

# WHOLE GRAINS AND SPECIALTY FLOURS IN ARTISAN BAKING



## **Scott Megee**

Skills Victoria/ISS Institute TAFE Fellowship

Fellowship funded by Skills Victoria,  
Department of Innovation,  
Industry and Regional Development,  
Victorian Government



**ISS Institute**

Suite 101  
685 Burke Road  
Camberwell Vic  
AUSTRALIA 3124

**Telephone**

03 9882 0055

**Facsimile**

03 9882 9866

**Email**

[issi.ceo@pacific.net.au](mailto:issi.ceo@pacific.net.au)

**Web**

[www.issinstitute.org.au](http://www.issinstitute.org.au)

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ISS Institute  
101/685 Burke Road  
Camberwell 3124  
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# Executive Summary

Scott Megee, Culinary and Bakery Instructor at Holmesglen Institute, travelled to the USA and Europe in order to observe and gain skills and techniques in artisan bakery utilising whole grains and specialty flours. The specific aims of the Fellowship were for Megee to better understand:

- The science and techniques used in whole grain and specialty flours, in pre-ferments and complex artisan breads
- The physical and chemical characteristics of specialty flours such as buckwheat and semolina
- The science and techniques used for high hydration doughs, high ash contents and whole grain flours, as well as the full spectrum of 'difficult' flours such as rye and spelt
- The chemical composition and usage of flour for manufacture
- The efficacy of natural concentrates, flour additives, dough conditioners and the utilisation of retarding techniques in creating artisan breads.

According to an Australian baking industry profile (Department of Agriculture, Forestry and Fisheries Report 2003), there is a move away from traditional apprenticeships, toward more customised in-house training by the large franchisers. Technological developments in ingredients, premix formulations and in automation, have fostered a decrease in the industry skills base. With the Australian bread sector having been in a state of change due to governmental policy and a growing public interest in food and nutrition, the industry has seen the rise of a small but growing Australian artisan-baking sector.

Agri-food Australia cited a shortage of master artisan bakers across the industry (Agri-food Skills Australia Progress Report – June 2007). This gives rise to the dual problems of insufficiently skilled artisan bakers to fulfil consumer demand, and longer term even fewer skilled master craftsmen trainers of artisan bakers. Viewed in combination with the fact that the baking industry is now identified on the National Skills Shortage list (July 2007), there is considerable scope for improving skills and education across the baking sector.

Megee's Fellowship specifically focused upon five main areas of skills deficiencies in the Australian Baking Industry:

- The use of whole grains and specialty flours in artisan bakery, with a particular emphasis on whole grain and specialty flour in high hydration doughs
- The use of sour-culture in sweet breads and flourless breads, including the manufacturing parameters of sugar content, culture percentage and the dough tolerance in mixing and proving
- The use of pre-ferments in advanced artisan bread, with a focus on determining optimum preferment percentage and the techniques for using high-ash flours, sprouted grains and whole grain starters
- The use of retarding techniques in artisan baking
- The use of bread concentrates and dough conditioners in artisan baking.

Megee attended two courses at the San Francisco Baking Institute (SFBI), a globally renowned centre for bakery education in both traditional and modern artisan bread techniques.

# Executive Summary

The opportunity to study under Didier Rosada ('Artisan III – Advanced Artisan Bread' workshop) and Thorsten Philippi ('German Breads' workshop) ensured that Megee gained a thorough understanding of the more scientific processes involved, with reference to both the physical characteristics of the dough and how manipulating the underlying chemical reactions can have a dramatic effect upon the final loaf, its storage and eating qualities.

The SFBI component of the Fellowship brought a greater knowledge of the Raymond Calvel method of artisan bread manufacturing, as well as the practical, technical and theoretical applications of the fundamental rheological functions and effects of the ingredients used within bread production. Although not containing a great deal of the theory and history which underpins traditional German baking, the German Breads workshop ensured that Megee developed sound 'hands-on' experience in the suitability of whole grains, minimally processed grains and specialty flours. The health implications of these breads align well with the Australian Government's 'Guide to Healthy Eating' policy, which encourages Australians to have a larger percentage of whole grain and cereals in their diets. Combining this imperative with the public's increasing desire and appreciation of specialty breads, the knowledge that Megee acquired from the SFBI will enable bakers to be better educated in producing more unique and region-specific breads, vital to enriching both the baker's expertise and the public's palate.

The Fellowship also allowed Megee to travel to Belgium for an investigation into enzyme technology and the use of bread improvers at the Puratos Innovation Center (PIC). Considered by many to be the market leaders in enzyme technology; PIC is at the forefront of an enzyme technological revolution set to influence the international baking industry. Though an advocate of traditional methods, Megee's experiences and observations at PIC also enriched his understanding of the baking industry. The Fellow recognises that advances in enzyme technology will have a dramatic effect upon the production of artisan breads, in both small and large-scale commercial ventures. The Australian Baking Industry can only benefit from the exposure and dissemination of these procedures and techniques.

Megee can see the outcomes of the Fellowship having many practical applications in the training and educational environment. Information gained has been disseminated through the TAFE system, in ongoing professional development and in designing higher qualification courses. Megee can also foresee the skills acquired having application in creating connections with the hospitality industry, particularly the restaurant and café sector.

