# Driving Profitability Through Innovation:

## Rose petals for the culinary market.

**A report for:**


By Sarah Sammon
2014 Nuffield Scholar

July 2015
Nuffield Australia Project No 1409

**Sponsored by:**

Horticulture Innovation Australia

**SCHOLAR Contact Details**

Sarah Sammon
Simply Rose Petals Pty Ltd
PO Box 1504, Swan Hill VIC 3585 Australia

Phone: 0408 329 690
Email: sarah@simplyrosepetals.com.au
Web: www.sarahsammon.com

In submitting this report, the Scholar has agreed to Nuffield Australia publishing this material in its edited form.

**NUFFIELD AUSTRALIA Contact Details**

Nuffield Australia
PO Box 586, Moama NSW 2731 Australia

Phone: (03) 5480 0755
Fax: (03) 5480 0233
Mobile: 0412 696 076
Email: enquiries@nuffield.com.au

# Executive Summary

Australian rose petal farmers are currently producing their entire crop for the wedding and romance industry. There are an average of 120,000 weddings in Australia annually versus two million weddings in the USA. This figure has changed little over the last decade. The small size of the Australian wedding market and the inflated Australian dollar prohibits new entrants to the rose petal industry or significant growth for the existing rose petal farms.

By comparison, Australia's specialty food industry is experiencing record growth on the back of the popularity of cooking shows and the rise of a "foodie" culture. Travelling to 14 countries overseas has shown that rose petals can be successfully produced organically and there is plenty of scope for creating specialty foods and nutritional supplements derived from rose petals.

Edible rose petal production is unlikely to be a stand-alone business as it is more suited as an added diversification of an existing business. This research gives rose petal farmers and cut flower growers insight into the necessary steps for producing edible rose petals and the options for manufacturing should they wish to create specialty food products such as sugared rose petals.

Growers must take care to grow rose varieties suited to food production for maximum flavour, aroma and volume. The labour intensive nature of this industry makes efficiency during harvest and freeze-drying critical. It is recommended that growers' introduce piece-rate wages for harvesting and that laboratory measurements be taken on the collapse temperature (Tc) and the eutectic temperature (Teu) of rose petals. Food certification can be challenging for new specialty foods and a nutritional analysis will need to be conducted on rose petals for the Australian and New Zealand Food Standards database.

The Australian flower industry can remain competitive against cheaper foreign imports by continuing to diversify into the areas of specialty food production and agri-tourism.

# Contents

# Index

# Foreword

My high school years were spent on my mother's farm at Murraydale, just out of Swan Hill in northwest Victoria. After completing a Bachelor of Science degree in 2000, I took the unconventional path of ski instructing and travelling overseas for three years. Upon returning to Swan Hill finding employment in biomedical science was virtually impossible.

My mother, Jan Slater, still had crop of 1,000 rose plants from a business she'd run in earlier years. In mid 2004, my mother and I decided to resurrect the crop and co-found Simply Rose Petals. It has been a very family orientated business from the outset with endless support (and free labour) from my maternal grandmother, stepfather, husband and stepson.

Originally we planned to supply country Victoria with cut-flower roses. Mum had all the credentials, with experience growing 25,000 rose plants for cut flowers when I was in primary school. A failed first crop in late 2004, led me to start researching value-adding alternatives for roses. Online research revealed an emerging rose petal industry in the USA and UK. This coincided with the ecommerce boom and the potential for us to reach a worldwide market through selling online. In 2005 Simply Rose Petals became the southern hemisphere's first rose petal farm and our entire business was converted into producing air-dried rose petals for weddings and our crop was increased to 6,000 plants.

Undertaking a Peter Mitchell Churchill Fellowship for Horticulture in 2007, I spent 3 months visiting the same farms overseas where I had sourced the original idea. The following year we purchased our first two freeze driers and by 2009 had transitioned entirely to freeze-drying. Australia's rose petal industry began to thrive, becoming a highly competitive industry today comprising rose petal farms, cut flower growers producing rose petals as a bi-product, freeze dry manufacturers, artificial rose petal manufacturers and importers.

Reality television and cooking shows have skyrocketed in popularity in the last five years. Our rose petals have been featured on national television shows including *Landline, The Bachelor Australia, The X Factor* and *Big Brother*, resulting in strong demand from the romance market. We have also fielded many requests for edible rose petals from cooking

shows such as *MasterChef,* cake decorators and home cooks as Australia's "foodie" culture has taken off. Staying on-trend is important in a niche industry like rose petals. After assuming it would be easy to sell edible rose petals, I quickly discovered there was a lot of confusing red tape involved in selling a food that regulators weren't familiar with.

I became keen to further my research and investigate options for creating an entire edible rose petal range as well as improving our existing farm's efficiency to keep us competitive against the pressure of new low quality importers. From June to September 2014, I travelled for eleven weeks undertaking the personal study component of my Nuffield Scholarship. Of the fourteen countries I visited, I spent the most time in the USA, Ecuador, UK, Ireland, Germany, Italy, France, and Denmark.

My trip commenced with North America's largest specialty food and beverage event, the Summer Fancy Food Show in New York. With a seminar program and 2,400 exhibitors from 80 countries, the specialty food industry showed plenty of potential. One of my greatest highlights was seeing John Nevado's range of rose petal foods on display at the trade show. Later in my trip I had the pleasure of visiting his rose farms in Ecuador.

Joining me for two weeks of my European leg, my mother and I had an unforgettable visit to a stunning farm in the heart of the UNESCO National Park of Beigua, Italy, where the highest quality rose petal gelato, preserves and syrups were all manufactured on-farm, from roses grown on-site. This year has been an incredible year of research, exploration and inspiration.


Photo 1: Sarah Sammon and John Nevado with 'I Love Roses' edible rose petal products. (Summer Fancy Food Show, New York, July 2014).

# Acknowledgments

This incredible Nuffield journey has been a once in a lifetime experience, all made possible by the generous sponsorship of Horticulture Innovation Australia Limited. I will be forever grateful for the organisation's support and would like to formally acknowledge their continued support of Nuffield Australia.

Becoming a Nuffield Scholar feels like I have joined an extended family of people passionate about agriculture in the way that I am. Thank you to all contributors to Nuffield Australia for their dedication in promoting agricultural research and for making the Contemporary Scholars Conference and the Global Focus Program such an enriching experience.

Words cannot convey my appreciation for the support and countless hours that my family, particularly my mother, stepfather and grandmother have given to enable me to undertake 19 weeks travelling for Nuffield this year. My mother, Jan Slater, has worked extremely long hours in my absence, continuing to grow our business at the same time. Thank you to my family from the bottom of my heart.

A final warm thank you must be extended to the many farmers I visited. They were incredibly generous with their time and information. I look forward to the opportunity to return their hospitality in the future.


Photo 2: Sarah Sammon & her mother, Jan Slater, at the "Wall St of Flowers".
(Aalsmeer Flower Auction, Netherlands, August 2014).

# Abbreviations

| | |
|---|---|
| AUD | Australian Dollars |
| CAGR | Compound Annual Growth Rate |
| DIAS | Danish Institute of Agricultural Sciences |
| EurepGAP | European standard for Good Agricultural Practices |
| FDM | Freeze Drying Microscopy |
| FLO | Fairtrade International |
| GFC | Global Financial Crisis |
| ICEA | Instituto Certificazione Etica e Ambientale (Italian organic certification) |
| ISO | International Organisation for Standardisation |
| HACCP | Hazard Analysis and Critical Control Points |
| JV | Joint Venture |
| MAP | Modified Atmosphere Packaging |
| NIP | Nutrition Information Panel |
| OEE | Overall Equipment Effectiveness |
| OFD | Oregon Freeze Dry |
| OSU | Oregon State University |
| *R.* | *Rosa* |
| RFID | Radio-Frequency Identification |
| SKU | Stock Keeping Unit |

| | |
|---|---|
| Tc | Collapse Temperature |
| Teu | Eutectic Temperature |
| Tg’ | Glass transition temperature in the frozen state |
| UK | United Kingdom |
| USA | United States of America |
| USD | United States Dollars |
| USDA | United States Department of Agriculture |

# Objectives

The objectives of my research project were to:

- Review international trends in specialty fine food manufacturing.

- Research innovative edible rose petal products that are currently on the world market.

- Study the process of developing new specialty food products derived from rose petals.

- Establish the commercial viability and pricing constraints of growing and manufacturing edible rose petal products in Australia.

- Study current best practice rose petal growing, freeze drying, packaging and marketing.

# Introduction: The specialty food industry

The majority of Australian flower petals are produced for wedding and romance purposes. For the last five years, freeze-dried rose petals have dominated the confetti sector of the wedding industry as the biodegradable solution for paper confetti. Currently there are over 120,000 weddings per year in Australia, with the industry's annual revenue exceeding $2 billion dollars (Runway Dream, 2014). In this time there has been very limited change to the production, price or packaging of freeze-dried rose petals for weddings.

Cooking television shows have grown rapidly in popularity. Known as "the *MasterChef* effect", it is believed that the popular television show has triggered a rise in foodie culture and seen spending at restaurants and cafes boom over the past couple of years (Polites, 2014). Consumer demand for specialty foods has grown in line with this foodie culture. Specialty foods are foods and beverages that command a premium price due to their quality, convenience or target consumer.

