhere for processing which required both time and financial investment. It was through this outsourcing of the processing that the fruit was taken to the original Kyneton Olive Oil plant. Fast-forward a decade and the family's grove was producing so much fruit that it became essential to have their own processing on site in part because it was critical to shorten the time between picking and processing. With the news that Kyneton was looking to sell their equipment, the decision was made to purchase the machinery from the then owners, together with the rights to all the Kyneton Olive oil brand IP. In contrast to many other groves in Australia, the highest proportion of the 7,000 trees planted at

this grove are Frantoio – up to 90% according to one of the grove’s Director Salvatore Inturissi. The remaining trees are a combination of ten further high yield varieties which help to provide a flavour depth and complexity to the resulting olive oil.

Whilst Inturissi fondly recalls the family’s joy at their grove’s first harvest of 1000 kg of fruit, this location is now producing up to 80t of olives each year, yielding 14% - 20% of extra virgin olive oil which is pressed on site within only hours of being harvested.

OOP here is pumped out of the processing plant into a holding container which then moves the waste to an allocated space at the rear of the property. Here it is allowed to dry naturally in the sun and eventually breaks down. Some of the dried waste is then distributed over the grove.

A portion of the dry OOP is also privately collected for use in a worm farm, which undergoes a process, and the resulting matter is then used as a soil conditioner.

Kyneton’s management are open to exploring alternative uses for and upcycling of the OOP with the Fellow beyond this Report.

DISCUSSION - TARALINGA ESTATE

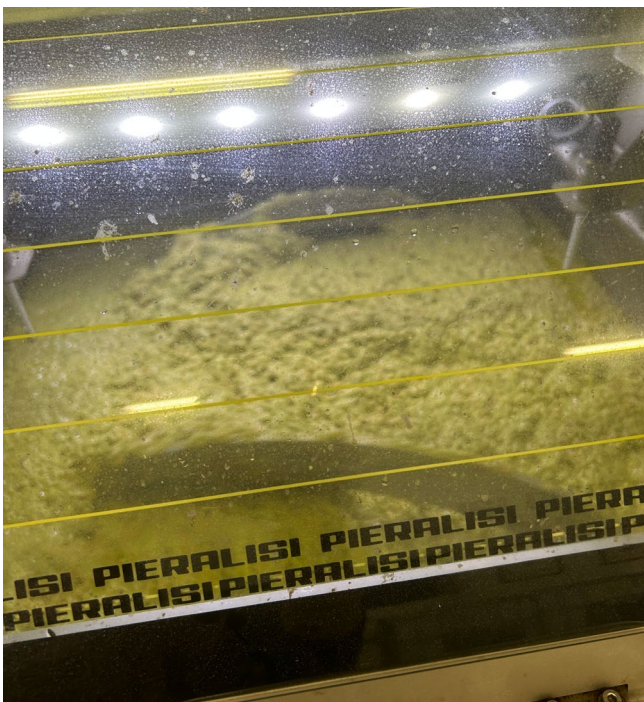


Figure 36. *Taralinga malaxer* (bottom left); olive oil crushing (top)

Perched on the picturesque Mornington Peninsula in Shoreham, Victoria, the 3rd and final grove visited by the Fellow was Taralinga Estate which is situated in a pristine environment. Purchased by esteemed Melbourne-based property developer and passionate olive oil consumer Sam Tarascio in 2010, the 80 hectare parcel was originally covered in dense bushland. A portion of the land was cleared to make way for the 2,500 olive trees which were planted in 2015 to pay homage to Tarascio’s grandfather who used to make olive oil. With volcanic soil rich in minerals and a microclimate perfectly suited to growing olives, in order to maximise the excellent conditions it was important to Tarascio that sophisticated processing equipment was to be used. Subsequently, a world class 2-phase set up was purchased from specialist machinery supplier Pieralisi who are headquartered in Italy. Taralinga currently produce two extra virgin olive oils - the lighter fruttato and richer tasting robusto. Their oils have won numerous awards from the very first

harvest including at the New York International Olive Oil Competition – regarded as one of the largest and most prestigious awards for olive oil in the world.

The Fellow was able to visit the Taralinga grove and discuss their management of OOP and environmental challenges around oil waste disposal.

The Fellow was shown how the OOP at Taralinga was pumped into a large catchment area adjacent to the processing facility and then allowed to settle. The solid waste was then relocated to another area of the property and allowed to further breakdown and dehydrate in the sun. Once the ph level of the pomace had improved in terms of soil compatibility, it was then used as an organic fertiliser for their own groves, and also added to feed for the property's cattle.



Figure 37. Taralinga olive trees



Figure 38. OOP scrub

Taralinga's management team were open to discussing the upcyclability of the waste generated by their olive oil processing facility, and so the Fellow collected some fresh OOP from the grove during the harvest of 2023. Some preliminary sampling was then undertaken by the Fellow, which is currently being used to gather information on stability and hence suitability of OOP use in the beauty/personal care sector.