The Fellow recommends that the review of future training packages must have greater emphasis on increasing the skill level in the industry, without lowering the standards needed to achieve a Certificate III. Megee's Fellowship experience reinforced the need for greater regulation on what types of product can be called 'artisan breads' and outlined that the developments in enzyme technologies will greatly benefit the Australian Baking Industry. Greater collaboration and communication between industry training providers would have the obvious impact of improved and standardised methods of delivery, resulting in a clearer career path and increased expertise for Australian bakers, from early apprenticeship through to master craftsman.

The ISS Institute also has a role to play in encouraging future research into gluten-free breads, artisan pastries and an examination of breads from an Asian and Eastern European origin.

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# *Abbreviations and Acronyms*

ASB	Australian Society of Baking
BESA	Bakery Equipment Supplier Association
BIAQ	The Baking Industry Association of Queensland
BIAV	Baking Industry Association of Victoria
DEECD	Department of Education and Early Childhood Development
GI	Gluten Index
HCB	The School of Hospitality, Cookery & Bakery
NASAA	National Association for Sustainable Agriculture Australia
OHS	Occupational Health and Safety
PIC	Puratos Innovation Center
RTO	Registered Training Organisation
SFBI	San Francisco Baking Institute

# Definitions

Ash	The incombustible vitamins and minerals contained within the grain
Bigga	A pre-ferment that contains 50 per cent water
Bran	The fibrous protective outer layer of the grain
Bulk proof	The initial time allowed for the first fermentation to occur within the dough
Design	<p>Design is problem setting and problem solving.</p> <p>Design is a fundamental economic and business tool. It is embedded in every aspect of commerce and industry and adds high value to any service or product - in business, government, education and training and the community in general.</p> <p><i>Reference: 'Sustainable Policies for a Dynamic Future', Carolynne Bourne AM, ISS Institute 2007.</i></p>
Disaccharides	A sugar consisting of two molecules
Endosperm	The albumen enclosed with the germ in seeds, found in the centre of the grain
Enzyme	A protein acting as a catalyst in a specific chemical reaction
Germ	The portion of the grain responsible for plant development
Innovation	<p>Creating and meeting new needs with new technical and design styles (new realities of lifestyle).</p> <p><i>Reference: 'Sustainable Policies for a Dynamic Future', Carolynne Bourne AM, ISS Institute 2007.</i></p>
Intermediate proof	The resting time in between dividing and the final shaping of the dough
Levain	The dough responsible for the perpetuation and growth of wild yeasts and bacteria
Maillard	The browning of proteins
Monosaccharide	A sugar consisting of a single molecule
Natural conditioners	An ingredient that changes the working qualities of the dough
Polysaccharides	A long-form complex chain of sugars
Poolish	A pre-ferment that contains 100 per cent water
Pre-ferment	A fermentation starter used in bread baking. It usually consists of a simple mixture of flour, water, and a leavening agent (typically yeast), this is added to bread dough before the kneading and baking process.

## Definitions

Proofer	A chamber with a controlled temperature and humidity for the proofing of dough
Retarding	The ability to inhibit the fermentation process
Skills deficiency	<p>A skill deficiency is where a demand for labour has not been recognised and where accredited courses are not available through Australian higher education institutions. This demand is met where skills and knowledge are acquired on-the-job, gleaned from published material, or from working and/or study overseas.</p> <p>There may be individuals or individual firms that have these capabilities. However, individuals in the main do not share their capabilities, but rather keep the IP to themselves; and over time they retire and pass away. Firms likewise come and go.</p> <p><i>Reference: 'Directory of Opportunities. Specialised Courses with Italy. Part 1: Veneto Region', ISS Institute, 1991.</i></p>
Sustainability	<p>The ISS Institute follows the United Nations NGO on Sustainability, "Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"</p> <p><i>Reference: <a href="http://www.unngosustainability.org/CSD_Definitions%20SD.htm">http://www.unngosustainability.org/CSD_Definitions%20SD.htm</a></i></p>



# Acknowledgments

Scott Megee would like to thank the following individuals and organisations who gave generously of their time and their expertise to assist, advise and guide him throughout the Fellowship programme.

## **Awarding Body – International Specialised Skills Institute (ISS Institute)**

The International Specialised Skills Institute Inc is an independent, national organisation that for over two decades has worked with Australian governments, industry and education institutions to enable individuals to gain enhanced skills and experience in traditional trades, professions and leading-edge technologies.

At the heart of the Institute are our Fellows. Under the **Overseas Applied Research Fellowship Programme** the Fellows travel overseas. Upon their return, they pass on what they have learnt by:

1. Preparing detailed reports to government departments, industry and education institutions.
2. Recommending improvements to accredited educational courses.
3. Offering training activities including workshops, conferences and forums.

Over 180 Australians have received Fellowships, across many industry sectors.

Recognised experts from overseas also conduct training activities and events. To date, 22 leaders in their field have shared their expertise in Australia.

According to Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010':

Australia requires a highly skilled population to maintain and improve our economic position in the face of increasing global competition, and to have the skills to adapt to the introduction of new technology and rapid change.