The specialty food industry is one of the very few industries to thrive during the global financial crisis (GFC). In the USA, "*specialty food in all channels grew at 9.6% in 2012 and 8% in 2013, with specialty food representing 10.4% of all retail food sales*" (Tanner and Lockwood, 2014). This was almost four times the growth of sales across all food sectors. The USA Specialty Food Industry predicts that 8% growth is a sustainable target for the next three years (Tanner and Lockwood, 2014).

Internationally, rose petals have a widespread use in both sweet and savoury cuisine. The use of rose petals in Australian cuisine has been limited due to the availability of food grade rose petals and little knowledge about how to prepare them. Rose petals have been commonly used in Persian, Indian and European cooking for hundreds of years in jams, marmalades, teas and syrups. More innovative rose petal products are sought after today, including rose petal gelato, refreshments and chocolate.

The average specialty food manufacturer in the USA generates $1,904,400 USD in sales per year, which almost rivals the average specialty food importer at $2,055,900 USD in sales (Tanner and Lockwood, 2014). Increased consumer interest in locally grown, specialty foods shows potential for edible rose petal products to capitalise on these trends.

Producing vibrant, on-trend colours is the key to growing rose petals for weddings and romance. By comparison, growing rose petals for food relies on preserving and packaging techniques to optimise shelf life for the consumer and ensure food safety. Whether growing for the wedding industry or the specialty food industry, employing best practice is critical to profitability. A review of industry best practice, particularly in the area of freeze-drying, will help increase profitability and professionalism industry wide.

China is currently the largest freeze-drying country in the world; producing 85% of the world's freeze dried produce. Their specialty is bulk freeze dried fruit and meat. Competing with Chinese manufacturers in large markets such as bulk freeze dried fruit is unlikely to be commercially viable for Australian manufacturers. However, Australia's reputation for quality and food safety can enable manufacturers to profitability produce high value, niche freeze-dried foods that command a premium price. Freeze dried edible rose petals can provide flower farmers with an additional revenue stream to secure against changing trends.

To date there are only a handful of flower farmers attempting to produce fresh rose petals for culinary consumption in Australia. They are not certified organic and there are no existing specialty food product lines derived from rose petals.


Photo 3: Sarah Sammon at the Summer Fancy Food Show (New York, June 2014).

# Chapter 1: Growing edible rose petals

## 1.1 Rose varieties

Growing rose petals for the wedding market has different considerations to producing for the culinary market. Not all flowers are edible. Hydrangea florets are commonly grown for green and blue wedding confetti but they are actually toxic when consumed by humans. All varieties of the *Rosa* species are safe for human consumption but not all varieties have a good flavour and fragrance profile. Some rose varieties are best suited to freeze-drying, others more suited to air-drying, and some are best used when fresh.

Specialty foods derived from rose petals differ greatly in terms of the rose variety used and the pre-processing of the rose petals (air drying, freeze drying, fresh). Using edible freeze dried rose petals in one marmalade may deliver a smother texture than using air dried edible rose petals which may be have a chewier consistency. Deciding on the rose variety to grow and the method of pre-processing will ultimately involve a lot of trial and error.

Consideration must be given to the following points when assessing rose varieties for culinary consumption:

- **Petal size.** Will the size and shape of the rose petals complement the new specialty food and be easy to work with in terms of packaging? For example, large Ecuadorian roses would be unsuitable for pairing with delicate rock salt in a rose petal seasoning.
- **Petal count.** Rose varieties differ immensely in the average number of petals per head. For example, the popular floribunda rose, Iceberg, has an average of 20 petals per head, whereas many David Austin roses exceed 100 petals per head. Roses with a lower petal count are more costly to produce due to increased labour and inputs.
- **Aroma.** Aroma and flavour often go hand-in-hand. Generally the stronger the rose's aroma, the tastier the petals are. The more aromatic roses have a higher volume of essential oil, which contributes to a better flavour profile.
- **Flavour.** The rose petal flavour is vastly different across all rose varieties, with some having a sweet, moist taste and others having a peppery or zingy flavour. The rose

petal flavour of specialty foods overseas varies tremendously. This can be attributed to the rose variety used in manufacturing and the quality of the manufacturer.

*Rosa Damascena* is the most popular rose variety grown overseas for culinary consumption. It exhibits a high petal count averaging 100 per head, versatile medium-sized petals, a full-bodied aroma and a delicate, sweet flavour. Commonly grown in Bulgaria for large scale industrial production of essential rose oil, *R. Damascena* is known as the oil rose (Kovacheva, Rusanov & Atanassov, 2010). *Rosa Centifolia* is another popular variety, grown by Carolyn Biancalana at Le Domaine de Manon in the famous perfume region of Grasse in France. Biancalana supplies the famous perfume house of Christian Dior with her *Centifolia* rose petals and jasmine petals for distillation. She also manufactures specialty rose foods on-farm and has developed a thriving tourist business. The limiting factor with growing *R. Damascena* and *R. Centifolia* varieties is that they typically produce only one crop per year. A rose petal farmer producing wedding confetti from cut flower varieties will produce three to four crops per year. Producing only one crop of edible rose petals per year is a high-risk strategy as the entire crop could be lost to pests or adverse weather.

In Ecuador, cut flower rose varieties are grown for culinary consumption. The most popular are the red and white varieties of *Freedom* and *Vitality*. Their fragrance and flavour was quite strong, although slightly less aromatic and not as sweet when compared to *R. Damascena* and *R. Centifolia.* Their year-round production, however, gives greater protection against crop loss and offers a larger harvest capacity. They would need to be trialled in different locations and outdoors as these were observed growing in greenhouses with the ideal climate, altitude and rich volcanic soils that Ecuador is renowned for.

Photo 4: Organic white *Vitality* roses Nevado Roses (Ecuador, July 2014).

## 1.2 Organic production

Growing edible rose petals using organic principles is recommended whether the farmer plans to pursue organic certification or not. Most commercial rose pesticides and herbicides are not classified as food safe, so a mainstream rose grower is unlikely to meet food safety regulations.

Fabian Vargus (2014), Nevado Roses' Organic Farm Manager, has seen no difference in the head size, stem length or health of their *Freedom* roses when grown organically compared to when they are grown inorganically on the cut flower rose farm. Vargus' main challenge with large-scale organic rose production has been managing disease, especially botrytis, rust and mildew. He has been unsuccessful in treating rust in the organic crop. Thrips and aphids have also been problematic and he has struggled to develop a way to control thrips aside from standard preventative measures such as keeping the crop clean and deadheaded at all times.

Plastic mesh sleeves are applied to red roses at Nevado Roses to prevent blackening in cold weather. Vargus has found these add some protection against insects, so he now applies the sleeves to other colours grown organically when they are at risk of an insect plague.

Mint plants at the end of every row as well as chile and chamomile plants throughout the farm keep most insects away from Vargus' crop. Similarly, Young Living Essential Oils grow chile plants for the same purpose on their uncertified organic farm in Ecuador (Chong, 2014). Fortunately for Young Living Essential Oils, many of their crops have such high levels of essential oil that bugs don't like them anyway. Ylang ylang is their largest crop at 24 hectares, followed by oregano, Lippia alba and lemongrass. Further research is recommended into companion planting essential oil crops as a method for pest management in organic roses.

Providing adequate nutrition and fertiliser was not problematic for any of the rose farms visited. Flyboy Naturals in the USA is the world's largest producer of freeze dried rose petals. Whilst their petals are not certified organic, they are grown using organic principles. They do not apply any synthetic fertilisers to the roses but they have recently diversified into organic aquaponics and are using the fish waste to fertilise their rose crop (Brown, 2014). Soil health

on Nevado Roses organic farm is maintained by composting the organic waste from rose leaves and petals. Vargus monitors the calcium levels in the compost carefully and has a soil pH target of 6.5 to 7. The rich volcanic soil has an organic matter of 3 to 4% across the entire farm. Drip irrigation water is infused with sea algae to keep oxygen and nitrogen levels high and organic waste is brought in from local organic farms to add to the rose compost.

Young Living Essential Oil's Ecuadorian farm has a lower organic matter of 1.5% and an average pH of 7.5. Chong and his team have developed a worm casting plant to provide organic fertiliser to boost their soil health. Reapplying the plant waste from their oil distillery back onto the farm also serves to increase organic matter and act as a weed control.

The primary method of weed management on organic flower farms is done by hand weeding crops. Even Young Living Essential Oil's 900-hectare farm in Ecuador is entirely hand weeded. Hand weeding in Australia is quite cost prohibitive with the high cost of labour. Australia's minimum wage is almost 7.5 times Ecuador's minimum wage of $318 USD per month. Young Living Essential Oil, however, have the additional cost of offering housing to many of their 90 staff and providing 200 local high school children with free education at the Young Living Academy (Chong, 2014).

Photo 5: Worm casting plant at Young Living Essential Oil (Ecuador, July 2014).

## 1.3 Harvesting

It is believed the aroma and flavour of rose petals are influenced by the time of day they are harvested, although this theory hasn't been scientifically tested. Harvesting early in the morning is recommended for colour retention in rose petals for weddings, whereas a late afternoon to early evening harvest is recommended for edible rose petals as this is when the essential rose oils are at their strongest.