DISCUSSION - COBRAM ESTATE



Figure 39. Cobram HO (top), Andrew Burgess (bottom)

Located at Boundary Bend, a small town close to the junction of the Murray River and the Murrumbidgee River, Victoria, Australia's largest producer of olive oil began its journey. With a location lending itself to an efficient use of nearby fresh water, college friends Rob McGavin and Paul Riordan believed this was the perfect location for an olive grove and planted their first trees back in 1998. Over the next two decades Cobram went on to become the largest olive oil producer in the country, owning more than 18,000 hectares of freehold farmland – 90% of which is located in central and northwest Victoria and southwest NSW. Now boasting 2.6 million olive trees, planted on 7,000 hectares of farmland across several sites, the Cobram brand has become one of the most well-known olive oil success stories in the world, producing more than 70% of Australia's olive oil. At Cobram, their 2020/21 harvest yielded a mammoth 16 million litres, more than the oil produced by several entire countries.²⁷

From its beginnings, Cobram Estate has displayed a firm commitment to operating sustainably, aiming to reduce any environmental impact on a number of levels and with an ultimate goal of net zero waste.

Several sustainability practices have long been in place at Cobram including around wet olive oil waste management. In fact, one such practice involves OOP from processing at Boundary Bend being treated on site and then distributed back to the groves as organic fertiliser. Crushed olive pits are also upcycled here and used as fuel for the property's boilers. Discarded olive leaves are used as part of a range of wellness products including teas under Cobram's Wellgrove brand which was launched in 2019. Even tree prunings are put to use as mulch for the grove.

During the Fellow's research it was discovered that Cobram is involved in an innovative sustainability project, the aim of which is to build Australia's first zero waste hub for olive growers. The industry-first facility will exist to upcycle up to 28,000 t of olive waste per year, transforming it into new products, delivering greenhouse gas reductions and reducing waste. The facility will also serve other olive growers in Victoria, encouraging farmers to sustainably upcycle their OOP.



Figure 40. Cobram bottling

The Fellow met with the company's Business Development Manager Andrew Burgess at the Cobram plant in Lara. Home to the largest bottling plant of its kind in Victoria, Burgess provided the Fellow with a tour of the impressive facility followed by an overview of the Sustainable Olive Mill Waste Management Project. He explained how at the time of meeting, the company was awaiting further notification from the EPA who had requested information on the noise output of the industrial dryers to be used for the planned Project.

The Fellow later spoke with joint grove CEO Leandro Ravetti who has been with Cobram for more than 20 years. He agreed that "biomass for energy production, soil conditioner and stockfeed are the most common and proven uses for large volumes of olive pomace" and he estimates that over 95% of the world's olive pomace ends up used as one of those three alternatives.

Cobram is currently consistently producing approximately 13 million litres of olive oil each year with fluctuations only due to the olive's biannual bearing nature. In terms of export, this was not expected to increase in the near future due largely to a robust domestic demand.

In terms of further use of OOP, or any waste for upcycled consumer goods, Cobram was not working on any specific project at that time however olive oil from the 2nd pressing was being used as an ingredient in consumer products under their Wellgrove brand. Ravetti also shared "I have known of some phytochemicals used for supplements, cosmetics, additives, nutraceuticals, etc." and suggested some other uses could imply the extraction of some phytochemicals (biophenols, squalene, maslinic acid – the latter thought to have some anti-tumor, antioxidant and anti-inflammatory benefits) however he believes that the "extraction and purification technologies are quite expensive on the one hand and the markets for those products are not substantial or competitive enough on the other".

"We have been investing significantly over the past 10 years in new groves including some 270 ha that we are planting right now so we have enough young trees on the ground to give us an organic production growth between 5 and 10% year on year for the next 8 years" Ravetti said. This will ensure Cobram continues its upward trajectory.

More oil however results in more waste which makes this last statement from Ravetti important; that Cobram has an "interest in exploring any avenue that allows us to add more value to our byproducts and to increase our net zero approach to waste upcycling as much as possible."

05

Personal, professional and sectoral Impact



Figure 41. Community olive project

Personal Impact

This Fellowship has had an enormous effect on the Fellow. She immersed herself in the topic of all things 'olives' throughout the Fellowship period and beyond, in an effort to understand more fully the growing appeal of the humble olive tree and its by-products. In connecting with individuals and community associations, wonderful stories of life and love were uncovered. During her regular walk on the Bellarine Peninsula, where she would travel every few weeks, the Fellow would pass by a private home with 3 large olive trees. As the seasons changed, she would witness the fruit growing, turning from green to black and eventually falling from the trees and spoiling on the ground. The Fellow reached out to the resident to enquire about the wasted olives. He shared the story of his wife (who had passed away) planting the trees approximately 40 years earlier. He was glad for the Fellow to pick and use the olives and remarked that his wife would be so happy to know the fruit was going to good use. The Fellow picked the olives with the initial intention to attempt to press the fruit and obtain olive oil, in an effort to understand first-hand the waste component. After researching the topic online and watching countless DIY videos, the Fellow resigned herself to the fact that producing oil without professional equipment would be fraught with disappointment – and more waste, the very thing she was looking to minimise. Instead, the Fellow tended to the freshly picked olives every day, over an 8 week period, to prepare them for preserving. A similar story unfolded