International and Australian research indicates we need a deeper level of skills than currently exists in the Australian labour market to lift productivity. We need a workforce in which more people have skills, but also multiple and higher level skills and qualifications. Deepening skills across all occupations is crucial to achieving long-term productivity growth. It also reflects the recent trend for jobs to become more complex and the consequent increased demand for higher level skills. This trend is projected to continue regardless of whether we experience strong or weak economic growth in the future. Future environmental challenges will also create demand for more sustainability related skills across a range of industries and occupations.<sup>1</sup>

In this context, the Institute works with Fellows, industry and government to identify specific skills in Australia that require enhancing, where accredited courses are not available through Australian higher education institutions or other Registered Training Organisations. The Fellows' overseas experience sees them broadening and deepening their own professional practice, which they then share with their peers, industry and government upon their return. This is the focus of the Institute's work.

For further information on our Fellows and our work see [www.issinstitute.org.au](http://www.issinstitute.org.au).

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<sup>1</sup> Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010', pp. 1-2 [http://www.skillsaustralia.gov.au/PDFs\\_RTfS/WWF\\_strategy.pdf](http://www.skillsaustralia.gov.au/PDFs_RTfS/WWF_strategy.pdf)

# Acknowledgments

## Fellowship Sponsor

Skills Victoria (TAFE), Victorian Government is responsible for the administration and coordination of programs for the provision of training and further education, adult community education and employment services in Victoria and is a valued sponsor of ISS Institute. Megee would like to thank them for providing the funding support for this Fellowship.

## Supporters

### In Australia

- Margaret Davies, Secretary, Australian Society of Baking (ASB)
- Gary Higgins, Executive Officer, Baking Industry Association of Victoria (BIAV)
- Jo Spurway, Chief Executive Officer, Leading Edge Bakery Journal

### In Belgium

- Stephane Van Cauwenbergh, Manager, Puratos Innovation Centre

### In the USA

- Michel Suas, President & Cofounder, San Francisco Baking Institute

## Employer Support

The Fellow would like to acknowledge the support of Holmesglen Institute of TAFE for providing the additional time and funding required in undertaking the Fellowship.

- Allen Dickson – Report Writing Mentor
- Ross Digby – Associate Director of The School of Hospitality, Cookery & Bakery (HCB)
- Graham James – Senior Education, HCB
- Bruce Mackenzie – CEO
- Greg O'Shea – Teaching Centre Manager, HCB

## Australian Organisations Impacted by the Findings of this Report

### Government – Federal, State and Local

- AgriFood Skills Australia – [www.agrifoodskills.net.au](http://www.agrifoodskills.net.au)
- Local Shire Councils throughout the country
- National Training Information Service – [www.ntis.gov.au](http://www.ntis.gov.au)

### Industry – Business, Commerce, Firms and Professional Associations

- Allied Trades of the Baking Industry
- Artisan Baking Association
- Australian Chamber of Commerce and Industry
- Australian Society of Baking
- Bakery Equipment Supplier Association (BESA)
- Baking Industry Association, NSW

# Acknowledgments

- Baking Industry Association of South Australia
- Baking Industry Association of Victoria
- Baking Industry Association of Western Australia
- Cereal Food and Baking Mix Manufacturing in Australia
- Chef Works Uniforms
- Flour Millers' Council of Australia
- Laucke Flour Mills
- Leading Edge Bakery Journal
- National Association for Sustainable Agriculture Australia (NASAA)
- Queensland Baking Association

## **Education and Training Institutes**

- Department of Education and Early Childhood Development (DEECD) – the government body for the administration and running of the vocational education and training in Victoria. <http://www.education.vic.gov.au>
- Skills Victoria – Skills Victoria provides information on education and training options to the community including apprentices, trainees, students, teachers, trainers, businesses and employers. <http://www.skills.vic.gov.au/>
- TAFE Institutes throughout Australia involved in Bakery education programs
- Businesses and organisations that are Registered Training Organisations (RTOs) such as Bakers Delight, Woolworths Ltd and The Baking Industry Association of Queensland (BIAQ).

# About the Fellow

**Name:** Scott Megee

## **Employment**

- Culinary and Bakery Instructor, Holmesglen Institute of TAFE

## **Qualifications**

- Certificate III in Hospitality – Commercial Cookery (1992)
- Certificate IV in Hospitality – Supervision (2001)
- Diploma – Vocational Education and Training (2007)
- Certificate III in Food Processing – Retail Bakery – Combined Trades (2008)
- San Francisco Baking Institute – Artisan 1 & Artisan 2 (2008)

## **Memberships**

- Australian Society of Baking

## **Biography**

Scott Megee has been in the wider hospitality industry for over 21 years. Starting his career with an apprenticeship in commercial cookery, he worked in a variety of establishments from five star resorts to local cafés, achieving the position of Head Chef in two different restaurants.

Megee was introduced to the art of baking while in a café that made its own bread. From there his interest in the craft of bread making grew and he gained his formal qualifications in 2008 with a Certificate III in Food Processing Retail Bakery Combined Trades. He participated in a national artisan competition 'La Coupe Down Under', leading to Megee being twice selected as a representative in Team Bakery Australia (Australia's International Baking team) competing in Italy in 2008 and 2009.