Harvest efficiency is important for the grower's bottom line, as labour is typically one of the highest input costs in growing rose petals. The delicate nature of rose petals prohibits harvest by machine. Shropshire Petals in the UK have recently changed harvesting wages from an hourly rate to a piece rate, reportedly doubling their output (Bubb, 2014). For it to work, Bubb suggests teams of four pickers as a minimum, with the optimum team size being ten. In a normal season, Shropshire Petals employs three teams of six pickers; with the top performing team labelled as the A team and the top picker aiming to earn almost double the minimum hourly rate.

All pickers receive the UK minimum wage of £6.31 as a base rate. The piece rate is always set at the end of the day, so the day's conditions can be taken into account. For example, it may have been really hot, or raining, or the crop had a higher density of weeds than usual. Some delphinium colours are also much slower to harvest than others. The dark blue delphinium crop automatically earns £0.20 more per hour for piece rate.

Bubb says there must be a supervisor working with the teams all day when piece rate is used. If the whole team fail to meet the minimum wage rate, they receive a warning for three consecutive days before being dismissed. Most of Shropshire Petals' season labour is backpackers from Eastern Europe who are hired by contractors.

With limited opportunity for job rotation, the routine nature of the work can be detrimental to output. Perhaps this is why piece rate has proven so effective. Teams are also required to start harvesting from the middle of each row and working to the end of the row, rather than working from end to end. Bubb says this has significantly improved staff morale and output.

# Chapter 2: Innovation

A search online reveals thousands of sweet and savoury recipes that require rose petals. Despite this apparent unlimited scope for creating specialty foods derived from rose petals, the number of edible rose petal products on the market is quite minimal. Perhaps this is because fresh edible rose petals are not readily available or perhaps it is because flower farmers do not typically venture into food production as a means of adding value.

According to Michael Morrissey (2014), Director of Oregon State University's Food Innovation Center, it takes between six months and two years to commercialise a new specialty food. If the manufacturer plans to distribute in supermarkets or larger retail chains, they will be expected to produce an entire line of products. John Nevado (2014) believes a line of 20 products is desirable for a specialty range. His current *I Love Roses* line includes chocolate, marmalade, energy bars, jam and tea made from rose petals as well as packets of fresh culinary rose petals. Innovation and diversification give Australian flower growers the ability to add value to their brand and compete with cheaper imports.

Carol and Jim Adelman (2014) in the USA grow cut-flower peonies as well as cereal and horticulture crops. They attribute the success of their mixed farm to constant diversification and matching production with consumer demand. Their entire peony operation is vertically integrated and diversified across wholesale, retail, online, export and tourism. Tanner and Lockwood's (2014) research indicates that consumer demand for locally grown, organic, traceable, all natural, food safe specialty foods is at an all-time high. Organic fresh rose petals, freeze dried, sugared and imprinted edible rose petals as well as rose hip powder, have been identified as matching today's consumer demand.

Photos 6 & 7: Full traceability of marmalade at Wilkin & Sons Ltd. (Tiptree, August 2014).

## 2.1 Organic edible fresh rose petals

Consumer demand for certified organic produce was found to vary greatly from country to country. In the UK, labelling a product as sustainable and locally grown reportedly drove more sales than organic certification. Rupert Evans (2014), co-owner of the UK's Denstone Hall Farm Shop and Cafe, has noticed a decline in demand for organic produce over the last five years. His experience suggests that provenance is more of a drawcard so he tries to source all produce locally and label it accordingly.

The Soil Association's *2014 Organic Market Report* revealed growth of 2.8% in organic sales in the UK in 2013, the first year of growth after four years of contraction (Sexton, 2014). By comparison, organic sales in the USA are predicted to grow by a compound annual growth rate (CAGR) of 14% from 2013 to 2018 (Daniells, 2014).

Australian consumers appear to be trending more closely with the USA market. This year's *Australian Organic Market Report* showed consumption of certified organic food, cosmetics and household products are at a record high in Australia. With a CAGR of 15.4% between 2009 and 2014, the organic industry is one of Australia's fastest growing industries, appearing to following in the USA's footsteps (Australian Organic Ltd, 2014).

Certified organic edible rose petals are difficult to source, as there are no certified organic rose farms or importers of certified organic edible rose petals in Australia. The few Australian edible flower growers who produce edible rose petals are not certified organic and they do not have sufficient quantity for specialty food manufacturing. Obtaining organic certification and food safety certification could give the Australian rose grower a point of difference and the ability to command a far higher price than their cut flower counterparts.

Nevado Roses is the only 100% certified organic rose farm in Ecuador. Their organic roses are exported worldwide, with one of their largest customers being Wholefoods. They are also the largest single-owner rose farm in Ecuador and became the first commercial rose growers in the world to obtain 100% organic edible certification with Italian organic certification company, ICEA six years ago (Altamirano, 2014).

Red and white organic fresh rose petals are sold as Culinary Rose Petals by Nevado Roses to leading restaurants worldwide, including El Bulli, a Spanish restaurant that has consistently been voted Best Restaurant in the World by the renowned San Pellegrino Top Restaurants Guide. It is not only the rose petals that are used by the culinary market, as chefs often request the organic stems, leaves and heads too. ICEA certification was a lengthy process, taking Nevado Roses five years before they could sell their rose petals as edible and then another two years to be certified for producing specialty foods derived from their roses (Altamirano, 2014).

The few Australian edible flower growers producing small quantities of rose petals are permitted to label their product as organic, without obtaining certification, provided they can substantiate their organic claim. The voluntary Australian standard for growers and manufacturers wishing to label their products as *organic* and *biodynamic* is AS 6000 – 2009. Failing to apply for organic certification, yet marketing rose petals as organic could be a risky strategy. As consumer awareness develops, organic consumers in Australia are likely to steer clear of organic products unless they have been certified.

Social enterprise, Organic Blooms, produce organic flower bouquets on the outskirts of Bristol in the UK. Founder, Jo Wright (2014), felt the additional paperwork required to obtain organic certification ate into the business profits too heavily so she continues to produce uncertified flowers. However, the UK organic market is not experiencing the exponential growth that Australia and USA are, so organic certification may not be a necessary marketing tool for Wright.

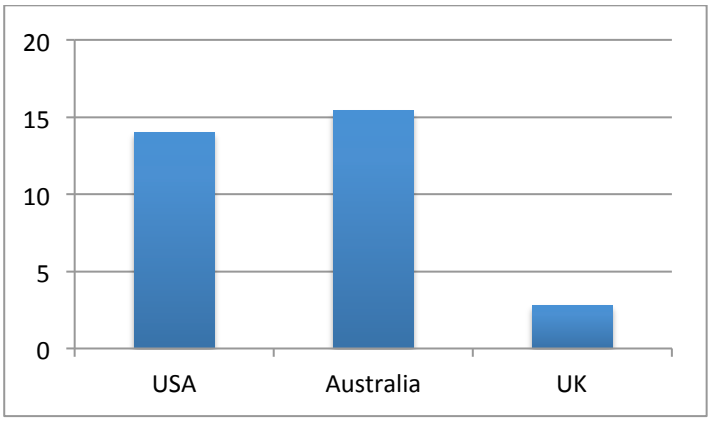


Figure 1: Compound Annual Growth Rate (CAGR) Organic Sales 2013.

*Source: Sexton, Daniells & Australian Organic Ltd. (2014).*

## 2.2 Freeze dried edible rose petals

There are many floral preservation techniques and solutions that can effectively remove water from flowers, including air-drying, dehydration, glycerine and silica gel desiccants. Unlike other drying methods, freeze-drying retains over 90% of the rose petal's original colour, shape and form without using any artificial substances. Common potpourri rose petals are air-dried which accounts for why they are often shrivelled up and very firm to touch.

The basic principle of floral freeze-drying is to remove water from the rose petals while the water is in a solid state (ice crystals). This removal is via the process of sublimation. Sublimation is vaporisation of water from its solid state to its vapour state, without first passing through an intermediate liquid phase. The removal of the frozen water molecules from the rose petals (sublimation), takes place when the vapour pressure of the ice on the rose petals' surface exceeds the vapour pressure of the surrounding air.

A rose petal's flavour is derived primarily from the essential oil content. Because 98% of the moisture is removed from freeze dried rose petals, their taste, aroma, softness and pliability can be compromised in the freeze-drying process. Exposure to the air's natural humidity can only restore partial softness to the rose petals upon removal from the freeze dryer. However, the convenience of edible freeze-dried rose petals far outweighs many of the negative aspects. They do not require refrigerated storage and have a shelf life of 1.5 to 30 years subject to the manufacturer's packaging.

The extended shelf life and attractive appearance makes edible freeze dried rose petals ideal for specialty food retailers and cake decorators. Anderton-Tyers (2014), founder of Uncle Roy's Comestible Concoctions, has successfully stocked his edible freeze dried rose petals in specialty food departments of many leading UK retailers including Harrods, Fortnum & Mason and Marks & Spencer.

## 2.3 Sugared rose petals

Anderton-Tyers (2014) has seen resurgence in the cake decorating market, accounting for approximately five of his new clients every week. Sugared rose petals have become popular for cake decorating as well as adorning chocolate and sweet pastries.

