



# Aussie Road Trip

BYRON BAY



*salty ocean air  
delectable spreads*



*ocean breeze  
heady company*





Golden Grove Naturals  
**The Australian Study Tour Report**  
*2nd to 9th December, 2018*

## ACKNOWLEDGEMENTS

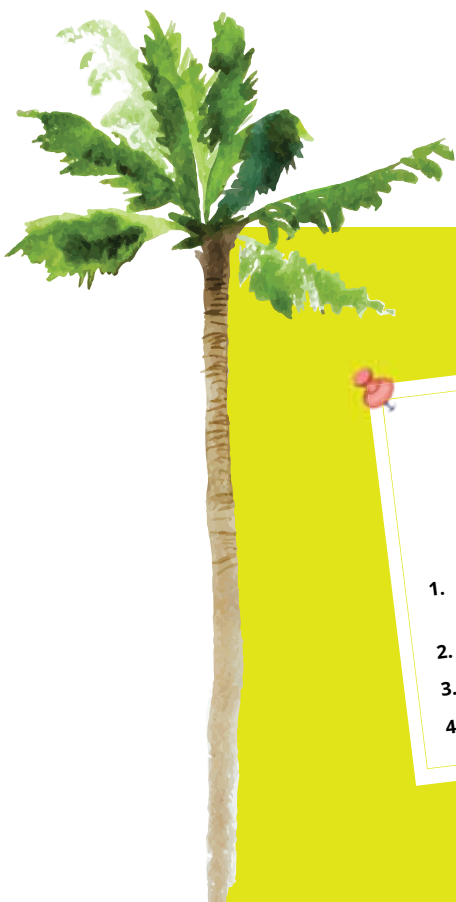
The success of the Golden Grove Naturals Study Tour was a result of efforts from a great team of good people. In particular we would like to thank:

Remy Tancred, and Tammy Saunders, Sample Events Pty Ltd, the coordinators of this tour.

A special thanks to tour hosts, Anthony Hotson of Rainforest Foods, Rebecca Barnes of Fire Native Foods, and Pam and Martin Brook of Brookfarm. A special thank you to chef Samantha Gowing for an absolutely delightful meal experience.

We are grateful to Trish Irish, Kate Steel and Angie Brace from Lismore City Council, Kevin Glencross and John Grant from Southern Cross University and Kath French, New South Wales Forestry.

And, of course, this tour would not have been a 'study tour' if it weren't for all the wonderful presenters, the stalwarts of the industry, who took the time to enlighten us about Australia's essential oil treasures, techniques, and findings.



## TABLE OF CONTENTS

1. Introduction by Golden Grove Naturals
2. Australia's Essential Oils
3. Company & Farm Visits
4. Lecture Programmes





# Introduction



## ON THE SCENT OF AUSSIE TREASURES

Work close to nature is most enthralling and stimulating. In years of experience, one's learning stands out; a study tour is everything but 'study.' With an emphasis on experiential learning and self-explorations, a study tour opens up opportunities to closely observe cultures, practices, and people. And the study tour to Byron Bay, Australia did not disappoint. Guised in the garb of enriching, immersive experiences, the trip was instrumental in taking knowledge enhancement to unprecedented levels. The seven-day trip was an opportunity to explore exotic essential oils from a most sought-after origin, study sustainable practices, and gain insight into groundbreaking research. In addition, it brought the group up close and personal with the heart-warming indigenous culture of this island continent.

December 2, 2018 found participants unwinding with welcome drinks and canapés. In the distance loomed Cape Byron Light, a tall, majestic and active lighthouse. Byron Bay is a picturesque coastal town off the eastern coast of Australia's famed beach pilgrimage, the never-ending Gold Coast. A tempting vibe that is an eclectic mix of contradictions of arty splendour, performing arts hotspot, and a hedonistic surfer paradise. Add to it enticing rainforests, the call of windswept cliffs, winding creeks that beckon with pristine clarity, and of course, the ribbon of golden sand, all home to a spectacular biodiversity of species of one of the most successful naturals of Australia, tea tree. That just about encapsulates Byron Bay in a nutshell.



Sky  
above,  
sand below,  
peace  
within



The essential oil industry of Australia goes way back to the 18th century when eucalyptus oil was first produced commercially. Since then commercial production has flourished; the botanicals thriving in Australia's diverse topography, temperate Mediterranean climate, and relative isolation from the rest of the world. Subsequently, governments working with industry bodies have commissioned research centres, implemented breeding programmes for high-grade seeds, and sanctioned compulsory research & development and emergency plant pest response levies to further buoy the nation's thriving essential oil industry.

Today, more than 90% of Australia's natural oils are exported. Needless to say, Australia was the natural choice for a study tour. And if there ever was a whole new way of seeing nature's little hideout of treasures, the group struck gold with the Gold Coast. Please enjoy this discovery of Byron Bay.

*Warm regards  
Golden Grove Naturals Team*





# Australian Essential Oils

## OILS R' US

For all those who consider Australia a land of bustling cities, breathtaking beaches, natural woodlands, and serene farmlands, there's a surprise in store. It is more than what is visible to the naked eye. Discover Australia for its treasure trove of wellness.

Australia has an incredible story to pen, highlighting its rich history of traditional natural oils. Its climate, commitment to sustainable development, and government assistance has made it an increasing important supplier to the global essential oils market. The world has been hit by a wave of Australia's essential oils, and they have hardly touched the surface.



## CYPRESS OIL BLUE

The blue cypress, scientifically known as *Callitris intratropica*, is found freely in nature and is harvested from the wild to produce blue cypress oil. It is known to grow anywhere between 10 and 40 metres and live for as long as 200 years. It prefers the monsoonal parts of Northern Australia, including Northern Territory's Kakadu, Queensland's Cape York, and Western Australia's Kimberley regions.