Currently, Megee is a Bakery and Cookery lecturer at Holmesglen Institute of TAFE, Moorabbin Campus, and is responsible for the development and delivery of the bakery program to bakery apprentices and international students. He is also responsible for the creation and delivery of an innovative 'Artisan Bread' short course program.

These experiences have culminated in Megee having a passion and a drive to promote the baking industry both domestically and internationally, assisting bakers to advance their skills and knowledge and to become 'masters' of their craft.

# Aims of the Fellowship

The aim of the Overseas Study Fellowship was to participate in programs in the USA and Europe, observing and gaining skills, knowledge and techniques in the use of whole grains and specialty flours in artisan bakery. In particular:

- The science and techniques used in whole grain and specialty flours in pre-ferments and complex artisan breads
- Development of the knowledge of the physical and chemical characteristics of specialty flours such as buckwheat, spelt and semolina
- The science and techniques used for high hydration doughs, high ash contents and whole grain flours, as well as the full spectrum of 'difficult' flours such as rye and spelt
- The chemical composition and usage of flour for manufacture
- The utilisation of retarding techniques in bakery
- The capacity to meet the needs of people with specific dietary requirements
- Techniques in baking to meet the requirements of people with dietary restrictions while retaining taste, variety and quality
- Artisan breads that contain concentrates, flour additives and natural dough conditioners.

# The Australian Context

## Brief Description of the Industry

The Baking Industry in Australia is complex and tends to have a mixture of large wholesale manufacturing and a range of small to medium-sized enterprises which comprise: national franchises, in-store bakeries in local supermarkets, hot bread shops and small bakeries and patisseries.

The Australian bread sector is dynamic and has been in constant change for a number of decades. Traditionally white bread accounted for more than half of all bread sold but sales of this product have been declining due to a growing public interest in food and nutrition. This has been brought about by government policies and an increasing demand for organic, unprocessed, whole grain foods.

The industry has shown flexibility and adaptability to trends and consumer demands. This has given rise to a small, but growing Australian artisan-baking sector.

Increasing disposable income means that more people are prepared to pay the premium price required to buy artisan bakery products that not only taste good, but are also perceived as being a healthier alternative.

The Australian baking industry was profiled in a publication written in 2003 by the Department of Agriculture, Forestry and Fisheries 2003, *The Australian Baking Industry: A Profile*. It is currently the most comprehensive source of market information and was written predominately by the Baking Industry for the Baking Industry.

The key points contained in this report are:

- Annual growth in turnover is estimated at an average of two point eight per cent between 1997–98 and 2001–02. Turnover in bread manufacturing in 2001–02 is estimated at \$1.6 billion
- The value of bread produced in onsite premises is estimated at \$1.0 billion
- White bread remains the staple product
- Premium breads now account for approximately 25 per cent of the white bread market
- Industry rationalization and consolidation is continuing
- Significant restructuring has occurred in the past five years with the market now dominated by the larger in-store bake houses of supermarket chains Coles Pty Ltd and Woolworths Ltd together with the franchise sector of Bakers Delight, Brumby's Bakeries chain and to a lesser degree Banjo's bakeries
- Exports have grown in the past five years, but still only account for less than one per cent of manufacturing turnover.

The report also emphasises the key points relating to education and training issues, as follows:

- The bakery manufacturing sector is the second largest employer in Australia's Processed Foods Industry
- Employment has remained relatively static in total across the three sectors for the past six years
- Structural shifts in the industry have impacted on the delivery of public training courses provided through TAFE institutes

# The Australian Context

- Franchises and in-store bakeries are increasing their demand for customised courses
- Legislative drivers for training to manage food safety, labelling and Occupational Health and Safety (OHS) are now stronger than the demand for skills-based training
- Technology developments in ingredients and premix formulations, as well as automation, have also fostered a decrease in the industry skills base
- Industry perceives a general disconnect between the courses offered and requirements of the industry.

According to Megee's own observation and experience in the vocational sector and, supported by the conclusions published in the baking industry profile, there is a major shift in training in the baking industry. There is a move away from traditional apprenticeships, towards more customised in-house training by the large franchisers. On the job training has been taken up by the industry, supported by local RTOs and TAFE institutes.

Based on these trends, Megee proposes that there is a greater need to develop specialty educational training that bakers can utilise to refine and upgrade their skills.

The baking industry report also cites that there is a high attrition rate among apprentices in the baking industry. This is due to the pressures of working in the industry and general lifestyle issues, such as early working hours. With the advances in technology of the plant bakery equipment and the growing use and accessibility of proofer/retarders, these issues related to working conditions and lifestyle are slowly being overcome.

## The Need for Additional Skills

The Fellow's recognition of the additional skills required in the Australian Baking Industry was identified through four main sources:

### Government Policies

*The Australian Guide to Healthy Eating, 2008* (Australian Government, Department of Health and Ageing). This publication states that the people of Australia need to eat more food from the food group consisting of bread, cereals, rice, pasta and noodles required for in a balanced diet needed to maintain good health and wellbeing.

The foods in this group are either manufactured or are wheat, oats, rice, rye, barley, millet and corn based. These can be either milled into flour or processed into foods such as bread, pasta or noodles. These foods are responsible for the supply of the main source of carbohydrates, some protein, vitamins, minerals and foliate. The whole grain varieties and wholemeal provide more fibre, vitamins and minerals than processed products.