Scalability is an obvious concern with sugared rose petals, as their delicate nature requires them to be handcrafted individually. Founder of Wales based Eat My Flowers, Sarah Hughes (2014), produces exceptionally high quality sugared roses. Each flower is individually hand-painted and hand dusted. Hughes admits that scalability is difficult and a recommended retail price of $1.80 AUD per flower restricts market penetration. In high minimum wage countries such as Australia, high quality sugared rose petal production is likely to exist only as a side income for small rose farms and home-based businesses.

Natural, traditionally sugared rose petals are produced by applying egg white to the rose petals to act as an adhesive for the sugar. Hughes applies a paste of pasteurized powdered egg white, water and confectioner's sugar to her flowers.

French manufacturer, Candiflor, sell their candied roses and violets in wholesale one-litre tubs and smaller jars for retail. Larger manufacturers like Candiflor, rely on artificial colours and flavours to facilitate production in bulk. This sacrifices the *all natural* appeal and visual appearance that are in demand by today's specialty food consumers. The question is whether Australian consumers will be prepared to pay a higher price for all natural, handcrafted, sugared rose petals, or whether they would they rather settle for a cheaper alternative that has been flavoured artificially?

Photo 8: Candiflor sugared roses (Venice, August 2014).

## 2.4 Laser imprinting

Oregon State University's Food Innovation Center is currently trialling laser imprinting on specialty foods such as hazelnuts and apples. Printing on cut flower roses and rose petals has been available for over a decade. The ink used for printing has made them unsafe for human consumption. Laser printing has undergone preliminary testing to show it is safe for use on food products.

The Food Innovation Center has trialled Red Delicious Apples with the new Firestar Series t100, patented, A254 Laser Imprinting System. There was no significant difference to the appearance of the apples three months after the laser treatment. This technology has not been commercialised on the open market yet as it is still awaiting Food and Drug Administration (FDA) approval. The purchase price of a Firestar Series t100 is estimated to be around $50,000 USD which may be cost-prohibitive for smaller markets such as the Australian rose petal industry unless used in conjunction with other food products.

For a country like USA that has over two million weddings per year, a Firestar Series t100 could deliver strong returns to diversified rose petal farms.

Photo 9: Laser imprinting on a walnut (OSU's Food Innovation Center, Portland, July 2014).

## 2.5 Rose hips

Since the early 1980's, the Danish family farm, Hyben Vital ApS, have manufactured food supplements from rose hips. In 2002, Hyben Vital's owner, Torbjorn Hansen (2014), partnered with the Danish Institute of Agricultural Sciences (DIAS) to research the compound health benefits of rose hips.

The rose hip is the fruit of the rose plant. Typically orange to red in colour, rose hips begin to form after successful pollination of flowers in spring or early summer, and ripen in late summer to autumn. Rose hips are one of the richest plant sources of vitamin C. They are also known to contain carotenoids, beta-carotene, lutein, zeaxanthin and lycopene. *Rosa Rugosa* and *Rosa Canina* are the common rose varieties grown for the production of rose hips as they bear much larger fruit than a conventional hybrid tea rose.

Hyben Vital ApS are recognised as producing the highest quality in the world, having purpose bred and patent protected a new rose variety, *Lito*, exclusively for their rose hip farm. Their earlier years growing *R. Rugosa* prevented mechanical harvesting of the rose hips. The larger fruit and thorn-free *Lito* plants can be mechanically harvested using a modified wine grape harvester (Hansen 2014). The growing conditions in Denmark are ideal for rose hips with 18 hours per day of sunlight during the summer months when they are at peak production.

Osteoarthritis is the most common joint illness in the world. Clinical tests show that arthritis sufferers have reduced pain, increased mobility and a reduced intake of medicine when taking the Hyben Vital ApS rose hip products (Kvistgaard, 2003). Within a 3-month period, the test subjects had reduced their medicinal intake by 50% on average. Further trials are expected to show that arthritis sufferers can stop taking arthritis medicine altogether, however access to funding has prevented further study. Hansen (2014) stated that his company had already spent in excess of one million AUD in privately funding rose hip research. Christensen et al. (2008), states that although there is a demonstrated reduction in arthritis pain, further analysis of the safety and efficacy is required. Access to research funding will ultimately determine the commercial viability of rose hips for medicinal use.

Photo 10: Hyben Vital's patented, thornless *Lito* rose hip crop (Denmark, August 2014)

Photo 11: Ripening *Lito* rose hip fruit (Hyben Vital, Denmark, August 2014).

Photo 12: Hyben Vital's signature orange rose hip powder (Denmark, August 2014).

# Chapter 3: Manufacturing specialty foods

One of the most difficult decisions to make when innovating a specialty food is whether to concentrate on growing the raw ingredient and outsource the manufacturing, or setup a commercial kitchen and manufacture on-farm. The most popular options being used by todays edible rose petal growers are:

- Building a manufacturing plant on-farm.
- Hiring a commercial kitchen.
- Supplying an established manufacturer with the rose petals and the recipe.
- Private labelling an existing product.

## 3.1 On-farm manufacturing plant

Funding the development of a commercial kitchen can be extremely costly for new entrants. Many growers opt for shipping containers as the foundation for their first manufacturing plant. The containers are cost effective, water tight and easy to sanitise but they will still cost thousands of dollars, potentially reducing cash flow to other business departments such as marketing. This can impede future growth so a lower risk alternative such as outsourcing to an established manufacturer may be a better option in the start-up phase of food production. On the plus side, vertically integrating the business with a manufacturing plant offers more flexibility for trialling small batches of new products, tighter quality control and traceability as well as great opportunities for agro-tourism revenue. The story of a rose farm growing and manufacturing specialty food products is one that consumers will love.

Luca Dalpian, owner of Dalpian Il Sottobosco, has developed a delicious range of rose petal based products including rose petal icecream and rose petal syrup. Dalpian (2014) took more of a bootstrapping approach, starting from his home kitchen through to the impressive commercial kitchen, restaurant and visitor centre that exists on his farm today. The quality and freshness of Dalpian's products is undeniable as he produces the food as soon as the crop is harvested. The flavour and aroma fresh rose petals can be compromised if they are held in cold storage for a long period of time to await manufacturing.

## 3.2 Hiring a commercial kitchen

This is a good option for small growers with a short harvest window, who want to control the quality and freshness without incurring the expense of building their own plant. It can also be the best option for trialling and testing small batches with consumers, provided the grower is in close proximity to the commercial kitchen.

OSU's Food Innovation Center offers a commercial kitchen for hire that is home to a number of start-up food entrepreneurs. Jack Kuo (2014), creator of Cheesy Puffs, uses the incubator facility for processing and packaging his all natural corn puffs. Similarly, Wandering Cooks in Brisbane, Australia and Kitchen Cru in Portland, USA, hire out shared-use community kitchens and culinary incubators to budding food entrepreneurs.

## 3.3 Supplying an established manufacturer

In this instance the grower supplies the edible rose petals to an established manufacturer to develop the specialty food products. The grower may or may not provide the recipes. With minimal set-up costs, this option will keep overheads down and be a more scalable model of production.

This is the option used and recommended by Nevado (2014). Nevado Roses supply their edible rose petals to specialist food manufacturers throughout Ecuador to process each different product. Confiteca C.A. is an Ecuadorian confectionery company that was established over half a century ago. Nevado Roses supply Confiteca C.A. with organic edible rose petals for the manufacturing of rose petal chocolate. By keeping their packaging uniform across all outsourced specialty food products, Nevado Roses are able to maintain a strong and consistent brand.

## 3.4 Private labelling an existing product

This option requires a manufacturer to already be producing the specialty food under another brand. In most cases the rose grower will source the manufacturer at a food trade fair and propose private labelling. For smaller rose petal farms with limited resources, this is a great way to extend their brand without putting pressure on their crop and finances. It provides fast entry to market and removes the hassle of obtaining food safety certification.

However, many manufacturers visited during this research were reluctant to private label due to the exclusive nature of their rose petal products. Anderton-Tyers (2014) was approached by retailing giant Fortnum and Mason, to private label some of his edible flower products with the famous Fortnum and Mason branding. He declined the offer saying he felt his own brand, Uncle Roy's Comestible Concoctions, could be diluted by this approach after using considerable resources over the years to develop his well-known Scottish brand.


Photo 13: Cheesy Puffs creator, Jack Kuo, hard at work packaging his product.

(OSU's Food Innovation Center, Portland, July 2014).

## 3.5 Consumer sensory testing

The major determinant of a specialty food's success is its consumer appeal. Consumer Sensory Testing is a valid scientific approach to measuring consumer response to new foods. Many of the large retailers and supermarket chains require in-house sensory testing before new foods can become approved lines. In 2011, Woolworths launched their Sensory Evaluation Kitchen in Australia, a state of the art testing facility that enables panels of consumers to test products for taste, functionality and overall appeal (Woolworths, 2014).

OSU's Food Innovation Center has a similar state of the art Consumer Sensory Testing Facility which can be used for blind taste testing. Ten individual booths are equipped with individual sinks, touchscreen computers, a sliding door pass-through that connects to the staging area, and adjustable lighting for white, red, green and blue light level colour.