The plantations around Northern Territory were originally meant for timber production in the 1960s. However, after the cyclone of 1974 the plantations were left idle, until 1995, when blue cypress essential oil was discovered. Traditionally, the oil was used by the Tiwi people of Melville and Bathurst Island as a hygiene wash and to keep tiny pests away. Sustainable development is at the core of the state government's plans to harvest the oil. Technically superior equipment is used to steam distil the blue cypress from the chipped bark and wood of the tree. The entire process can last several days and is dependent on temperature and pressure. Blue cypress is grown in plantations deemed sustainable based on 30-year rotations. The rich blue colour of the oil can be attributed to the bark.

Blue cypress oil is slowly and steadily capturing the market. Sporting a woody base note, it is extensively being used to replace vetiver, sandalwood, and even guaiacwood in fragrances and cosmetics. The fact that blue cypress oil also has therapeutic properties, including anti-inflammatory, anti-viral, and natural calming effect, makes it highly attractive.





## BUDDAWOOD OIL

### *Eremophila mitchelli*

The small figwort buddawood is native to Australia and prominently spread across the deserts from Central South Australia to North West Queensland. Known as false sandalwood, it is popular for its antibacterial properties. The smoky and earthy aroma of buddawood oil also makes it apt as a base in fragrances, and cosmetic products.

Of its own accord, the buddawood tree can grow up to 10 metres. But, it needs dry sand or soil to prosper. That's why it flourishes in the desert areas of Australia.

Buddawood oil is an economical and sustainable alternative to similar products in the market. While the supply of hexane-extracted material from *Eremophila mitchelli* was limited in the past, today consistent supplies are available. This has been made possible by the support of local authorities that have aided the development of advanced steam distillation facilities. These new methods of production have resulted in the change of the oil colour. It is now a slightly lighter shade of brown than its original form.

In a vast country like Australia, there is an abundance of natural resources. But this also puts sustainable development in the limelight. The ecology needs to be preserved for future generations. Australia adopts nature harmonious practices and works closely with primary producers to encourage wholesome development.

## EUCALYPTUS RADIATA

The native Australian *Eucalyptus radiata* forms a dense canopy with dark green leaves. It gives a peppermint scent when crushed and that is why it is also referred to as narrow leaved peppermint gum. It is densely spread across central Victoria, through the mountain country of New South Wales, and extends to the tablelands of south-eastern Queensland. Even northern Tasmania has a slight population of *Eucalyptus radiata*.

*Eucalyptus radiata* has a grey fibrous and finely fissured bark. The tree blossoms with small creamy-white flowers between the months of October and January. It is a highly adaptable tree and can flourish in fertile and infertile soils with the assistance of good sunlight. The oil is extracted via steam distillation from the leaves and terminal branches.

Traditionally *Eucalyptus radiata* was considered the most pleasant aromatically and safest of the eucalyptus varieties for children. Today, this variety of eucalyptus is extremely popular in the production of essential oils and is also appreciated by koalas as food. It is mainly used in aromatherapy, cosmetics, and confectionery.





## EUCALYPTUS HORISTES

A few kilometres from the sparsely populated mid-west region of Western Australia are dense plantations of the native *Eucalyptus horistes*. The shrub-like mallee typically grows to a height of 12 metres. It exhibits a fibrous, fissured grey bark on the lower trunk that becomes smooth as you go higher. The plant blooms between November and January.

*Eucalyptus horistes* flourishes on the sand plains, sand dunes, and road verges. It craves sandy-loam soils around laterite. This makes the wheat belt in the Great Southern and Goldfields-Esperance regions of Western Australia its ideal growth bed.

Its high cineol content hovers mostly around 90%, but sometimes is known to go up to 95%. It is, thus, the closest to unadulterated eucalyptol. It has a distinctively fresh, camphor odour and is popularly used as a decongestant and deterrent for insects.

## EUCALYPTUS DIVES

*Eucalyptus* broad leaf peppermint is scientifically referred to as *Eucalyptus dives*. It has a pleasing peppermint aroma, and is great for breathing, relaxing tired muscles, and as a room freshener. The tree can grow up to 20m, and survive in tricky frost conditions and prospers on most soils. Plantations of *Eucalyptus dives* can be found in southeastern New South Wales. The oil is extracted from the leaves and young twigs of the plant through the process of steam distillation.

For ages, indigenous people have used eucalyptus as a medicinal plant. They treated ailments like coughs, colds, flu, muscular and joint pain. As far as the *Eucalyptus dives* variety goes, it has also been harvested and distilled for over 100 years as it exhibits similar properties. The oil is also important for its significant source of menthol and thymol.





## KUNZEA OIL

The Australian kunzea is found prominently in North East Tasmania, the islands of Bass Strait and Eastern Australian mainland states. Also known as white kunzea, it is a large shrub growing 3-5 metres in height. It flowers in the spring, between the months of August and December.

Kunzea essential oil is derived through steam distillation from the terminal branches of *Kunzea ambigua*. It has a similar profile to *Agonis fragrans* essential oil when it comes to remedial therapies and palliative care. It is primarily used for pain management and respiratory conditions. In terms of its usage as an aromatic medicine, it has potent anti-viral and immune stimulating qualities.

Kunzea is an interesting product that has been around for years, but was initially used as boutique oil for its therapeutic values. With the increase in studies and knowledge of the product, new producers have entered the market, resulting in better economies of scale.

It has a pleasant odour, reminiscent of the Australian bush. Consumed orally it has a medicinal taste similar to tea tree oil. Kunzea is also known to have a soothing effect, and aids in elevating blocked pain and trauma. It also helps in clearing emotional and psychological clutter.





## TEA TREE OIL

Tea tree, scientifically known as *Melaleuca alternifolia*, was first wild harvested in the early 1920s. The first commercial farms, though only came about in the 1980s. Today, the Australian industry produces approximately 850 tonnes of oil per annum, and is on course to touch the 1,000 tonne mark.

Tea tree is endemic to New South Wales and Northern Queensland. The harvest period starts in May and lasts till November. Tea tree generally grows up to a height of 2 metres in plantation, and takes around 3 years to fully mature.

The oil is extracted via steam distillation from the foliage and terminal branchlets of *Melaleuca alternifolia*. The entire process takes around 2 hours to produce 250 kg of oil. In the international market Australian production standards are regarded as the best.