Some of the practical suggestions given in the publication state that we should eat a wider variety of breads including high-fibre whites, brown, whole grain, mixed grain, rye, pita and other flat breads. There is also evidence that whole grain breads help to protect against heart disease, type 2 diabetes and some forms of cancer. The vitamins, minerals, antioxidants and other chemicals found in the outer layer or 'bran layer' are removed when processed into white flour.

# The Australian Context

## The Bran

The bran is the outer layer of the grain and it is where many of the beneficial protective components are found. The bran layer of the grain can be found in most wholemeal or multigrain breads.

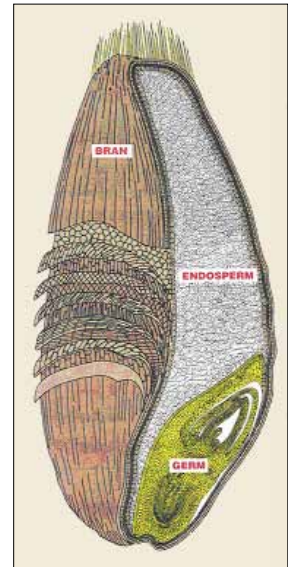
## The Endosperm

The endosperm is found in the centre of the grain. The endosperm contains the greatest amount of carbohydrates and protein compared to other layers of the grain, and is the major component of white bread.

## The Germ

The germ is the small section of the grain that contains unsaturated fats and other nutrients. The wheat germ component can be found in both multigrain and grain breads.

(Source: <http://bread.com.au/nutrition.htm> 04/03/2009)



## Consultation with Peak Industry Body

Megee's association and dialogue with Gary Higgins, Executive Officer, Baking Industry Association of Victoria revealed the following:

- The Baking Industry Association of Victoria (BIAV) is the peak employer organisation for the manufacturing, wholesale and retail Baking Industry in Victoria
- The BIAV was incorporated on the 28th May, 1999 following the amalgamation of the Victorian Association of Bakers and the former Victorian Master Pastry Cooks Association
- The establishment of a united body means that the Baking Industry has the resolve and representational impact to proactively address the many challenges which face the industry now and that are likely to confront the industry in the future
- The BIAV is a strong voice for its members, who consist of industrial bakers and a range of small to medium-sized enterprises
- The BIAV's goal is to provide the support and motivation to ensure the success and development of the entire Baking Industry
- These discussions indicated that the industry is experiencing a growth in demand for organic, unprocessed, whole grain foods and that businesses were looking for ways to fit new breads into an existing product line and an expansion of skills to produce breads and related products such as:
  - Sourdough to make sweet bread
  - High-ash flour
  - Wholegrain breads that are produced using whole grain starters and no white flour
  - Difficult flours such as rye and spelt.



# The Australian Context

## Skills Council Reports

In July 2007, the baking industry in Australia was identified on the National Skills Shortage list. AgriFood Skills Australia cited a shortage of master artisan bakers across the industry (*AgriFood Skills Australia report, 2007*). This gives rise to the dual problems of insufficient skilled artisan bakers to fulfil consumer demand, as well as even fewer skilled master trainers of artisan bakers throughout the country. This confirmed Megee's pre-existing belief that there is growing necessity for advanced skills across the baking sector and the introduction of a Master Artisan qualification.<sup>2</sup>

## Personal Experience

The Fellow was a member of 'Team Bakery Australia', Australia's international baking team that competed in Rimini, Italy, in the International Bread Cup at the International Exposition for Artisan Production of Gelato, Pastry, Confectionary and Bakery (SIGEP). The participating teams included Italy, Germany, Hungary, Israel, Belgium, France, Ireland, Spain, Portugal and Mexico. This reinforced Megee's view that a significant deficiency exists between current levels of skills and knowledge in the field of sophisticated artisan bakery in the Australian Baking Industry, compared with that which exists overseas. Megee has worked in baking education at Holmesglen Institute of TAFE for three years and also has first-hand experience of the shortage of skilled bakers in the industry in Australia.

## Benefits in Obtaining the Skills

The skills that Megee has obtained while on the Fellowship can be utilised to enhance and update the following education and training contexts:

### Accredited Units

- FDFRBAB3A – Produce Artisan Breads is currently being delivered in TAFEs and other Registered Training Organisations (RTOs) in the following:
- FDF30603 – Certificate III in Food Processing (Retail Bakery – Bread)
- FDF30703 – Certificate III in Food Processing (Combined Trades)

### Short Courses

The current training package requirement states that for FDFRBAB3A – Produce Artisan Breads the student must demonstrate the knowledge of the following:

- Typical formulations for bread types
- Principles and processes involved for extended fermentation doughs
- The fermentation process in chemical and natural sour doughs; as this effects dough preparation, baking and final product characteristics, and relates to food safety issues
- Preparation stages and requirements for nominated bread types. This includes, but is not limited to, a knowledge of:
  - Starter preparation
  - Dough scaling and rounding methods including sheeting, hand and mechanical scaling and rounding

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<sup>2</sup> Carolynne Bourne AM, CEO, ISS Institute, has identified the way forward in a report: *Master Artisan Framework for Excellence. A New Model for Skilling the Trades*, December 2004. The Australian Government, through the Department of Education, Employment and Workplace Relations (DEEWR) the ISS Institute was commissioned the *Australian Master Artisan School. Program and Courses. Feasibility Implementation Plan*, May 2007.