in the Port Phillip area, where she resided, with the Fellow going on to pick a neighbour's olives and then preserve them, minimising the pedestrian slip hazard from fruit rotting on the footpath in the process. The Fellow offered the finished table olives back to neighbours, friends and family, sharing her knowledge of olive oil waste in the process. The Fellow was also given permission to pick olives from the grove of Taralinga which she then preserved over the course of 12 weeks, eventually gifting the fruits of her labour, the pickled olives, back to grove owner Sam Tarascio.



Figure 42. Albert Park olives



Figure 43. Taralinga pickled olives

Throughout the Fellowship, the Fellow also built on her passion for cooking, featuring olive oil and sharing images and video content on social media, often in turn re-shared by olive oil stakeholders including the Get Drizzling campaign (an initiative by AOOA to promote the consumption of olive oil in Australia).

The Fellow has joined several olive oil associations as a member and has made lasting connections with several community groups which come together to pick fruit from suburban olive trees and there are currently ongoing communications. The Fellow plans to continue her work in the area of olive oil waste reduction via the personal care sector and to share her knowledge through professional bodies and various forms of media.

Professional Impact

As a long-time natural skincare product specialist, the Fellow has begun to look at ways to use olive oil in her business, developing new products incorporating not only the oil but also the olive oil waste. The Fellow is in the process of testing OOP for stability in formulations and as a direct result of her Fellowship, plans to launch new products late 2024 as an Australian first.

Sectorial Impact

The Fellow has engaged key stakeholders during her Fellowship journey, meeting with grove owners and associations who now have 'food for thought' specifically around using OOP in new ways. Making meaningful connections with grove owners, processors and enthusiasts both in Australia and in Italy will ensure the Fellow's impact will be both widespread and ongoing.



Figure 44. Cosmetic packaging

The Fellow met with City of Port Phillip Mayor Heather Cunsolo to discuss ideas around increasing the impact of a community project which centres around local olive trees. The olives, which until recently had mostly gone to waste, are now collected and processed as part of a local program supported by the City of Port Phillip



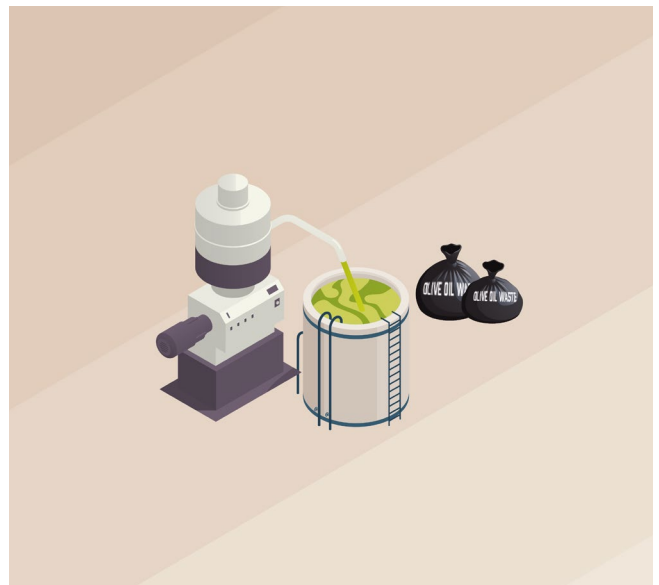
Figure 45. Fellow with Heather Cunsolo, Mayor of Port Phillip

06

Recommendations and Considerations

Major suppliers to the personal care industry could either gather the waste from growers and/or olive oil processors and send it for treatment if required (for example irradiation to reduce any microbiological bacteria and susceptibility to mould) or an industry body/consortium could handle this process. Such treatment should not impact the efficacy and the material could then be either air dried or freeze dried to remove any trace of remaining moisture. OOP could then be packed off in powder form for storage and commercial sales.

The material could be made available as an upcycled, Australian produced novel ingredient for example, in 25kg bags up to 1t bulk containers for supply to personal care manufacturers and/or brand owners globally.



07

Engaging Stakeholders

The Fellow believes stakeholder engagement needs to be multi-faceted in order to achieve the end goal of both commercialisation and sustainability benefits.

- Industry stakeholders to be engaged include Australian Olive Association

Industry organisations need to be convinced of the environmental and commercial benefits; by offering strong marketing support and advocacy to all Australian growers; innovative ingredients from upcycled OOP can become mainstream.

- Large growers and groves including Cobram Estate

Through connections already established and further direct contact, via educational presentations to marketing and NPD teams, who can in turn use the initiative to promote their environmental policies, lobby for government support and apply for sustainability grants.