Post harvesting, tea tree normally regenerates in a period of 12-15 months. As the tree matures it yields higher levels of oil, and establishes a stronger root network to endure adverse weather conditions.

With a warm and spicy odour, tea tree oil is popular for its antifungal, antiviral, and antimicrobial properties.



## SANDALWOOD OIL INDIAN

Indian sandalwood oil has been used for generations in fragrances. But, unfortunately, years of deforestation and no replanting has left India as a non-viable source for this variety. Australia stepped into the market to fill this gaping hole. And, after 20 years of research and sustainable development has been able to consistently produce Indian sandalwood oil.

The Indian sandalwood, also known as *Santalum album*, prospers in tropical environments. The conditions speed up the growth process, but also require constant weed management. It generally flourishes between March and November.

Australia first commercially produced the Indian sandalwood oil in 2014. Its quality and odour were similar to the original variety in India, and acceptable to the fragrance industry. Though, only about a tonne of oil was produced during the first attempt, there has been a significant increase in the volume of production since. Estimates peg production of Indian sandalwood oil to touch the 150,000 kg mark, which is four times the production in India. Producing a similar variety at affordable rates has made Australia the leader in Indian sandalwood oil production.

Apart from being popular in fragrances, Indian sandalwood oil is also used in Ayurvedic medicine to treat common colds, muscle problems, and digestive issues among others uses.

## SANDALWOOD OIL LANCEOLATUM

*Santalum lanceolatum* oil is extracted from a species of sandalwood found predominantly in Eastern Australia. The shrub can grow up to 6 metres in height and survive in drought and salty soil. The oil has its own smooth sweet floral aroma with a slight woody note. The demand for this product is increasing.

## SANDALWOOD OIL SPICATUM

Over 80 varieties of sandalwood are found in nature, but only two have found regular buyers in the international market. Apart from Indian sandalwood, the other variety is native to Australia and is called *Santalum spicatum*. The two varieties combined account for 90% of the trade in sandalwood.

*Santalum spicatum* is a desert tree endemic to central and southern Western Australia and South Australia. It has been harvested for over 100 years, and exported to Asian markets for its oil and fragrant timber.

Sandalwood oil is harvested from the trees after they reach optimum maturity. In other words, unless the trees are 15-20 years old, they are not touched for oil. Australia has numerous long-term plantations of sandalwood dating back to the 1990s, and thus has hectares of plantations ready to be used for oil production. The oil is obtained through the process of steam distillation of powdered sandalwood. The butts and tree roots house the best oil quality.

Sandalwood oil is known for its calming qualities, and helps clear the mind. The wood is also used to manufacture incense and carvings.



## SANDALWOOD OIL AUSTROCALEDONICUM

*Santalum austrocaledonicum* is a highly sought after and rare variety of sandalwood. It has a soothing effect that makes it a popular choice in body and skin care products. The price has remained stable over a period, though the demand for the oil has decreased slightly due to a decrease in the price of *Santalum album* quality.



## LEMON MYRTLE OIL

Lemon myrtle is one of Australia's newest and most exciting gifts to the essential oil world. It was rediscovered in the late 1980s in Byron Bay. By the mid 1990s small plantations of the delicious flavoursome herb had been cultivated. But it was only in early 2000 that effective equipment was developed to harvest the oil.

The lemon myrtle tree grows up to a height of 20 metres. It prospers in warm and wet conditions and is indigenous to the rainforests of Queensland from Brisbane to the Atherton Tablelands. A small population of the tree can also be found in cooler parts of Australia. But the lemon myrtle can't tolerate frost, and thus needs more attention in a cooler climate.

Lemon myrtle oil, scientifically known as *Backhousia citriodora*, is extracted through steam distillation of its glassy bright green leaves and branchlets. It exudes a strong lemon note, and comprises anywhere between 90-97% of citral.

Lemon myrtle oil is popular for its fresh and strong citrus note and is flooded with skin care benefits. It helps in the reduction of clogged pores, balances oily skin, and uplifts the mood. Its therapeutic benefits include reduction in cold and flu symptoms, and sinus.



## ROSALINA OIL

Wild rosalina trees (*Melaleuca ericifolia*) flourish in wet, swampy lowlands. Thus, it hardly comes as a surprise that New South Wales, Victoria and Tasmania, are its prominent habitats.

Rosalina oil was initially used by the aborigines to treat skin imperfections like acne and warts. It was only in 1922 that it was introduced to the world outside Australia.

The rosalina tree can reach up to 8 metres in height and produces white flowers in late spring. Its oil is extracted through steam distillation of the leaves, twigs, and branches. Rosalina oil is also referred to as lavender tea tree oil because of the gentle lavender back note. It is mostly used as a subtler version of tea tree oil with lavender tendencies. Rosalina oil also offers a host of physical and emotional therapeutic benefits, along with antibacterial, antiviral, and immune-stimulant properties.



## MANUKA OIL

Manuka, scientifically known as *Leptospermum scoparium*, is prominently found in New Zealand, and Tasmania, Victoria and New South Wales in Australia.

The Maori tribe of New Zealand has been using the oil for almost 900 years. They use the leaves, bark and seed capsules of the bush to cure a variety of ailments.

The Manuka tree grows anywhere between 2 to 15 metres with dense branches, small leaves, and white and pink flowers. The wild growing tree is harvested organically with the exclusion of fertilisers or any artificial chemicals. The harvest period is typically between November and June. Manuka oil is extracted from the sap and seed capsules through steam distillation.

Even though manuka oil is a relatively new entry in the aromatherapy industry, its impressive diversity of applications makes it a prized catch. It is also used to cure urinary complaints, stiff muscles, and helps in relaxation.

## AGONIS FRAGRANS OIL

*Agonis fragrans* is one of Australia's most recent finds in the essential oils market. It is a shrub of about 2.4 metres growing in south-west Western Australia. It prefers swamps on acid, peaty sand and waterlogged areas.

The oil is extracted via steam distillation of the stems and branches. The entire process takes around one and a half hours.

There are no historical records of *Agonis fragrans*. It was only in 2001 that the husband and wife duo of John and Peta Day started cultivating small plantations of the oil. Today, they have acquired the trademark to the name Fragonia Oil, and are the primary suppliers of the oil.