# The Australian Context

- Intermediate proof methods including ambient temperature and normal proofing
- Moulding including novelty shapes and plaited product preparation
- Loading product into ovens. This includes stretching flat bread doughs such as Turkish bread on the oven floor
- Baking parameters for different bread types
- The effect of ingredients on shelf-life and food safety
- Optimum storage conditions and shelf-life for ingredients and related sequencing requirements
- Optimum storage conditions for the finished product prior to sale
- Ingredient suppliers and pricing information
- Methods of estimating fixed and variable costs, and profit margin to determine sale price range
- Basic awareness of trade practice issues when pricing products
- Business policy and parameters in pricing products

With the skills obtained from San Francisco Baking Institute (SFBI) and from Puratos Innovation Center (PIC) in the use of whole grains and specialist flours, the Fellow is able to assist current and future students and teachers with an enhanced skills and knowledge base. The methodology for teaching artisan bread manufacture, including the mix of theoretical and practical instructional techniques employed at SFBI and at PIC will also improve the teaching standards at a national level. Megee is now able to communicate these standards and skills to students, colleagues and fellow bakers.

## Benefits to the Baking Industry

- An expanded knowledge base of the artisan bread manufacturing processes with the use of pre-ferments.
- A more detailed knowledge of the properties of various flours and natural artisan bread concentrates and natural dough conditioners.
- The knowledge would enable introduction of new products, currently unavailable in Australia.
- Providing knowledge of new products for bakery wholesalers and distributors in the food and bakery industries with the aim to expanding product lines.
- Retail bakeries would be able to introduce new methods of manufacture to their bread lines with the use of natural conditions, concentrates and proofer retarder techniques, enabling creative new products for the consumer.
- Facilitate development of new flour and grain specifications with the flour milling industry and grain farmers.
- An opportunity for bakery equipment manufactures to provide specialty equipment.
- An invaluable opportunity to network with renowned artisan bakers from around the world.
- Enhanced knowledge to share with professional associations.
- The knowledge and inclination to contribute written articles on artisan bakery to newspapers, magazines, journals and association newsletters.
- The motivation to contribute competitively at an international level in bakery events.

## SWOT Analysis of the Australian Baking Industry

### Strengths

- Adaptable due to its diverse nature.
- Australia's Baking Industry is operating in a mature market, is complex and tends to have a mixture of large industry bakeries and a range of small to medium-sized enterprises.
- Strength and marketing of the franchises and chain bakeries.
- Due to the distance from European markets, Australia has developed a strong technical base for cereal science and technologies.
- New business enterprises.

### Weaknesses

- Fragmented state associations and training organisations.
- Population numbers and demand volume makes Australia a small discouragement in the international arena. This limits large multinational bakery companies from investing in new technologies and product lines.
- Working hours make recruiting new staff difficult.
- Limited career path development—minimal opportunities after Certificate III.
- The tendency to change and modify traditional European products to traditional Australian bread styles.

### Opportunities

- Adapting to Australia's café culture.
- Expanding to meet artisan bread demand.
- Incorporating new technologies and bread systems from overseas to change working conditions.
- Profile of the Bakery Industry has been lifted through participation in international competitions.
- To expand product development to Asian and Middle Eastern style products instead of solely European products.

### Threats

- Losing individualism, diversity and regional differences through franchises and large corporate bakeries.
- 'De-skilling' through the use of convenience products and par bake products.
- Loss of traditional market share to large take-away food outlets.
- Industry is continuing to rationalise its capacity at the corporate level.
- Lack of appreciation by bakers and the general public of the skills and techniques of the craft of baking.
- Lack of Master Artisan training qualifications and related career pathways.

# Identifying the Skill Deficiencies

## Skills Deficiencies: Definition

As already established, a skills deficiency is where a demand for labour has not been recognised and where accredited courses are not available through Australian higher education institutions. This demand is met where skills and knowledge are acquired on-the-job, gleaned from published material, or from working and/or studying overseas.

There may be individuals or individual firms that have these capabilities. However, individuals in the main do not share their capabilities, but rather keep the IP to themselves; and over time they retire and pass away. Firms likewise come and go.

## Identifying and Defining the Deficiencies

### 1. The Use of Whole Grains and Specialty Flours in Artisan Bakery

- To analyse the suitability of whole grains, minimally processed grains and specialty flours in the different styles and shapes of artisan bread. To analyse the characteristics of breads that have used whole grain and specialty flour in high hydration doughs and flat bread baking.
- To be able to identify the appropriate flours or grains for complex artisan breads
- To have an understanding of the physical and chemical characteristics of the full spectrum of specialty flours and the techniques for using non-gluten flour, such as buckwheat; and low gluten flour, such as spelt and semolina
- To improve techniques in baking to meet the requirements of people with dietary restrictions while retaining taste, variety and quality.

### 2. The Use of Sour Culture in Sweet Breads and Flourless Breads

- To produce sweet breads that are based on a sour dough culture, including the manufacturing parameters of sugar content, culture percentage and the dough tolerance in mixing and proving.
- To develop breads that contain no flour by increasing a knowledge base in enzyme activity, yeast fermentation, proving time, mixing techniques and health benefits.
- To be able to produce sweet bread with a sour culture and bread that has no flour in the formulation.