A standard Consumer Sensory Test will involve 100 panellists who are paid $25 to $30 USD for each half an hour of testing (Morrissey, 2014). A minimum of 100 panellists must be tested to gain accurate results. Potential panellists are drawn from a database of 20,000 consumers and screened so that they align with the specialty food's target demographic.

OSU is not the only North American university with a Food Innovation Centre. Oklahoma, Cornell, North Carolina and Ohio State offer similar facilities for food entrepreneurs. A thriving culture of food entrepreneurship is evident in the USA. Over 2,400 manufacturers exhibited 180,000 products at the 2014 Summer Fancy Food Show in New York. This innovative culture is being driven partly by the USA federal government's Value-Added Producer Grant.

Farm Futures (2014) reported the USDA pledging $25 million USD to the Value Added Producer Grants on 19 August 2014. This goes toward providing assistance for 247 USA businesses to create value-added products, expand marketing opportunities and develop new uses for existing products. "*Since 2009, USDA has awarded 863 Value-Added Producer Grants totalling $108 million USD. Twenty percent of the grants and 16% of the total funding has been awarded to beginning farmers. Miles Smith Farm, for example, has been selected*

*for a $127,732 USD Value-Added Producer Grant to market and produce burgers made from 55% grass-fed beef and 45% organically raised pork*" (Farm Futures, 2014).

Australia is lacking in programs and funding to support farmers in food innovation and specialty food manufacturing. In his keynote presentation at the Rabobank F20 Summit, Chairman of the Australian Agricultural Co Ltd Board and external Director of Nuffield Australia, Donald McGauchie (2014) stated, *"Australia has dropped the ball on agricultural research and development"*. McGauchie believes *"private researchers are doing great work but [due to finance constraints] they have to focus on commodity areas such as grains"*.

Photo 14: Michael Morrissey, Director of Oregon State University's Food Innovation Center, demonstrating the impressive Consumer Sensory Testing Facility (Portland, July 2014).

## 3.6 Food certification

Obtaining food certification can be challenging for uncommon specialty foods. As there are no current guidelines for the production of edible flowers in Australia, local government regulators tend to be overly cautious about certifying them as safe for human consumption.

Sarah Hughes' (2014) sugared roses are grown and manufactured on her farm and supplied to celebrity cake decorators across the UK. Despite her local authority's initial concern, her innovative foods were eventually deemed very low risk after she had completed a risk assessment. Depending on local regulations, completion of a food hygiene course will probably be compulsory. With edible flowers, there is more risk of selling poisonous flowers or flowers with bugs and dirt on them, than a risk of bacteria or disease being present. In obtaining food certification, Hughes was able to rule out most food safety risks associated with edible flowers by committing to a visual inspection of every flower. However, this is a very labour intensive process.

Hughes suggests drawing on similarities in everyday foods to give authorities a reference point. Washing some flower petals can damage their delicate texture so Hughes compared her practice of not washing to growing fresh mushrooms. Rachael Voaden, founder of The Edible Flower Shop, also experienced difficulty obtaining food certification. Voaden (2014) found the process much simpler once she explained to local regulators that her dried edible flowers were *"just like dried herbs"*.

Photo 15: Visual inspection of each individual rose is required for food safety compliance (Cynwyd, Wales, July 2014).

## 3.7 Improving operating efficiency

Freeze drying offers an opportunity for growers to store their product for one year or more so they can command a higher price out of harvest and ensure year-round cash flow for their farm. Commercial freeze-drying equipment is one of the most expensive investments for a rose petal grower. Maximising freeze dryer operating efficiency ensures a faster return on investment and increased profitability.

Oregon Freeze Dry (OFD) is the largest freeze-drying company in the northern hemisphere, grossing over $100 million USD annually (Damon, 2014). With a 20 million tonne capacity, OFD's two manufacturing plants in Oregon cover 10,000 square metres and their four plants across the UK and Denmark amount to an additional 3,500 square metres. The 32 Oregon-based industrial freeze dryers currently produce 450 sock keeping units (SKUs) (Damon, 2014).

John Damon (2014), OFD's Senior Vice President of Manufacturing and Engineering, specialises in Lean Six Sigma manufacturing and recommends the book, *Adkar*, as essential reading for food manufacturers. One of OFD's Key Performance Indicators is the Overall Equipment Effectiveness (OEE), which is the amount of time that their equipment (packaging and freeze-drying) is operating.

In three years, Damon has led OFD from an OEE score of 59% to a staggering OEE score in the low 90-percentile range. World class OEE is 85%, so OFD are currently operating above world class standard, with a target of reaching 100% OEE. This has dramatically improved OFD's bottom line, doubling their profitability, reducing labour by 40% and increasing employee bonuses from 3% to 10% (Damon, 2014).

Damon stresses the importance of first establishing which products your company can generate the best return from and which products have the greatest potential for growth. With this methodology OFD chose to exit the pharmaceutical market and focus on packaged meals and developing the Mountain House brand.

OFD can produce a load of Mountain House freeze-dried meals in 24 hours. By comparison, it can take seven to fourteen days to freeze-dry rose petals in a floral freeze dryer. Knowledge of parameters such as collapse temperature (Tc), glass transition in the frozen state (Tg'), and eutectic temperature (Teu) are valuable in determining the most efficient and economical freeze drying cycle for each product (Cook, 2010). There are no known Tc, Eg' and Teu parameters for the production of freeze dried rose petals.

Damon (2014) and Anderson (2014) suggest testing the following areas for potential efficiency gains and a shorter freeze-drying cycle:

- Trial external pre-freezing.
- Measure the Tc of rose petals.
- Measure the Teu of rose petals.
- New freeze drying equipment.

### 3.7.i Trial external pre-freezing

OFD pre-freeze all food products prior to loading the freeze dryers. Foral freeze-drying conventionally relies on freezing the product in the freeze drier. By pre-freezing in a large walk-in freezer, the rose petals can be frozen in thinner layers, maximising their surface area. The more surface area created during pre-freezing, the faster the actual freeze-drying process will be, as greater heat transfer will be allowed (Labconco).

External pre-freezing can also be useful for managing harvest during a crop flush. Rose petals can be kept in a frozen state for up to three months prior to freeze-drying. Outdoor rose growers and growers with limited freeze-drying capacity can benefit from pre-freezing to increase their year-round OEE (Rasmussen, 2014). The freezers must be constructed in close proximity to the freeze driers, as the rose petals must remain in a frozen state during transfer to prevent any melting.

OFD use cool rooms with a freezing capacity of minus 40 degrees Celsius to pre-freeze all products. With a 30 tonne freezing capacity on-farm, Hyben Vital ApS use pre-freezing as a strategy for managing the crop's flush and maintaining nutritional integrity of the rose hips

(Hansen, 2014). The less time a product spends in a cool room and the faster it can be transferred to freezer, the greater the nutritional quality.

### 3.7.ii Measure the Collapse Temperature (Tc)

The Tc is the point at which the frozen rose petals, when subjected to vacuum, can no longer maintain their structure during the period when the frozen solvent is removed. Collapsed rose petals often have poor rehydration ability, a high residual water level and a shrunken, visually unacceptable appearance (Cook, 2010). The Tg' is the point at which the rose petals show signs of softening, indicating a possible loss of structure. The Tc and the Tg' temperatures are often quite close, with the Tg' generally lower than the equivalent Tc (Cook, 2010).

Knowledge of the Tc can lead to a significant saving of both time and money. A 1% increase in shelf temperature during primary drying can lead to a massive 13% decrease in drying time (Cook, 2010). Under a conventional two-week floral freeze drying cycle; applying heat and increasing shelf temperature by 1% would reduce the cycle time by two days. Over the duration of one year, this equates to producing an additional four freeze dry loads per machine and thousands of dollars in additional rose petals.

### 3.7.iii Measure the Eutectic Temperature (Teu)

Labconco states that the most important factor in freeze-drying is the eutectic temperature of the rose petals. The Teu is the point at or above which a frozen eutectic solid becomes a liquid, which would boil as the solvent is removed (Labconco). Otherwise known as the point at which the rose petals yield the lowest possible melting point.

A food science department or pharmaceutical laboratory at a university can measure both the Tc and Teu of rose petals using freeze drying microscopy (FDM) such as the Lyostat2 (Cook, 2010). Once the Tc and Teu have been established, heat can be safely applied to rose petals to shorten the freeze-drying cycle and initiate sublimation without risking a rise in temperature of the rose petals and possible melting.

### 3.7.iv Invest in new equipment

Although the underlying principles of freeze-drying have not changed since commercial freeze-drying began in 1935, freeze driers have become far more automated and less labour intensive in the last decade. A new Cuddon General Purpose Freeze Dryer is fully computer controlled so there is no manual labour required to defrost the condensing chamber daily. Every facet of operating a new model can be controlled, even altering vacuum pull-down time to provide another small efficiency gain over the course of a year.