There is evidence to suggest that Agonis oil has a positive and regulatory effect on the endocrine and nervous system. It is unique with three distinct aromas. The three oil components arguably aid in balancing emotions.





## HONEY MYRTLE OIL

Honey myrtle oil is one of the rarest Australian essential oils. It is similar to lemon myrtle, but differs with a warm and more soothing honey note.

Honey myrtle trees, scientifically known as *Melaleuca teretifolia*, are indigenous to south-west Western Australia. They typically grow to a maximum height of 5 metres. It prospers in the sandy Western Australia soils, and is at home in the wetlands. The oil is extracted from the middle and upper stems, branchlets and leaves via steam distillation.

The honey myrtle oil assists in focusing the mind, relaxing, relieving pressure, soothing hypertension and also as an anti-depressant.

Not much is known about the historical usage of the oil, though some experts believe the Aboriginal people of Australia used honey myrtle oil to soothe troubled skin. The fact that honey myrtle trees, unlike lemon myrtle and anise myrtle, were not exploited during the World Wars helped keep them intact.

The study tour participants also visited macademia farms and learnt how macademia oil is extracted from the seed of macademia nut.



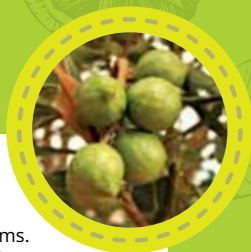
## MACADAMIA OIL

Australia's iconic Pacific Coast is dotted with macademia farms. Never-ending plantations of macademia can be seen along the seaboard side of New South Wales and Queensland. Australia holds the distinction of being one of the world's prime macademia producers. It accounts for 25% of the world's production, courtesy of 850 growers.

Commercially, though, only two species of Australian macademia hold significance, *Macadamia integrifolia* and *Macadamia tetraphylla*. They are indigenous to the subtropical rainforests of the east coast. Macademia nut oil is extracted from the ripe seed of *Macadamia integrifolia*, which is harvested to manufacture edible nuts.

Native to Australia, the macademia nut or Queensland nut features as a staple dietary component for the native aborigines. It was first cultivated in Hawaii in 1930, and since then has evolved to acquire global commercial significance.

Macademia oil is cholesterol free, and has widespread benefits. It is a palatable alternative to various cooking oils, and can be used for salad dressings. It has anti-inflammatory properties, and is excellent for softening skin, regenerating cells, and moisturising.





eeze  
air  
ees  
ere

pal  
oce  
sati





# Company and Farm Visits



A blend of visits, presentations, and authentic cultural experiences, the days through the tour were packed with a perfect balance of all that the coast had to offer.

## OF SIGHTS, SOUNDS AND SCENTS OF GOLDEN GROVE NATURALS

On December 3, 2018 we embarked on the golden trail of essential oils. An exciting plethora of sights, sounds, and scents assailed our senses as we moved from the existing plantations to upcoming ones.

While the new plantations are dedicated to honey myrtle, and two new strains of tea tree, the forthcoming ones will grow further manuka, kunzea, rosalina and lemon-scented tea tree oil. We were taken through the in-house seedling nursery, followed by a tractor ride through the field plantations, harvesting, distillation processing to the finished stock warehousing, and the quality control laboratory.

There was also an insightful presentation by Dorene Petersen, founder of the American College of Healthcare Science.

The interactions with the field staff undertaking the establishment of tea tree seedling planting, along with using a tractor-drawn mechanical planter to transport the delegates emerged as the highlights of an action-packed day well spent at the Golden Grove Naturals plantation.

## GOLDEN GROVE NATURALS: Soaring on sustainability

Golden Grove Naturals (GGN) is renowned for its cultivation of tea tree, with some of the original fields dating back over 30 years.

The plantation offers superior grade tea tree oil. GGN is also exploring other in-demand native Australian plants to ensure that more products have the sustainable future that tea tree has come to enjoy over the past three decades. Sustainability is at the core of GGN farming practices. An example of this is the spreading of spent distillation biomass (tea tree mulch) back to tea tree fields. This improves soil structure, microbe life and assists in weed control. GGN's agronomy practices also incorporate integrated pest management and use of organic agrichemical products.

Recently, GGN has collaborated with Lismore Council and Southern Cross University for research into tea tree production biodiversity. Restoration and rehabilitation work along the Wilson's River bank, development of new crops, and partnerships to develop native lands have made considerable headway with GGN's proactive efforts. The company is currently reviewing its farm plans and is keenly exploring deep-rooted perennial tree cropping systems, best water management practices, ecological diversity, habitat quality, soils and soil carbon, koala and wetland/riparian high conservation values in order to generate biologically-based natural benefits.

With a serious and unwavering commitment to quality, safety, and inclusivity, the company follows a safety-compliant environment for its culturally diverse workforce. Golden Grove's much-in-demand tea tree oil is obtained through an intensive systematic quality management system. Proactively identifying and managing our safety and quality risks, monitoring through audits, inspections, internal reporting and reviews and implementing effective controls are an integral part of the workings of GGN. The study tour to the plantation gave us not just the opportunity to immerse ourselves in the workings of essential oils and the journey from botanical to bottle, but also enabled us to truly understand the core philosophy behind GGN's success story – the golden rule of sustainable growth.

## MYRTLE'S LEMONY MOOD: Our visit to GGN's lemon myrtle plantation

A spicy, lemony fragrance comes wafting to greet us as we walk towards rows of trees in a plantation. The aroma is emanating from some of the crushed leaves of *Backhousia citriodora*, or the lemon myrtle. We are at the Golden Grove Naturals plantation as part of our Australian study tour in December 2018.

Golden Grove Naturals boasts one of the first commercial tea tree plantations in Australia, with roots dating back to the early 1980s. After visiting the tea tree plantation that the farm is renowned for, we continued our exploration with the lemon myrtle orchards.