### 3. The Use of Pre-ferments in Advanced Artisan Bread.

- Work with pre-ferments that are not based on wheat flour. Learn how to judge the pre-ferment's readiness, determine the optimum pre-ferment percentage and the techniques for using high-ash flours, sprouted grains, whole grain starters.
- Develop the skill to produce bigga, sponge and poolish in bread formulations where flours such as rye, spelt and whole grains are used.

### 4. The Use of Retarding Techniques in Artisan Baking

- To increase the knowledge of retarding temperatures and temperature control; appropriate mixing and gluten development for retarded dough; proving times in relation to different retarding stages and loaf size; recovery times for retarded dough; optimum baking temperatures; how retarding affects gas production, gas retention and natural dough degradation; and frozen pre-shaped doughs.

# Identifying the Skill Deficiencies

- To become skilled in techniques to retard dough in the bulk proofing stage, the intermediate stage and the final proofing stage
- To become skilled in the retarding processes of dough, to produce products such as baguettes, ciabatta and whole-wheat breads.

## **5. The Use of Natural Artisan Bread Concentrates and Natural Dough Conditioners in Artisan Baking**

- Work with natural sourdoughs in powder or liquid form, based on concentrates of wheat or rye.
- Assess the effect on dough development and proofing times.
- Explore yeast derivative products, which are characterised by their excellent dough conditioning qualities and their function of enhancing taste.
- Have an understanding of sour dough concentrates and natural dough conditioners, their effects on the dough and how they affect proofing times, yeast and enzyme activity, dough degradation and taste in the final baked loaf.

## **Nationally Accredited Courses**

The skills that the Fellow has obtained while on the Fellowship can be utilised in the following education and training contexts.

### **Accredited Units**

- FDFRBAB3A – Produce Artisan Breads is currently being delivered in TAFEs and other RTOs in the following:
- FDF30603 – Certificate III in Food Processing (Retail Bakery – Bread)
- FDF30703 – Certificate III in Food Processing (Combined Trades)

### **Short Courses**

- Artisan 1 – Fundamentals of Artisan Baking
- Artisan 2 – Sour Dough Production
- Artisan 3 – Sweet Yeast and Pastries

### **Future Courses**

There are also implications for the development a new course as an outcome of these findings:

- Certificate IV in Food Processing (Combined Trades), artisan stream.

# The International Experience

## San Francisco Baking Institute (SFBI)

### South San Francisco, USA

**Contact:** Michel Suas – President and Co-founder

The SFBI is a globally renowned centre for bakery education and has a well-established reputation as being at the forefront of traditional and modern artisan bread techniques. President and co-founder Michel Suas is passionate about spreading the craft of artisan bread production and training. Megee had the opportunity to attend two five-day workshops at the SFBI: 'Artisan III – Advanced Artisan Bread' from August 24th to 28th, 2009 and 'German Breads' from September 7th to 11th, 2009.

### Course: Artisan III – 'Advanced Artisan Bread'

**Instructor:** Didier Rosada

Didier is a certified French master baker, awarded a Brevet de Maîtrise (Masters in Baking) from the prestigious Institut National de Boulangerie Pâtisserie in Rouen, France. He was winner of the 1993 Golden Baguette Award and is a consultant to some of the leading specialty bread bakers worldwide. Rosada is also the owner/operator of Uptown Artisan Bakery in Hyattsville, USA.

### Objectives

- Work with international master bakers
- Gain knowledge and experience in the Raymond Calvel method of artisan bread manufacture, a manufacturing method widely adopted in Australia
- Look at bread formulation with different flour specifications
- Look at advanced mixing methods and technologies
- Learn how to interpret scientific tests in assessing flour baking performance
- Examining the rheological functions and effects of the ingredients used within dough.

### Outcomes

Recognising the need for further education in Australia concerning hydration techniques and the interaction of water within the dough, the Fellow paid particular attention to the role of water in the dough. Megee gained a greater understanding of the way in which the flour compounds hydrate, about the timing of water absorption in relation to protein and the importance this hydration plays in the development of the dough characteristics. Not only was it found that timing of hydration affected dough development, but also flour granulation variation and its affect on water absorption also needed considered attention in creating the desired dough profile. During the training Megee acquired knowledge of flour specification sheet interpretation which resulted in a understanding of variables such as:

- Reaction of starch with water
- Humidity levels and their impact upon the maturation of flour
- Protein modification and the issue of gluten quality versus quantity
- The reaction of non-starch polysaccharides, both soluble and insoluble
- The impact on the overall physical dough properties.