- EPA; where pilot projects may have been held up due to potential 'noise' pollution, the enabling of fast-tracking based on the 'greater good' (reduced environmental waste, solutions for fellow olive growers and processors) of the project

Personal care industry bodies need to understand the overall benefit to the environment by embracing and promoting the use of novel ingredients from upcycled food waste.



Figure 46. Olive oil soothing balm

- ASCC

Skincare brands need to be made aware of the availability of new ingredients and the environmental benefit in using such ingredients.

- Large Australian founded brands including Aesop, Bondi Sands, Adore Beauty.

Cosmetic ingredients suppliers/raw material distributors and agents in Australia need to be made aware of the potential to both minimise waste and increase commerciality by embracing the idea of offering upcycled food waste ingredients from OOP.

- Significant raw material suppliers and manufacturers of cosmetics and personal care ingredients need to be made aware of the opportunities in using/offering upcycled food waste from OOP as an option to small batch operators and wholesale customers who shop with them.

Consumers need to be better educated around the topic of greenwashing and understand how locally sourced, upcycled food waste ingredients can have a positive impact on the environment – and in the process, provide a sense of ‘ownership’ around what an individual can do for sustainability by making alternative consumption decisions (around personal care, beauty products).

- Engagement of consumers, influencers, high profile/media personalities via education, promotion of DIY face and body care



08

Conclusion

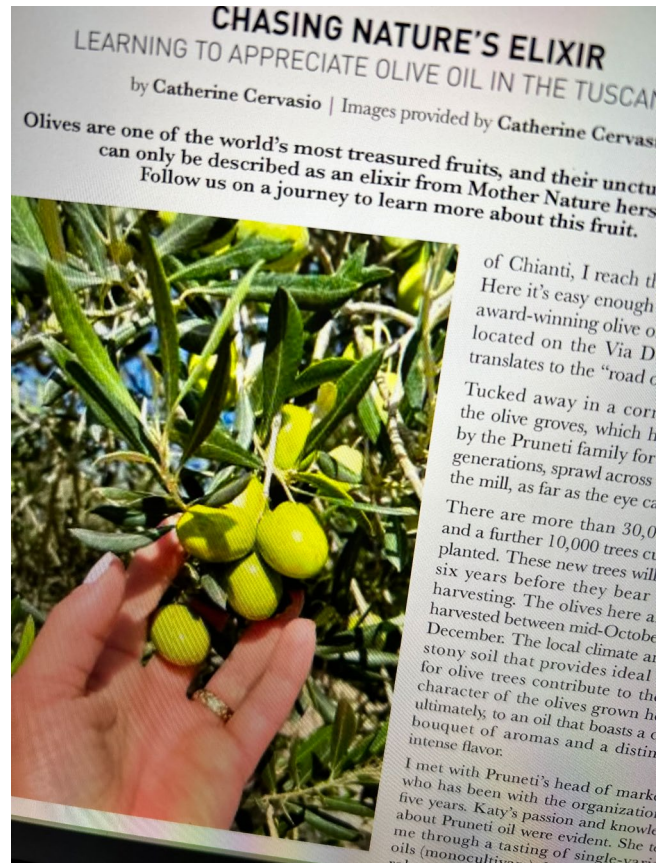


Figure 47. Catherine's first olive (left), published olive article (right)

Through the course of this Fellowship, the Fellow has made strong connections within several communities and has developed a passion around working with and educating around the benefits of olives, olive oil and upcycled OOP.

The Fellow has met with various members of the community to talk about their own experiences

living with olive trees and using their fruit. She has helped minimise street waste – where olives would fall to the ground and become a potential slip hazard and create debris, she has hand harvested and preserved the fruit, giving back to neighbours and providing a conduit for further connection and dialogue in the process.

The Fellow has engaged with key industry bodies, stakeholders, associations, growers and individuals in the journey of her Fellowship, enabling her to share

both her acquired knowledge and growing passion around olives. She had also shared her progress through various channels including articles featuring olives in magazines, online and across social media such as LinkedIn throughout the Fellowship period.



Figure 48. Pickled community olives

On reflection of discussions held with various olive grove representatives in Australia and Italy, the Fellow has a strong belief there is room for diversification of OOP outside of its current, limited uses. These include as a fertiliser/soil conditioner, for mulch, as a stock feed additive and for types of fuel. The Fellow is certain that a great opportunity exists for stakeholders to explore the idea of using OOP in new ways, either establishing supplementary income streams by commercialising their OOP within the personal care sector or providing it for free to interested parties, minimising their own waste in the process.

Whilst the Fellow did identify one manufacturer of cosmetic ingredients in Italy using upcycled olive oil waste, challenges exist around the transfer of any information and of course around the use of any confidential, intellectual property. As with any innovation, those who have developed same are generally reluctant to share it without a strong, mutually beneficial and viable commercial outcome for both parties.

In conclusion, the Fellow believes that using OOP has tangible outcomes on a number of levels, whether it be usage in the personal care sector with commercial outcomes for all stakeholders or ultimately, the enormous benefits to the environment. Upcycled food waste from OOP could help put Australia on the map as an innovator and leader in this field.