The native lemon myrtle has been around for many years, and was used medicinally by the aboriginal population. However, it was only recently around the time of the Sydney Olympics in 2000 that



the commercialisation and export trade of lemon myrtle leaf and its essential oil really took off. Natural lemon myrtle thrives in the subtropical climate of the rainforests and coastal areas, but also grows well in the Northern Rivers area. Myrtle leaves as compared to other plants, contain much more essential oil, typically up to 4 or 5%. Crushing the leaves releases the volatile oils, and its refreshing lemony scent is attributed to citrus. In fact lemon myrtle contains the highest amount of naturally-occurring citral, in the range of 85 to 98%. As we walked amid the dark green foliage of these medium sized trees, we learnt that the leaves can be harvested throughout nine months of the year, except the three months of monsoon from January to March. The seeds of lemon myrtle have a low germination rate, around 0 to 4%. Though vegetative propagation by rooted cuttings is the most effective, though a tad expensive way, of producing nursery stock, it has potential for selection of specific clones for optimal growth and oil content. GGN's efforts with the lemon myrtle programme have yielded a healthy strike with a high essential oil content.



## THE KOALA COALITION

The bushlands, rainforests, and riparian foliage - the koala was found across every Australian terrain.

Indigenous Australian tribes have regarded the koala as a wise animal; and it has also been depicted in rock carvings. Hunted heavily during the 20th century this gentle marsupial was almost blotted out of existence. However, efforts to revive the koala population paid off. Today, though koalas abound in Australia, they are threatened by habitat loss as a consequence of land clearing for agriculture, alarming levels of disease, and even dog attacks, and road fatalities due to rapid urbanisation.

A section of Golden Grove Naturals' ample eucalyptus acreage abuts the local koala rehabilitation forest, the Tucki Tucki Nature Reserve. Another two kilometre stretch of eucalyptus corridor extends from the nature reserve to the Wilson River's edge. Working diligently to improve habitat values, GGN has partnered with the Lismore City Council to rehabilitate sick, injured or orphaned animals and re-establish them back into the wild.



Fussy as children, koalas are herbivorous. Those found in the Lismore area prefer only certain eucalyptus leaves – *Eucalyptus tereticornis* or forest red gum, *Eucalyptus microcoris* better known as tallowwood, *Eucalyptus robusta*, popularly called swamp mahogany, and *Eucalyptus propinqua* or small-fruited grey gum. However, eucalyptus species used for essential oil production are not the preferred choice for koala food.

Lunch at the Golden Grove Natural homestead was accompanied by an invigorating interaction and discussion with Kate Steel from the Lismore Council and koala conservationist Angie Brace on collaborative sustainability projects undertaken in conjunction with Golden Grove Naturals. Angie's interaction was an eye-opener; she is the coordinator of koala conservation efforts for the Lismore region. It gave us a glimpse of what we can do to strengthen our bond with nature, and give something back through this koala conservation coalition.



## THE GIST OF GENETICS-Southern Cross University

Australia is the emerging hotspot for high quality, naturally safe agro-products and Southern Cross University engages in intensive research studies to support this.

The highlight of December 5, 2018 was our trip to the hub of natural plant research and development, at Southern Cross University (SCU). We had an opportunity to observe from close quarters parts of the leading-edge research work and facilities of Southern Cross Plant Science, viewing the Environmental Analysis Laboratories, Geoscience Laboratories, Plant Genetics and DNA Laboratories, and Plant Chemistry Laboratories. We also visited the tea tree genetics plantation to obtain first hand experience of the tree oil breeding programme. The tour of the facilities culminated with presentations by experts in the field. SCPS welcomed us with an introduction to the staff and capabilities. Ian Southwell and Ashley Dowell traced the history of the Australian essential oil industry to the current scenario. We also gained insights into SCU's tea tree oil programme and on-going studies on cannabis and hemp.

### GENETICS PLANTATION: Insight into the DNA of Tea Tree breeding

Tea tree has emerged as Australia's iconic export to the world. SCU was the original site of the Australian Tea Tree Oil Research Institute (ATTORI); the institute underpinned the industry developing Australian standards, cosmetic and other natural product formulations. The institute was short lived with the Australian Taxation Office closing the facility some 12 months after opening. SCU took over the building and a significant proportion of the analytical equipment and continued to operate under the brand name Centre for Phytochemistry. The Centre is currently operating under the name Southern Cross Plant Science and incorporates a Centre for Conservation Genetics.

The SCU recently established a partnership with the Australian Tea Tree Industry Association (ATTIA) for tea tree breeding programme, actively supported by levy funds from the government. The University has a diverse tea tree population at SCPS's Brookside field site at Lismore that provides a varied germplasm collection for research. Genome analysis and DNA sequencing studies throw light on characteristics like pest and disease tolerance levels, root and shoot architecture, and terpene and methyl eugenol composition. The findings then constitute the founding block on which development of cultivars with better productivity, drought tolerance and superior oil quality, and techniques for clonal propagation are based.

Previously, the ATTIA tea tree breeding programme involved a fourth generation breeding population. A full tea tree breeding cycle required about eight years; from the formation of the plant to the final selection for the next generation propagation. But today, the evolution of the SCU tea tree breeding cycle requires about 12 months from the formation of the plant to the selection of the next generation propagation.

The participants also visited the Department of Primary Industries in New South Wales. They are a government agency, which GGN partner with for the propagation of new essential oils. CEO Ross Dickson, and expert Kath French helped the group to understand the growing potential of Australian essential oils.



## RAINFOREST RHAPSODY

Walking down a rough craggy terrain into the verdant shade of tree cover, you can lose yourself in the enthralling scents and sounds of a tropical rainforest. You would never believe that you are right in the midst of a busy farm! This is exactly what we experienced when we visited Rainforest Food and macadamia farm. Yes, you read it correctly; there is a lush rainforest in the heart of this iconic property.

The rainforest, lake, and surrounding macadamia plantation is owned by the Huston family. Anthony Huston took us on a guided tour, walking under the rainforest canopy to view many plantings of native Australian rainforest and bush foods. The ability to crush leaves, and taste fruit and berries, directly from the plantation trees added to the joy of the journey. Later, we met back at the macadamia processing factory and enjoyed a light morning tea. Tasting many rainforest infused products, such as lemon myrtle cookies, Davidson plum, and Riberry jams, macadamia nut spreads, macadamia oil, and lemon myrtle infused macadamia oil, and of course, macadamia nuts and chocolate covered macadamia nuts.