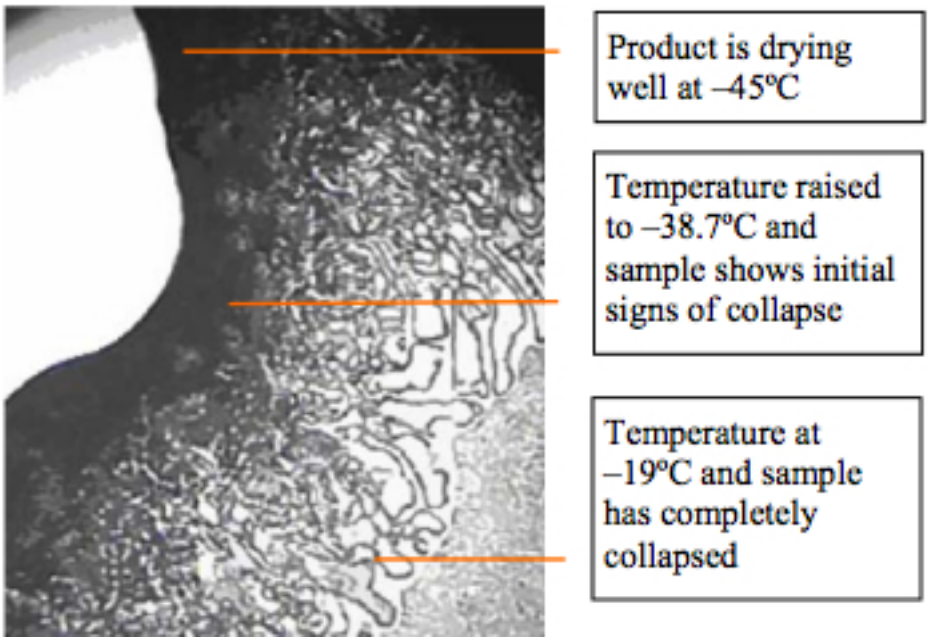


Figure 2: Screenshot from a Lyostat2 freeze-drying microscope as a sample is tested.

*Source: Cook (July, 2010).*

## 3.8 Packaging and storage

Specialty food manufacturers in the USA claim that packaging accounts for an average of 12% of their expenses, compared to the cost of raw ingredients at 29% (Tanner & Lockwood, 2014). The average cost of packaging for specialty rose petal foods will equate to almost half the cost of purchasing the raw ingredients. Whilst the cost of packaging may seem high, attractive, functional and correctly labelled packaging will directly increase sales.

One of the most attractive packaging for edible rose petal products is that used by Nevado Roses for the I Love Roses brand. The corporate colours of white and pink are highlighted by a stunning image of a bright pink rose that has been x-rayed. Nevado (2014) largely attributes the success of I Love Roses to the visual appeal of the packaging. Costing up to 90% of the manufacturing expenses, Nevado admits that the stunning packaging comes at a price.

Cheesy Puffs entrepreneur, Kuo (2014), emphasises that his packaging must communicate value to consumers because of the boutique nature of specialty foods. Kuo's Cheesy Puff bags are made from biodegradable rice paper and then hand-stamped to give an authentic, farm gate look as opposed to the mass produced appearance of adhesive labels. Co-owner of Young Living Essential Oils, Mary Young (2014), is excited about the new packaging developed for their essential oil and beauty products. Oozing sustainability, the new packaging is made of paper crafted from the farm's distillation plant waste. The paper will be incorporated at all levels throughout the company, even the business cards.

Packaging freeze-dried edible rose products is a fine balance between assuring shelf life and showing the visual beauty of the product. A lack of consumer awareness of freeze drying means that consumers often do not know what a freeze dried flower looks like, expecting it to be shrivelled up like its air dried counterpart. Deterioration of freeze-dried food can be caused by moisture, ultraviolet light and oxygen. Most freeze-dried foods are stamped with a shelf life of 1.5 years. Freeze-dried foods have the potential to be stored for 20 years or more but this type of packaging comes at a high price. It is generally a triple foil barrier, vacuum-sealed pouch with Modified Atmosphere Packaging (MAP). MAP involves flushing the packaging with an inert gas such as nitrogen or carbon dioxide to eliminate oxygen. An

oxygen absorber is often placed inside the package but this should not be necessary if the highest quality pouch has been gas flushed.

OFD's Mountain House meals have the longest proven shelf life in the freeze-dried food industry. When stored unopened and below 24 degrees Celsius, their pouched products have a shelf life of 12 years and their canned products have a shelf life of 25 years. The metallised foil pouches are so dense that you are unable to see anything through the pouches, even when held up to the strongest light. This prohibits the consumer from seeing the food, so the imagery on the packaging must be a high quality to give an accurate visual representation. A high resolution, sharp finish on triple foil barrier pouches usually requires rotogravure printing. The printing expense and MAP can make this option cost prohibitive for the edible rose petal producer.

Whilst MAP foil pouches are the superior option, glass, paper and plastic packaging can be used if an extended shelf life is not required. Anderton-Tyers (2014) supplies his freeze-dried edible rose petals in clear jars with hand-applied, foil adhesive labels. The glass jars showcase the petals well and protect them from shattering but the exposure to UV light and oxygen reduces shelf life to 1.5 years. Anderton-Tyers believes that consumers being able to visually see the rose petals inside the packaging translates into more sales than if they were offered a 20 year shelf life. After all, the rose petals do not become inedible after 1.5 years stored in glass jar; they simply lose their vibrant colour.

Photo 16: Headquarters of Oregon Freeze Dry (Albany, USA, July 2014).

## 3.9 Labelling

Attention to detail and adherence to the Australian and New Zealand Food Standards are critical when labeling new rose petal specialty foods. The initial product positioning will dictate the labeling requirements but it is recommended that a long-term view be taken. Supplying sugared rose petals to bakeries and confectioners will require less stringent labeling than supplying a supermarket. Even if the products are not targeted at large retailers in the beginning, comprehensive labeling will give a more professional appearance and provide greater opportunities for distribution in the long-term. Labelling requirements vary from country to country so this must be taken into account if the products are planned for export. Stickering, or applying a secondary sticker over certain elements of the package, can minimize labeling costs when beginning to export.

Offshore printers are generally cheaper for printing but most have minimum run sizes of 10,000 units. If Nevado's (2014) advice is followed and a line of 20 products is developed, this could equate to printing 200,000 packages – a very costly exercise. Harper (2014) advises engaging an experienced packaging designer for new specialty foods as even the slightest labeling error can cause rejection by distributors. Incorrect labeling on Top Barn Produce's packaging caused a loss of approximately 20,000 British Pounds when supermarkets refused to stock their vegetables (Harper, 2014).

Under Australian labeling laws, most manufactured foods must carry a Nutrition Information Panel (NIP). Fresh and freeze dried rose petals are exempt from carrying an NIP because they are an all-natural, single ingredient food whereas specialty foods manufactured with rose petals will require an NIP. In developing the NIP for a new specialty food, manufacturers can input the recipe into the Nutrition Panel Calculator on the Australian and New Zealand Food Standards website.

Currently the Australian and New Zealand Food Standards database has no registered nutritional analysis for rose petals. An Australian nutritional analysis of rose petals will need to be conducted by an ISO accredited food laboratory if an NIP is required for the new specialty foods.

## 3.10 Case sizing

Wholesalers may be hesitant purchasing large volumes of new or innovative specialty foods before consumer demand has been established. Anderton-Tyers recommends keeping case sizes to a minimum to encourage wholesalers to purchase more of the product range. Uncle Roy's Comestible Concoctions are often sold in smaller sets of three, compared to most of his competitors, which sell minimum cases of one dozen. Even reducing the case size from six items to five items per case has been found to increase the number of lines a wholesaler will invest in (Anderton-Tyers, 2014). This strategy also reduces the risk of the specialty foods sitting on the shelf for long periods of time and retailers presuming that the products are not popular.

## 3.11 Pricing

In developing a new specialty food, the manufacturer has the unique opportunity to set the industry's benchmark for pricing. Anderton-Tyers (2014) stresses the importance of building the correct margin in from the start. He aims for a 100% markup unless it is going to price his products out of market. The absolute minimum markup Anderton-Tyers will settle for is 50% because the wholesaler will require at least a 25% markup. If a product does not move with this markup then it is discontinued from production.

To maximize business profitability, most growers who diversify into specialty food manufacturing, are combining a mix of direct and online retail selling with wholesale. Anderton-Tyers states that new specialty food manufacturers may be reticent to sell wholesale and lose 25% of their margin, but often this margin is negated by the shipping and administration costs if the manufacturer was to sell wholesale.

A recent change to include postage as part of the price has increased sales and profitability for Hughes' (2014) online business. In 2013 Hughes charged £12.99 plus £4.99 postage for a box of 20 sugared flowers. Hughes is now charging a flat rate of £19.99 including postage for the same box. Despite the higher total cost, consumer demand has increased, as shoppers are more receptive to the single price inclusive of postage.

## 3.12 Commercial viability

Edible rose petals and specialty foods derived from rose petals have a market appeal to chefs, food distributors, bakers, home cooks and cake decorators. Despite the potentially broad market, Nevado (2014), founder of the culinary rose petal brand, I Love Roses, states that edible rose petals should be treated as a sideline for an existing business and not a standalone business. His belief stems from scalability issues caused by the artisanal and labour intensive nature of edible rose products.