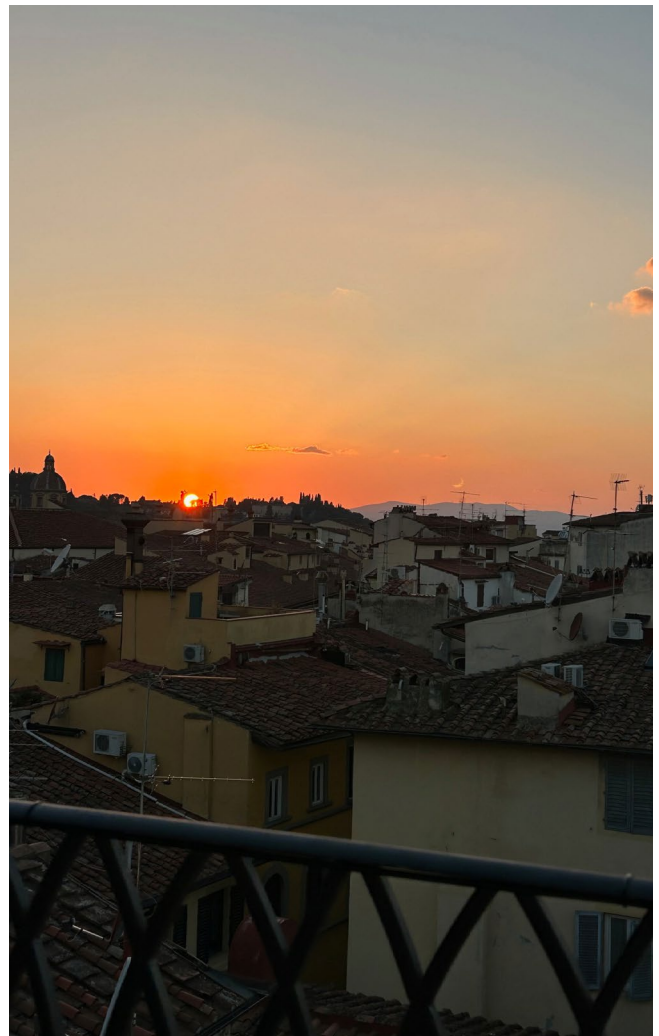
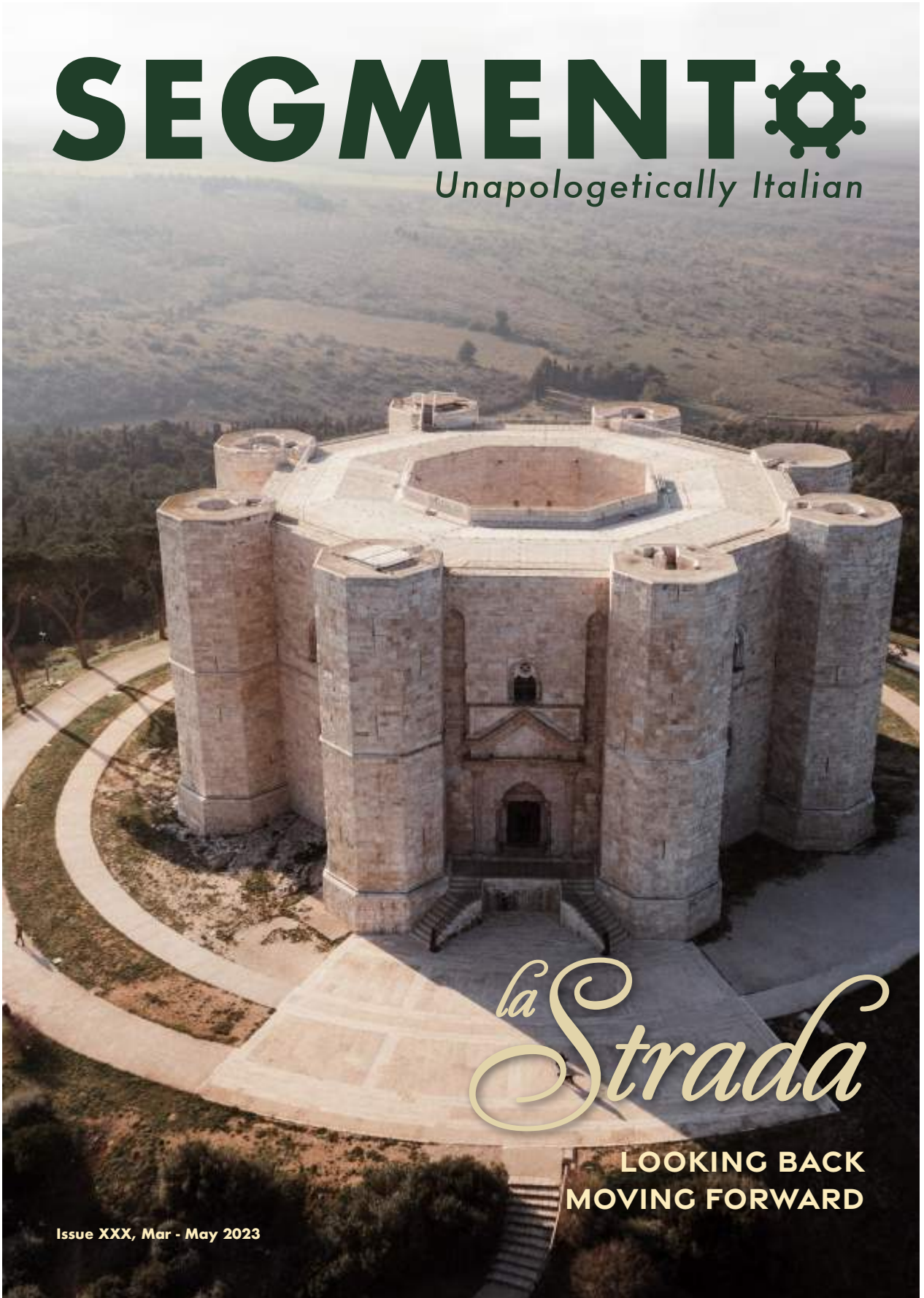