Whilst we devoured the delicious morning tea of native products we had the pleasure of enjoying a passionate presentation by Rebecca Barnes of Playing with Fire Native Foods. Rebecca shared her mission to supply the highest quality Australian indigenous foods in as pure and natural way as possible (without artificial additives or preservatives) for both domestic and international markets, and to educate the public about these Australian natural foods. To encourage and support organic sustainable farming methods, which aim to preserve native flora and fauna and their habitats, Rebecca covered such culinary products as cinnamon myrtle, lemon myrtle, aniseed myrtle leaf products, bush tomatoes and bush peppers, wattle seed, bunya nuts, rosella flowers, finger limes, Davidson plums, lilly pilly berries and quandongs. Rebecca introduced her products, which included bush teas and dried spices.



## BYRON BAY BROOKFARM

No tour to Brookfarm is complete without a stroll in the rainforest. Nestled in the Byron Bay hinterland, macadamia corridors are thickly surrounded by tropical trees abounding in a variety of native plants and animals, "... even a native platypus," laughs Will, one of the Brook brothers.

It all started in the family. In November 2000, Pam Brook took the plunge from being a dentist to co-founding Brookfarm with her husband Martin, an ex-film producer. Today, though it is a generational family business, Brookfarm employs over 70 people across its flourishing state-of-the-art Byron Bay bakehouse and macadamia farm. Martin and Pam Brook purchased a run-down dairy farm. The rich, red volcanic soils, high rainfall, and warm sub-tropical climate of the Byron Bay hinterland were ideal for macadamias to flourish. During the initial planting years, the Brooks noticed that the undulating hilly ground in the heart of the farm was unsuitable for orcharding and prone to erosion. So they planted 30,000 rainforest and eucalyptus trees on the steepest slopes and along a dry creek bed. The results are incredible and a lesson in patience. Today, the rainforest with the perennial creek running through is home to a thriving ecosystem and a wildlife haven.

## MAD ABOUT MACADAMIA

Macadamia muesli, granola bars, walkabout snack, premium nut blends and even porridge, Brookfarm is Australia's leading producer of award-winning gourmet macadamia. Organically grown macadamia nuts are sourced from Pam and Martin Brook's own farm. These are then carefully hand-blended, toasted, and mixed fresh every day. The only part where machines come in is in the packaging stage, but otherwise as they put it, "it's all hands on deck!"

- Macadamia is Australia's only indigenous nut tree
- Rich red soil and subtropical climate with warm winters, and copious rainfall is conducive to macadamia growth
- It takes 10 years before you can get your first crop; and this makes it expensive
- Only about 3 of the stalks turn into harvestable nuts; and of these about 35 to 37% are usable

Strong community feeling, love for the environment and sustainable farming practices lie at the heart of Brookfarm. The Byron Bay hinterland farm houses over 35,000 trees, with over 4,000 macadamia trees and 30 acres contributing to the regeneration of lush tropical rainforest. Home to many species, the rainforest ecosystem is Martin's sustainable pest control system. Rats are kept at bay by resident breeding owls, and the dreaded nut borer biologically controlled by trichogramma wasps. Brookfarm is one of the first places to adopt this method. The bakehouse is powered by the sun using 288 solar panels, and the Brooks make it a point to always source top-notch ingredients from Australian farmers without compromising on quality.

Brookfarm has grown to become a household name among national and international food brands. But there is one ingredient that keeps the Brook macadamia magic alive – its steadfast commitment to its founding principles of innovation, quality, and sustainability.



## OF FARMS, FOOD AND FLAVOURS: Brookie's Gin distillery

Travel is incomplete without gustatory explorations. Amidst day expeditions to plantations, laboratory visits, presentations, and photography sessions, the flavours of fresh culinary delights were a treat to the palate.

The evening of December 3rd found us salivating at the tantalising aroma of authentic Italian fare down under. Crisp, wood-burnt pizza and other delicacies were accompanied by a carefully chosen selection of drinks at Golden Grove Naturals. Another time, it was an out-and-out Australian dinner with a special barbecue and drinks. But from a purely gastronomic point of view, the highpoint of the study tour was the gin tasting and live cooking by Samantha Gowing at the Cape Byron Distillery on December 7, 2018.

Once we made our way back to the farm from a tour of the rainforest, we were led to the verandah overlooking the lush landscape. As we relaxed, and recuperated from our efforts, we were treated to a breathtaking visual panorama, and some special surprises. We started off with the zesty Brookie's & Tonic, garnished with caviar "finger" lime pearls, and anise myrtle leaves. As we sipped our way through the distinct flavour unique to the region, we learnt about the art of the Brookfarm distillation process. We got to know that Brookie's Byron Dry Gin contains 18 botanicals, which are native to the region of the NSW Northern Rivers.

Each season brings new flavours from the rainforest that are then carefully crafted into seasonal cocktails. Spring brings in native raspberries, while summers are the time for Davidson plum, the backbone of Brookie's Slow Gin. With autumn and winter come a plethora of key botanicals like gamely ginger, cinnamon, aniseed and lemon myrtle. "We built the distillery here on one of the last plots of vacant land on our farm and we use a lot of the native flavours, a range of botanicals that come straight from our rainforest into our gin," Eddie Brook explains. And all the while, with every word, sip and aroma we are taken on an unforgettable sensory experience.





# Lecture

# Programme



## A curated mix of information from the authentic sources

The programme included talks, presentations, and discussions with Australia's finest essential oil experts. Our visits to the Golden Grove Naturals plantations, the distillery at Grafton and the Southern Cross University were not mere guided tours. Guest speakers, lecture programmes and special events like sapling plantation drives and smelling sessions added to the thrill.

## DORENE PETERSEN: The essentials of essential oils

Dorene Petersen, Founding President of the American College of Healthcare Sciences (ACHS), conducted the first lecture. With over 35 years of experience in clinical teaching, aromatherapy, and other holistic health subjects, Dorene is a respected veteran in the field.