The production of sugared rose heads and petals is likely the most labour intensive of all edible rose petal products. Preliminary trials conducted at Simply Rose Petals took an average of 90 seconds per rose head to apply the sugar paste. To be priced competitively against foreign manufacturers, a retail price of approximately two Australian dollars per head could be expected. Selling wholesale, the manufacturer could expect to achieve a price of one dollar per head. With the high cost of labour in Australia, the profit margin will be slim if sold wholesale.

To achieve maximum profitability, a similar sales model to that used by rose petal growers producing for the wedding market should be adopted. Most Australian rose petal growers sell directly to the bride via ecommerce, negating the need for a middleman. The grower is then collecting the entire mark-up with the additional responsibility of marketing the product. Unfortunately this model would cancel out the largest segment of the target market – the chefs, cake decorators and bakers – limiting sales to home cooks. Perhaps this is why Nevado (2014) stresses that edible rose petals should be a diversification to an existing business, not an entirely new one.

On the other hand, the limited availability of edible rose petals on the Australian market may mean that manufacturers do not need to price competitively against foreign manufacturers. The novelty, artisanal value of the product may enable new producers to set a benchmark price offering profitability at both wholesale and retail level.

# Chapter 4: Marketing

*"Business has only two basic functions – marketing and innovation. Marketing and innovation produce results. All the rest are costs."* Peter Drucker (Trout, 2006)

Tanner and Lockwood (2014) reported that marketing accounted for 10% of specialty food manufacturer's expenses in 2013. Social media is expected to become more dominant as a marketing tool for specialty food manufacturers and online food delivery such as USA's Instacart is predicted to become mainstream. Educating consumers and growing market share for a new product can be an expensive process, especially if some of the bigger players in the industry are vying for a share. Fortunately, the rise of online marketing and social media has helped to level the playing field, and small specialty food manufactures have the opportunity to build a tribe of loyal followers without great financial expense.

## 4.1 First to market

Being first to market with an innovative specialty food is a genuine competitive advantage. Nevado Roses have repeatedly taken this approach, consistently positioning the company as the industry leader. Among Nevado Roses 'firsts' are:

- Being the first commercial cut flower rose farm to grow edible roses which are 100% certified organic.
- Being the only Ecuadorian farm to make food products derived from rose petals.
- Winning Ecuador Export's prestigious award for export product differentiation.
- Being the first commercial rose farm to plant trees in between greenhouse blocks to create a more natural environment and increase humidity.
- Being the first to commercially grow two metre long cut flower red roses for the Russian market.

## 4.2 Social media

*"Marketing has been democratised. The capability to use marketing tools and technology without having to beg or pay for attention is unprecedented. It's a time where you can now build your own crowd to market and sell to without paying the mass media gatekeepers. That's social media."* (Bullas, 2013)

One of the biggest trends in social media is the rise of visual marketing. Sharing images of food is popular among "foodies" as they compete to show off their attractive creations or unique food discoveries. This trend is particularly relevant for specialty food marketers as visual marketing highlights the beauty of products such as edible rose petals. Instagram and Pinterest are the fastest growing social media platforms in the Specialty Food Industry (Tanner and Lockwood, 2014). From June 2014 to September 2014, the number of active Australian users on Instagram has grown 2.5 times from 1.6 million to 4 million (Cowling, 2014). Specialty food marketers must trial using Pinterest and Instagram to engage consumers, build a loyal following and cut through the online noise.

Shropshire Petals have been very proactive on social media, concentrating mainly on Facebook and Pinterest. Bubb's (2014) team run quarterly competitions and daily paid campaigns on Facebook as well as encouraging customers to actively pin their wedding and product photos. Surprisingly, Instagram hasn't been as successful for Shropshire Petals compared to the sales generated through Facebook. It is undeniable though, that social media is no longer just a brand awareness platform; it is now a sales channel.

Photo 17: Delphinium harvest at Shropshire Petals (Newport, August 2014).

## 4.3 Traditional marketing

With social media and online marketing being the buzzwords of the moment, it is easy to forget about older marketing mediums such as direct catalogue mail outs. *"We've gone from being exposed to about 500 ads a day back in the 1970's to as many as 5,000 a day today"* (Walker-Smith, 2014). It can be difficult for a new specialty food manufacturer to stand out in a world crowded with marketing messages. Resorting to older style marketing can give the manufacturer a point of difference so they stand out from the crowd.

Rupert Evans (2014), co-owner of Denstone Hall Farm Shop and Café, states that *"people are going back to old fashioned marketing like radio, billboards and local papers"* and that an offline approach should be combined with online marketing. The rise of online marketing is forcing many traditional marketing media to offer more competitive advertising rates. Denstone Hall maintains a strong social media presence but Evans (2014) has been able to incorporate radio and newspaper advertising whilst still operating on a "shoestring budget" of 0.5 to 1% of total revenue.

Carol Adelman (2014) has successfully marketed Adelman Peonies through traditional marketing media. Her printed colour catalogue is mailed out annually to their entire database. Although it is free, it is cleverly printed with a three-dollar price tag on the cover, giving the catalogue added value and making customers feel like they have received something for nothing. Adelman's catalogues are also useful for drawing tourists to their farm, including a calendar of events listing special days such as Adelman's (2014) Peony Fairy Week and Grandma Weekend.

Tanner and Lockwood (2014) predict that subscription services, both direct mail and home delivery, will grow in the USA food sector following on from the success of businesses such as the beauty industry's Birchbox.

## 4.4 Tourism

Although agri-tourism is growing in Australia, there is still a lot of potential for farmers to open for the tourist trade. Location is critical to the success of a tourist business. If the farm is too remote then it may need to become a destination rather than an attraction, to make it worthwhile for tourists to travel out of their way.

Famous English jam manufacturer, Wilkin and Sons Ltd, open their 320 hectare farm to the public on the UK's annual Open Farm Sunday. They have never spent money advertising their open day, yet through word of mouth the farm hosted 5,000 visitors on one day in June 2014. Approximately 400 farms across the UK get involved in Open Farm Sunday every year, with each farm attracting an average of 250 visitors (Newenham, 2014).

Nevado Roses offer tours of their cut flower farm and export operation by collaborating with local tourism operators. Every week up to 100 tourists pay the $20 USD admission fee and drive three hours from Ecuador's capital city, Quito, to Nevado Roses high up in the Andes Mountain range. Nevado (2014) states that the tourist attraction is unlikely to ever be one of his core businesses but it is a good for promoting his brand and driving traffic to his website.

Carol Adelman (2014) felt that tourism was lacking throughout her entire region. With an initial investment of $200 USD from each local farm, Adelman created a harvest trail map and printed 25,000 copies for distribution to regional tourist hotspots such as hotels and dining venues. Adelman (2014) maintains that diversifying their agribusiness across many different income streams including retail, wholesale, tourism and online has given them long-term security.

# Conclusion

The Australian rose petal industry has become extremely competitive in the last five years. Margins have become slimmer and the cost of production has increased without the retail price reflecting the same inflationary rate. As one of the few industries to thrive during the GFC, the specialty food industry can offer Australian rose petal farmers, cut flower growers and food manufacturers an opportunity to further diversify and command a higher retail price.

Rose petals are used widely in many international cuisines but their use in Australia has been limited. When choosing to add edible rose petals to their production, growers should focus on rose varieties suited to food production rather than producing from their existing crop. They will need to work closely with local authorities to obtain food safety certification that prevents rose petal damage during sanitation.

Sales of certified organic produce in Australia are at a record high. Whether a grower chooses to meet this market demand or not, following organic growing principles is best practice. Growers and manufacturers should strive to improve overall operating efficiency and maximize harvesting and freeze drying output to be competitive and commercially viable.

Freeze dried edible rose petals, sugared rose petals, laser imprinting and rose hips show potential for the Australian market. Manufacturing these products on-farm gives greater flexibility but establishing a food processing plant is an expensive exercise. A fast, cost-effective and scalable option for new edible rose petal growers is to supply their product directly to specialist manufacturers.

Manufacturers must balance shelf life with visual appeal when designing packaging for edible freeze-dried rose petals. Case sizes should be kept to a minimum to encourage wholesalers to purchase multiple products in the range. If consumers do not support a retail price with a minimum 100% markup built-in, then the product's input costs should be reviewed and the product potentially discontinued.

Being first to market with new specialty food products helps to position a company as the market leader. Social media, particularly Pinterest and Instagram, offer new food manufacturers an unprecedented ability to cost effectively market specialty food alongside major industry players. Traditional marketing media including radio, direct mail catalogues and print should not be forgotten and opening the farm for tourists gives farmers further opportunity for diversification.

An Australian rose petal farmer may not become an overnight multi-millionaire by venturing into specialty foods, but added diversification is a good risk mitigation strategy in an industry that is driven by consumer trends.

# Recommendations

To maximize the outcomes of this report and facilitate edible rose petal production, further research is recommended in the areas outlined below.