Figure 49. Florence sunset

SEGMENT

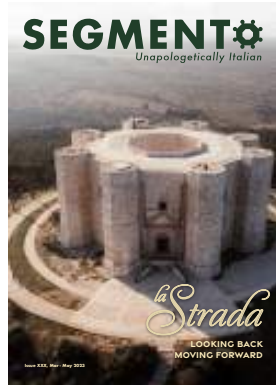
Unapologetically Italian



la Strada

LOOKING BACK
MOVING FORWARD

Issue XXX, Mar - May 2023



Segmento – Unapologetically Italian
Issue XXX • March-May 2023

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AU Melbourne
AU Sydney
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AU Adelaide
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AU Canberra
AU Cairns
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SIN Singapore

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CHASING NATURE'S ELIXIR

LEARNING TO APPRECIATE OLIVE OIL IN THE TUSCAN HILLS

by Catherine Cervasio | Images provided by Catherine Cervasio

Olives are one of the world's most treasured fruits, and their unctuous product can only be described as an elixir from Mother Nature herself. Follow us on a journey to learn more about this fruit.



In a quest to better understand this marvelous fruit, I traveled through France and Italy to learn more about olives and what makes the olive oil produced there so different from Australian varieties.

Driving along the narrow olive tree-lined roads that wind their way up into the hills

of Chianti, I reach the town of San Polo. Here it's easy enough to find the home of award-winning olive oil producer Pruneti, located on the Via Dell'Oliveto, which translates to the "road of the olive grove."

Tucked away in a corner of San Polo, the olive groves, which have been tended by the Pruneti family for more than four generations, sprawl across the land behind the mill, as far as the eye can see.

There are more than 30,000 olive trees and a further 10,000 trees currently being planted. These new trees will take around six years before they bear fruit worth harvesting. The olives here are typically harvested between mid-October and mid-December. The local climate and the dry, stony soil that provides ideal drainage for olive trees contribute to the unique character of the olives grown here and, ultimately, to an oil that boasts a complex bouquet of aromas and a distinct and intense flavor.

I met with Pruneti's head of marketing, who has been with the organization for five years. Katy's passion and knowledge about Pruneti oil were evident. She took me through a tasting of single-variety oils (monocultivars). My favorite was a robust, extra virgin olive oil produced entirely from green Frantoio olives. As a long-time aromatherapist and passionate cook, I'm no stranger to smelling, tasting, and describing aromas. This olive oil was reminiscent of artichoke and tomato vine, has a peppery, long-lasting taste, and would complement red meat or tuna. It won a gold medal at the New York International Olive Oil Competition (NYOOC) 2021.



The Pruneti brothers

According to brothers Gianni and Paolo, who took over the business in the 1990s, the success of Pruneti is the result of hard work, passion and knowledge passed down through the generations, as well as the drainage provided by the rocky landscape. Mother nature, of course, plays her role.

I was shown through the Pruneti production facility, where the equipment includes a state-of-the-art PIERALISI centrifuge (used to separate the oil from solids). It is one of only three such machines in the world. The speed, temperature, and separation time can be tailored to each batch of olives to maximize both flavor and antioxidant properties.

Co-founder of the Magnifico Olive Oil Awards in 2013 and Italian television chef

and passionate olive oil aficionado Matia Barciulli says that consumers need to be educated to make better choices when purchasing olive oil.

Olive oil needs to be protected from heat, light, and oxygen, and it needs to be purchased in an appropriately sized bottle. If you only use a little, buy a smaller bottle of oil. The harvest date is critical: an expiry date or “best before date” simply is not enough. Obtaining the most from high-quality olive oils is about proper storage in a cool dark place (or in a wine fridge) and ensuring the fruit is processed as close to harvest as possible, at a low temperature, then stored free of oxygen to maximize nutritional benefits and ensure a flavorful end product.