## Highlights of the presentation

The journey of many scents begins with a whiff. Before delving into the intricacies, our first whiff of aromatherapy was all about how the oil works, and technicalities associated with it. We found out some interesting facts:

- Humans can discriminate at least 1 trillion olfactory stimuli
- Contrary to popular perception, aromatherapy does not depend on olfactory perception
- Even people who are anosmic (have an inability to smell) experience positive changes from aromatherapy
- Essential oils display a suppression mechanism in hyperosmics
- Healing through aromatherapy is unique because it has positive physiological and psychological effects simultaneously



## And the positives

This part of the lecture navigated through research findings and biological potential of Australia's essential oils. Medicinally, essential oils containing aldehydes are effective in the control of fungal infections; with some exhibiting disinfectant and sedative actions. Effective as mood boosters, they also influence overall performance abilities like memory tasks, sustained attention, and problem solving.

Australia's prize export, tea tree oil is a good expectorant due to its ability to relieve swelling of the mucous membranes and ease breathing. It is the go-to antidote for fungal infections. The anethole component in anise oil works as a muscle relaxant and fungistatic by arresting fungi proliferation. The much celebrated buddawood leaf oil exhibits significant cytotoxic effects, while wood oil is a good anti-microbial. Lemon-scented tea tree oil shows antifungal qualities especially in treatment of fungi causing foot odour, and control of head lice. Lemon myrtle oil is used in limiting the spread of viruses. More importantly, it has cytotoxicity properties against liver cancer cells. Studies have brought to light evidence of Australian sandalwood being used by the aboriginal population. The oil's high santalol content makes it therapeutically effective and popular in cosmetic usage. Oleic acid present in sandalwood seed oil makes it the darling of the skincare industry. The malaria-causing virus strain *Plasmodium falciparum* FcBI meets its match in the strong chloroquine-resistant honey myrtle oil. In fact, honey myrtle also demonstrated high cytotoxic activity against human breast cancer-causing MCF7 cells. The chemical composition of manuka makes it a multi-purpose miracle oil for urinary complaints, as a febrifuge, relief from aching joints and burns, and also a sleep enhancer. In other experiments it had significant action against skin and ringworm fungi; even in infections in veterinary medicine. In topical applications, it suppresses signs of wrinkle formation, epidermal thickness, and collagen fibre content, so is an effective anti-photoaging agent. Blue cypress and rosalina too show marked antibacterial action; rosalina especially in septicemia, endocarditis, meningitis and the like. The keyword for eucalyptus oil is expectorant. Eucalyptol or 1,8 cineole is its signature constituent and is found in camphoraceous oils. Eucalyptus works as a strong antibacterial and anthelmintic agent. It can do wonders as a good absorption and penetration enhancer in topical drug delivery and antidandruff agent.



The background of the entire page is a vibrant tropical beach scene. In the foreground, there are palm trees with long, slender fronds. The middle ground shows a sandy beach with some rocks and the turquoise ocean waves breaking. The sky is a clear, bright blue. Overlaid on this scene is a large, solid yellow rectangular box that serves as a background for the text. Inside this yellow box is a smaller white rectangular box containing the text.

## GRAM POSITIVE AND GRAM NEGATIVE BACTERIA


Bacteria classified as Gram positive and Gram negative can be understood in the context of the protective outer membrane of these organisms. Certain bacteria with very thick peptidoglycan cell membranes retain the colour when subjected to the Gram staining test. These bacteria are termed as Gram-positive. In contrast, bacteria that appeared pale under microscopic vision are classified as Gram-negative. Though the cell walls of Gram-negative bacteria are extremely thin, they are almost impenetrable. This increases the bacteria's resistance to antibodies.

Essential oils have been found to have an impeding action on the spread of bacterial infection. The oils act as a deterrent to bacterial respiration and reduce cell replication. Another factor that works in favour of essential oils is that they disrupt the permeability barrier of bacterial cell walls; and induce leakage of potassium ions. Essential oils also work well to regulate genes that influence heat shock of cells and cell wall metabolism. As absorption and penetration enhancers, they facilitate topical drug delivery. Naturally, in the light of these studies, essential oils have emerged as having significant potential as active modified agents. In combination with antibiotics, essential oils are poised to become a ground-breaking phenomenon in treatment of antibiotic resistant bacteria.

## SOUTHERN CROSS UNIVERSITY

Southern Cross evolved as a full-fledged university in 1994. Since then research has been one of its core functional areas. The university has undertaken numerous studies and activities in the development of Australian essential oils.

Soon after inception the university's first major research centre dealing in plant conservation genetics was established. It caught attention instantaneously, and received significant funding for genetic research in tea tree, rice, barley and wheat. The establishment of the Australian Tea Tree Oil Research Institute followed.



At the beginning of the new millennium, the centre sequenced all the active genes in grapes. In 2007, additional funding aided extrapolating the plant conservation and genetics research into biofuels. Additionally, expertise in phytochemistry and pharmacology also extended the scope of research in plant and food science.

In 2011 Southern Cross University was included in the category of Research Intensive Universities. The following year it was conferred with the top rating of 'well above world standard' in the specific research fields of geochemistry, zoology, crop and pasture production, and forestry sciences.

Southern Cross University works with the best in the field to deliver ground-breaking research. Associate Professor Terry Rose is an expert in agronomy and soils. Her work primarily focuses on sustainable agricultural production. As her part of research, she is involved in extensive field trials to collaborate with key farmers or focus groups. This is followed by a controlled environment or glasshouse study to resolve any underlying mechanisms. Dr Ian Southwell, who has published over 50 papers on Australian essential oils, is also a regular at the university. He is also the chairman of the Essential Oil Committee of the Standards Association of Australia.

In order to assist its intensive research needs, Southern Cross University houses the state-of-the-art Environmental Analysis Laboratory (EAL) and Plant Science Analytical Research Laboratory; both are based at the Lismore campus.