- There is potential for a rose to be bred specifically for culinary consumption. Ideally it would have medium sized petals, be disease resistant and hardy in a changing climate as well as having a large petal count, strong aroma and luscious flavour.
- Thrips and rust are major impediments to organic production. The development of organic controls for these would reduce crop loss and increase the commercial viability of growing organically.
- Rose petals can be used as a base for hundreds of potential specialty foods and medicinal supplements. Many of the rose petal derived foods have not been produced in bulk, so recipes will need to be trialled and adapted to commercial manufacturing.
- Laser imprinting needs to be trialled on rose petals to assess the damage to their appearance and texture.
- Further research is needed into the safety and efficacy of rose hips for the treatment of osteoarthritis. Clinical trials must be funded to determine whether the administration of rose hips can remove arthritis medication altogether.
- Improvements to freeze drying efficiency will require pre-freezing trials to be conducted; the collapse temperature and eutectic temperature of rose petals to be measured by a laboratory; and a study comparing the efficiency of manually operated older equipment with computer controlled modern freeze driers.
- The shelf life of each new specialty food product will need to be determined in different packaging products and a nutritional analysis of rose petals will be necessary for the nutritional information panel.

# References


Adelman, C. & J. (July 2014) Personal meeting. Co-Owners. Adelman Peony Gardens LLC, Salem, Oregon, USA.

Altamirano, P. (July 2014) Personal meeting. Sales Manager. Nevado Roses, Monterrey, Ecuador.

Anderson, S. (June 2014) Personal meeting. Freeze-Dry Business Manager and Lead Engineer. Cuddon Freeze Dry, Blenheim, New Zealand.

Anderton-Tyers, R. (August 2014) Personal meeting. Founder. Uncle Roy's Comestible Concoctions, Moffat, Scotland, UK.

Australian Organic Ltd. (November 2014) *Australian Organic Market Report 2014.* Australian Organic, Nundah, Australia: http://austorganic.com/wp-content/uploads/2014/11/AO_Report_2014_web.pdf

Biancalana, C. (August 2014) Personal meeting. Owner. Le Domaine de Manon, Grasse, France.

Brown, J. (July 2014) Personal meeting. Owner. Flyboy Naturals, Myrtle Creek, Oregon, USA.

Bubb, J. (July 2014) Personal meeting. Co-owner. Shropshire Petals, Newport, UK.

Bullas, J. (July 2013) *7 Marketing Trends You Should Not Ignore.* http://www.jeffbullas.com/2013/07/16/marketing-trends-you-should-not-ignore/#DvfU42iFr1Rkso0w.99

Chong, N. (July 2014) Personal meeting. Farm Manager. Young Living Essential Oils, Chongon, Ecuador.

Christensen R., Bartels E., Altman R., Astrup A. and Bliddal H. (2008) *Does the hip powder of Rosa canina (rosehip) reduce pain in osteoarthritis patients? A meta-analysis of randomized controlled trials.* Osteoarthritis Cartilage. 16 (9): 965–72. http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0026445/

Cook, I. (July 2010) *Why, What and How? Understanding the freeze-drying process.* Online guide. Principal Scientist. Biopharma Technology Ltd. www.lyophilizationtechnology.com http://www.biopharma.co.uk/wp-content/uploads/2010/07/Why_What_How.pdf

Cowling, D. (October 2014). *Social Media Statistics Australia – September 2014.* http://www.socialmedianews.com.au/social-media-statistics-australia-september-2014/

Dalpian, L. (August 2014) Personal meeting. Owner. Dalpian Il Sottobosco, Tiglieto, Italy.

Damon, J. (July 2014) Personal meeting. Vice-President of Manufacturing. Oregon Freeze Dry, Albany, Oregon, USA.

Daniells, S (January 2014) *US organic food market to grow 14% from 2013-18.* http://www.foodnavigator-usa.com/Markets/US-organic-food-market-to-grow-14-from-2013-18

Evans, R. (July 2014) Personal meeting. Co-Owner. Denstone Hall Farm Shop and Café, Denstone, Staffordshire, UK.

Farm Futures (August 2014) *USDA Announces $25 Million in Value-Added Producer Grants.* Farm Futures, 20 August 2014. http://farmfutures.com/story-usda-announces-25-million-value-added-producer-grants-0-116603

Hansen, T. (August 2014) Personal meeting. Owner. Hyben Vital ApS, Tullebolle, Denmark.

Harper, D. & D. (July 2014) Personal meeting. Founders. Top Barn Farm, Worcester, UK.

Hughes, S. (August 2014) Personal meeting. Founder. Eat My Flowers, Cynwyd, Wales, UK.

Kovacheva, N. Rusanov, K. & Atanassov I. (2010) *Industrial Cultivation of Oil Bearing Rose and Rose Oil Production in Bulgaria During 21ST Century, Directions and Challenges, Biotechnology & Biotechnological Equipment.* 24:2, 1793-1798. http://www.tandfonline.com/doi/pdf/10.2478/V10133-010-0032-4

Kuo, J. (July 2014) Personal meeting. Owner. Fuller Foods Cheesy Puffs, Portland, Oregon, USA.

Kvistgaard, M. (February 2003) *Benefits to societies from research in select departments of the Danish Institute of Agricultural Sciences; Animal Breeding and Genetics and Horticulture Case Report.* Danish Institute of Agricultural Sciences, Denmark.

Labconco. (Unknown) Freeze Drier – Labconco Freezone. Online instructional guide. http://www.usask.ca/biology/scopes/Freeze%20Dryer%20instruction.pdf

McGauchie, D. (13 November 2014) *How to Create Winning Supply Chains.* From a presentation to the Rabobank F20 Summit. Carriageworks, Sydney, Australia.

Morrissey, M. (July 2014) Personal meeting. Director. Food Innovation Center, Oregon State University, Portland, Oregon, USA.

Nevado, J. (June 2014) Personal meeting. Director. Nevado Roses, Monterrey, Ecuador.

Newenham, C. (August 2014). Personal meeting. Director. Wilkin & Sons Ltd, Tiptree, Colchester, UK.

Polites, H. (2014) *The MasterChef effect is finally manipulating our migration intake.* Business Spectator, 23 July 2014. http://www.businessspectator.com.au/article/2014/7/23/retail/masterchef-effect-finally-manipulating-our-migration-intake

Rasmussen, M. (August 2014) Personal meeting. Plant Manager. Denmark European Freeze Dry, Kirke Hyllinge, Denmark.

Runway Dream (2 April, 2014) *Infographic: Australian Wedding Facts.* http://www.runwaydream.com.au/blog/infographic-weddings-in-australia/

Sexton, R. (March 2014) *Organic Market Report 2014.* Soil Association, Bristol, UK.

Summer Fancy Food Show (June, 2014) *I Love Roses Booth 313.* http://www.chirpe.com/ExhibitorHome.aspx?EventID=2366&BoothID=121438

Tanner, R. and Lockwood, D. (June 2014) *The State of the Specialty Food Industry 2014.* From a presentation to the Summer Fancy Food Show. New York City, New York, USA. education@specialtyfood.com.

Trout, J. (3 July, 2006) *Peter Drucker On Marketing.* http://www.forbes.com/2006/06/30/jack-trout-on-marketing-cx_jt_0703drucker.html

Vargus, F. (July 2014) Personal meeting. Organic Farm Manager. Nevado Roses, Monterrey, Ecuador.

Voaden, R. (July 2014) Personal meeting. Owner. The Edible Flower Shop, Devon, UK.

Walker-Smith, J. (19 March, 2014) *How many ads do we see a day? Do you remember any?* http://unomarcomms.com/our-insights/glenn/how-many-ads-do-we-see-day-do-you-remember/

Woolworths' website. (2014) *How do we assure the quality of our food?* http://m.woolworthsfacts.com.au/quality.html

Wright, J. (July 2014) Personal meeting. Founder. Organic Blooms, Latteridge, UK.

Young, M. (2014) Personal meeting. Co-Owner. Young Living Essential Oils, Chongon, Ecuador.

# Plain English Compendium Summary

| Project Title: | Driving Profitability Through Innovation: Rose petals for the culinary market. |
|---|---|
| Nuffield Australia Project No.: | 1409 |
| Scholar: | Sarah Sammon |
| Organisation: | Simply Rose Petals Pty Ltd<br>PO Box 1504<br>Swan Hill VIC 3585<br>Australia |
| Phone: | 0408 329 690 |
| Email: | sarah@simplyrosepetals.com.au |
| Web: | www.sarahsammon.com |
| **Objectives** | To review best practice rose petal production around the world and identify rose petal products for culinary consumption and the options for manufacturing them. |
| **Background** | Currently Australian rose petals are grown primarily for a crowded wedding and romance market. There is limited edible rose petal production in the Asia Pacific and no certified organic rose farms in Australia. |
| **Research** | Edible rose petal growers, commercial cut flower farms, freeze dry companies and specialty food trade shows were visited in 14 countries, including USA, Ecuador, UK, Ireland, Netherlands, Germany, Italy and France. Farmers, manufacturers, marketers and academics were interviewed regarding their industry and management practises. |
| **Outcomes** | This study revealed a thriving specialty food industry with potential for Australian flower farmers to create a secondary income through crop diversification with edible rose petals. Output can be increased by changes to current industry harvesting and freeze-drying methods. |
| **Implications** | Early adopters in the Australian flower industry will increase revenue and profitability by improving harvest and freeze drying output as well as diversifying into the specialty food industry with products such as sugared rose petals. |
| **Publications** | |