Matia is also the technical director of food and events for the Florentine Antinori



Catherine Cervasio and Matia Barciulli



Group, a family-owned business that has been producing wine for 26 generations. It is hard to believe, but this equates to six centuries of continuous production. Matia heads up the cooking school, with classes held at the Antinori country estate, Fonte de Medici. Situated in the heart of the Chianti wine region south of Florence, this delightful estate dates back to the 1400s. There is a free wellness center, an outdoor pool, and a traditional restaurant on site.

I met Matia through a good friend who has lived nearby for over 20 years. He kindly invited me to join a private cooking class when I was in town. The cooking school experience allows food lovers to prepare, cook and taste regional Tuscan cuisine. That day's menu was *pollo alla cacciatora*, handmade spinach and ricotta ravioli with butter and sage, and the traditional almond *cantuccini* biscuits. Olive oil features across the menus offered here (as does local wine), allowing Matia to educate guests on the importance of choosing high-quality olive oil.

In a world devoted to well-being, this golden oil, offering a myriad of health

benefits, is a star. Consumers are now researching before they purchase and demanding transparency, armed with a greater understanding of the importance of origin, harvest, and storage. The tree of the most revered olive variety of Tuscany, the Frantoio, was even included in Oprah's "Favorite Things" list of 2022. With a background in personal care product development, back home in Australia, I have sourced an award-winning Mornington Peninsula extra virgin olive oil, high in polyphenols, for use in an organic skincare collection.

Rich in healthy, monounsaturated fats, on the hot list of a global influencer, and with myriad culinary uses, olive oil is firmly in the spotlight. A recent Harvard study published in the *Journal of the American College of Cardiology* suggests that olive oil consumption, particularly when replacing butter, margarine, or mayonnaise, may be linked to a longer life span. What's not to love?



The Pieralisi centrifuge

09

Abbreviations and Acronyms

AOA	Australian Olive Association
AOOA	Australian Olive Oil Association
ASCC	Australia Society of Cosmetic Chemists
CIBE	China International Beauty Expo
DIY	Do It Yourself (make at home)
HKABA	Hong Kong Australian Business Association
IOC	International Olive Council
NPD	New Product Development
OMWW	Olive Mill Waste Water
OOP	Olive Oil Pomace
OOT	Olive Oil Times
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication

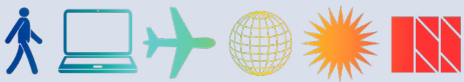
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References

1. Hart, E. (2022). Top Self-Care Trends for 2022. [online] Jungle Scout. Available at: <https://www.junglescout.com/blog/self-care-trends/>.
2. <https://www.facebook.com/thoughtcodotcom> (2012). Religion, Science, and History Blend in the Story of Making Olive Oil. [online] ThoughtCo. Available at: <https://www.thoughtco.com/ancient-history-of-making-olive-oil-4047748>.
3. Schuster, R. (2014). 8,000-year old olive oil found in Galilee, earliest known in world. Haaretz. [online] 17 Dec. Available at: <https://www.haaretz.com/archaeology/2014-12-17/ty-article/.premium/8-000-year-old-olive-oil-found-in-galilee/0000017f-e09f-d7b2-a77f-e39fbbbd0000> [Accessed 11 Mar. 2024].
4. Trove Newspaper (1870). THE MANUFACTURE OF OLIVE OIL. South Australian Advertiser. [online] 21 Sep. Available at: <https://trove.nla.gov.au/newspaper/article/28595260> [Accessed 11 Mar. 2024].
5. Reichelt, K. and Burr, M. (1997). Extra Virgin: An Australian Companion to Olives and Olive Oil. [online] Google Books. Wakefield Press. Available at: https://books.google.com.au/books?id=3UBIXdqK0M0C&pg=PT26&lpg=PT26&dq=1870+Adelaide+Gaol+olive+oil&source=bl&ots=mfGL1os6q7&sig=37RUtsfKtOdbfO8h-hMFFJE4E8U&hl=en&sa=X&ved=0ahUKEwIj-Z2N9LvJAhWkqqYKHUsCALg4ChDoAQg_MAg#v=onepage&q=1870%20Adelaide%20Gaol%20olive%20oil&f=false [Accessed 11 Mar. 2024].
6. Australian Food Timeline. (1870). Australian food timeline - first successful olive oil production. [online] Available at: <https://australianfoodtimeline.com.au/olive-oil-production/>.
7. International Olive Council (2022a). IOC STANDARDS, METHODS AND GUIDES. [online] International Olive Council. Available at: <https://www.internationaloliveoil.org/what-we-do/chemistry-standardisation-unit/standards-and-methods/>.
8. <https://www.facebook.com/StephEckelkamp> (2020). Bioactive Compounds In Olive Oil. [online] OliveOil.com. Available at: <https://www.oliveoil.com/the-bioactive-compounds-in-olive-oil/>.
9. Grandview Research (2022). Olive Oil Market Size, Share & Trends Analysis Report, 2030. [online] www.grandviewresearch.com. Available at: <https://www.grandviewresearch.com/industry-analysis/olive-oil-market-report> [Accessed 11 Mar. 2024].
10. International Olive Council. (2022b). THE WORLD OF OLIVE OIL. [online] Available at: <https://www.internationaloliveoil.org/the-world-of-olive-oil/>.