The lab offers a range of specialised quality analytical fees for services in conjunction with a greater potential to undertake pure research:

EAL testing capabilities

- agricultural soil testing
- plant tissue analysis
- acid sulfate soil and or rock testing
- compost and potting mix testing
- contaminant and environmental soil testing
- water testing
- mineral and microbiology analysis

Plant Science Analytical Research Laboratory fees for services capabilities

- Essential oil authentication
- Lipid chemistry
- Herbal authentication
- Stability evaluation of formulated products



## MARK WEBB

### Aromatic Wonders from the land down under.

Mark Webb is a leader in the field of aromatic medicine. He is a passionate man who strives to introduce the world to the Australian wonders of essential oils. Even as a child, science appealed to him, though he studied business and began his career in the IT world. Mark Webb was truly inspired to pursue a future in aromatic medicine after he attended a workshop with Australia's leader in the field, Ron Guba. Mark focuses on Australian Aromatics, Aromatic Cuisine & Aromatic Medicine, Aromatic Chemistry, Pharmacology and Toxicology, Internal and External Dose Forms. He has also authored *Bush Sense: Australian Essential Oils and Aromatic Compounds* in 2000.



### Highlights of the presentation

Mark provided a background to the development of the essential oil and natural products history of Australia. Mark shared his enthusiasm for the new product development that Golden Grove Naturals is undertaking for many less discovered and marketed Australian aromatic plants and essential oils.

Mark spent time covering the odour characteristics of GGN oils and potential to use CO<sub>2</sub> as a potential extraction process.

It was in the 1850s that Australia had its first thrust with essential oils. Dr Ferdinand von Muller was the first to suggest that eucalyptus be distilled for its medicinal properties. The idea became the catalyst that drove essential oil research for a century. Botanist Richard T Baker and chemist Henry G Smith heralded this revolution. The duo's greatest achievement happens to be the discovery and development of chemo-taxonomy. The practice is widely used to distinguish between different chemical varieties within the same plant species. The next big name in Australian essential oil history is that of Arthur R Penfold. He was the first to describe the medicinal and commercial uses of tea tree oil.

In the earlier days steam distillation was the primary method of extraction adopted by the Australian essential oil industry. This revolution has led to an extensive network of aromatic plant families in Australia.

Manuka is a 15 metre tall plant found throughout New Zealand, Tasmania, Victoria, and New South Wales.

*Agonis fragrans* is a shrub found in Western Australia. This fruity scent oil has a positive and regulatory effect on the nervous and endocrine systems.

Australian Kunzea is primarily used for pain management and respiratory relief. In aromatic therapy it is paired with tea tree to work as an anti-viral agent and immune stimulant.

The Australian industry produces over 850 tonnes of tea tree oil every year.

Rosalina, which is a good substitute for the highly expensive hyssop, and tea tree are both valued for their antifungal, antimicrobial, antiviral, and immunostimulant properties.

Nerolina with its soothing balanced floral green aroma is known to aid wound care, stress-related hypertension, anti-viral, anti-inflammatory and anti-mite issues.

Eucalyptus is the defining feature of the Australian landscape. Over 800 species of the plant are found across the country. Its different compositions help treat a variety of ailments. While a particular concoction is used for expectorant, anti-inflammatory and analgesic treatment, another can work wonders for bronchial spasms and coughing.



The Australian landscape is also rich in various lemon-scented species. These bright, uplifting and energetic species work as powerful aromatics. A small dose can aid in fighting off depression, anxiety, fear, and loss of concentration.

Aniseed myrtle is one of the richest sources of anethole. Its wide variety of uses includes treatment of pre-menopausal symptoms in females and colic in babies. It also stimulates the mind and assists the process of out of the box thinking.

As many as 25 species of sandalwood are found across the Indomalaya, Australasia, and Oceania eco zones. Extensive trials have shown sandalwood nut oil to produce an almost 70% reduction in wrinkle lines in the neck, puffiness in the eyes, and retention of moisture in the hands.

Fragrant woods of southern conifers are widely found around the dry regions of Queensland, New South Wales, Victoria, South Australia and the Northern Territory.

For farmers it may be a woody weed species, but desert rosewood (*Eremophila Mitchellii*) – also called buddawood - is known to treat mouth ulcers and has a calming effect. It is indigenous to central and western New South Wales and Queensland.

The metre tall shrub, brown boronia (*Boronia megastigma*) is found abundantly in south-west Western Australia. Brown boronia absolute is a potent warming elixir that works effectively to aid trauma and sexual dysfunction.

Tasmanian native pepper (*Tasmania lanceolata*) inhabits cool wetlands. The natural habitat from New South Wales to Tasmania provides the perfect conditions for its growth. Tasmanian native pepper absolute is known for its anti-fungal properties.

Only a couple of species of balm mint bush (*Prostanthera melissifolia*) are used commercially for essential oil production. These species grow along creeks and sheltered wooded slopes. The southern portion of Victoria along with the south-west and north-east of Melbourne are the hot beds for the balm mint bush.

The lilac mint bush (*Prostanthera caerulea*) grows in wet forests on sandy soil. It is found primarily in the gullies and rocky areas north of the Wollongong district of New South Wales. The refreshing oil produced from the bush is known for its uplifting, clearing and cleansing properties. Wild boronia is grown and steam distilled on Flinders Island off the north eastern coast of Tasmania.

The yellow-barked paperbark varies from a petite shrub to a small tree. It is widespread in Queensland, Northern Territory and Western Australia. Crushed leaves have traditionally been used as a decongestant.

The lemon paperbark is a common sight in the open forests of Northern Australia. It is typically used to cure skin ailments like cuts and bruises, and also works as a relaxant.

The insect repellent, Cape York red gum, is a small tree endemic to Cape York and southern Papua.



The field trip helped to discover Australia for its treasure trove of wellness. During the exploration the participants were able to delve deep to understand the conditions and techniques that aid the development of some of Australia's natural wonders. The week-long interactions with experts in the field and first-hand experience helped the tour participants understand the Unique Selling Proposition of this hotbed of essential oils.







[www.goldengrovenaturals.com](http://www.goldengrovenaturals.com)  
[info@goldengrovenaturals.com](mailto:info@goldengrovenaturals.com)