11. World Population Review and Nation Master (2024). Olive Oil Production by Country 2022. [online] worldpopulationreview.com. Available at: <https://worldpopulationreview.com/country-rankings/olive-oil-production-by-country>.
12. International Olive Council. (2022). CHANGES IN OLIVE OIL CONSUMPTION. [online] Available at: <https://www.internationaloliveoil.org/changes-in-olive-oil-consumption/>.
13. Australian Olive Oil (2019). Australian Olives | Australian Olive Oil – An Overview 2019. [online] Available at: <https://australianolives.com.au/australian-olive-oil-an-overview-2019/#:~:text=Australian%20olive%20oil%20production%20is%20estimated%20at%2019%2C736> [Accessed 1 Feb. 2024].
14. US News (2024). <https://health.usnews.com/best-diet/mediterranean-diet/review>. US News.
15. Olive Oil Times (2023). Med Diet More Effective in Obesity Prevention than Other Diets, Study Finds. [online] Olive Oil Times. Available at: <https://www.oliveoiltimes.com/health-news/med-diet-more-effective-in-obesity-prevention-than-other-diets-study-finds/118037> [Accessed 1 Mar. 2024].
16. Godman, H. (2022). Harvard study: High olive oil consumption associated with longevity. [online] Harvard Health. Available at: <https://www.health.harvard.edu/staying-healthy/harvard-study-high-olive-oil-consumption-associated-with-longevity#:~:text=Higher%20olive%20oil%20consumption%20was%20also%20associated%20with> [Accessed 1 Mar. 2024].
17. Chidgey, M. (2020). Daily dose of olive oil can reduce blood pressure. [online] The Olive Review. Available at: <http://www.theolivereview.com.au/2020/09/daily-dose-of-olive-oil-can-reduce-blood-pressure/> [Accessed 1 Mar. 2024].
18. US News (2023). [online] US News. Available at: <https://health.usnews.com/wellness/food/articles/why-you-should-stop-worrying-about-olive-oils-smoke-points>.
19. Alzaa, D. (2018). Evaluation of Chemical and Physical Changes in Different Commercial Oils during Heating. *Acta Scientific Nutritional Health*, [online] 2. Available at: <https://actascientific.com/ASNH/pdf/ASNH-02-0083.pdf>.
20. US News (2021). Air fryer Recipes. [online] US News. Available at: <https://health.usnews.com/wellness/food/articles/air-fryer-recipes>.
21. Ramírez-Anaya, J. del P., Samaniego-Sánchez, C., Castañeda-Saucedo, Ma.C., Villalón-Mir, M. and de la Serrana, H.L.-G. (2015). Phenols and the antioxidant capacity of Mediterranean vegetables prepared with extra virgin olive oil using different domestic cooking techniques. *Food Chemistry*, [online] 188, pp.430–438. doi:<https://doi.org/10.1016/j.foodchem.2015.04.124>.
22. Moreno, F.J.L. (2023). EXPERTS WILL GATHER AT THE IOC TO ANALYSE THE OLIVE GROVE'S FUNDAMENTAL ROLE IN ADDRESSING CLIMATE CHANGE ACTING AS A PERMANENT CO2 SINK. [online] International Olive Council. Available at: <https://www.internationaloliveoil.org/experts-will-gather-at-the-ioc-to-analyse-the-olive-groves-fundamental-role-in-addressing-climate-change-acting-as-a-permanent-co2-sink/>.

23. Hansen |, C. (2021). Waste Management in Olive Oil Industry | BioEnergy Consult. [online] Bio Energy Consult. Available at: <https://www.bioenergyconsult.com/olive-oil-waste/>.
24. In Cosmetics Global (n.d.). Attendee profile | in-cosmetics Global. [online] www.in-cosmetics.com. Available at: <https://www.in-cosmetics.com/global/en-gb/about/attendee-profile.html> [Accessed 11 Jan. 2024].
25. All Fruit - Overview. (2023). Available at: <https://www.horticulture.com.au/globalassets/hort-innovation/australian-horticulture-statistics-handbook/ahsh-2021-22-fruit-r3.pdf>
26. Australian Olives (2019). Australian Olives | Australian Olive Oil – An Overview 2019. [online] Australian Olives. Available at: <https://australianolives.com.au/australian-olive-oil-an-overview-2019/#:~:text=Australian%20olive%20oil%20production%20is%20estimated%20at%2019%2C736>.
27. Haynes, A. (2021). Cobram Estate competes with entire countries when it comes to olive oil production. [online] Food & Beverage Industry News. Available at: <https://www.foodmag.com.au/cobram-estate-competes-entire-countries-when-comes-olive-oil-production/>



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