# The International Experience



*A selection of sourdough breads with different hydration percentages*

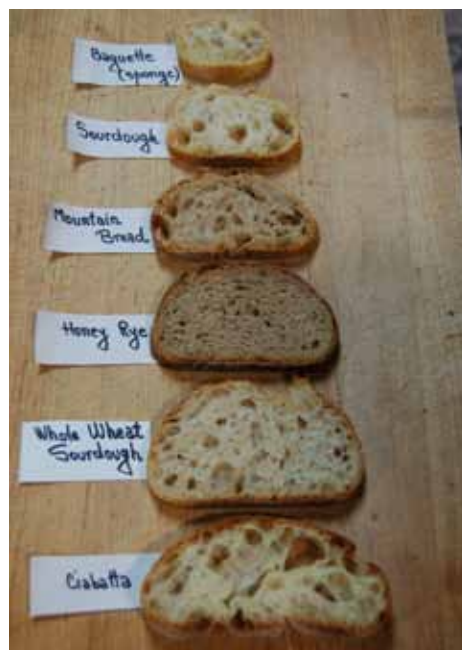
Megee also gained knowledge in the function of glucides, simple sugars (monosaccharides, disaccharides) and complex sugars (polysaccharides) in flour composition. Non-starch polysaccharides, such as pentosan, have a major impact upon mixing with regard to water absorption capacity, water distribution and overall dough viscosity. The differences between soluble and insoluble pentosans are that they will react differently within the dough.

Megee's investigations into the relationship between grain processing and enzyme activity revealed that the milling process is pivotal in determining rates of chemical reactions within the dough.



# The International Experience

Understanding the timing of these chemical reactions prompts the baker to be aware of an increased rate of pannyary fermentation and the decrease in dough tolerance in relation to long fermentation periods. This understanding of the milling and grain process also helps the baker determine the role that the ash content of the flour has upon fermentation, proofing times and baking properties. Such knowledge enables the baker to modify flour with the addition of malt and natural enzyme extracts, thus enhancing the falling number, which in turn changes the quality of the final baked loaf.



*Cross section and profile of breads produced with different enzyme activity and fermentation times*



*A 1.5kg miche using high-ash flour proofed for 16 hours with the addition of 230per cent liquid levain*



*The final baked sour miche*



*Panettone are inverted to maintain their final shape as they cool*

Megee also studied the methods of retarding dough and their effects upon dough development. The three distinct methods are:

- Delayed first fermentation
- Slow final proof
- Retarding proofing.

Each method produces a distinctly different product.



## The International Experience

Comparatively few bakeries in Australia make a levain-based sweet bread and pastry such as a pan d'oro and panettone. This is partially due to the fact that the levain can create a high acidity level in the bread, deleteriously affecting the desired sweet effect. Megee learned, however, that building the levain over time and acclimatising it to the new environment before introduction to the final dough, negates the tendency toward a sour profile. Acidity levels are still present, fortifying the gluten structure normally weakened by the inclusion of fat and sugars within the typical profile of a sweet-enriched dough.



*A sweet chocolate bread using a sour starter with 5 per cent rye flour*

### **Course: German Breads**

**Guest Instructor:** Thorsten Philippi

Philippi has a German Masters Degree in baking and has conducted international specialty training in German bread through China, Austria and the USA. He owns and operates his own bakery, Philippi's Backstube, which has five retail outlets located throughout Germany.

### **Objectives**

- To further understand the production and processes in creating traditional heavy grain breads and to examine ways to adapt them to the Australian culinary environment
- To improve techniques in baking to meet the requirements of people with dietary restrictions while retaining taste, variety and quality
- To learn how to produce bread with grain and flour that are not commonly used in Australia and be able to identify the appropriate flours or grains used in these complex artisan breads.

## The International Experience

### Outcomes

Germany is internationally recognised as a leader in traditional rye and rye-wheat combination breads. Philippi's experience in these traditional techniques and methods enabled the Fellow to focus upon the raw materials and procedures used to produce these styles of bread. The heavily practical nature of the course meant that Megee was able to create a variety of doughs, transitioning through various wheat flour, wheat-rye combinations, multigrain and 100 per cent rye flour bakery items.

With particular attention to German styles of breads that have a relatively small exposure in Australia, Megee gained experience and knowledge in the manufacture of breads that are characteristically denser with a closed crumb texture, darker in colour and with complex, richer flavours. Breads of special note were:

- Rye and rye-wheat rolls—large volume commercially manufactured breads for regular consumption
- Muesli rolls—healthier rolls with a larger percentage of whole grains in the overall bread formula and with low Gluten Index (GI) attributes
- Lye bread and pretzels—traditional breads and snacks dipped in a caustic solution prior to baking. This process modifies the external starches that, when baked, produce the golden glazed appearance associated with these items
- Mixed rye and multigrain breads—with a larger percentage of rye in their formula, these breads can be mixed with a variety of other flours such as wheat, wholemeal and spelt. A number of these breads, such as the Dreikornbrot, are actually proofed and baked in a thermally stable plastic bag to retain moisture and to modify crust texture after baking
- Pumpernickel bread—characterised by a 16–18-hour bake, this dough's longer baking time at much lower temperature produces a bread with a sweeter, nutty flavour due to greater enzyme activity.



*Rye bread baked in a thermally stable plastic bag*

# The International Experience



*The preparation and formation of pretzels and lye bread products*



*The final baked pretzels and lye bread products*



*Some traditional German wheat-rye combination small bakery items*



*Some traditional German wheat-rye combination small bakery items*

Traditional German bread baking uses different styles of levain as the starter culture. Unlike in France where the age of the levain is a source of pride, German starter cultures are replaced and refreshed every three months to maintain a high level of hygiene. The main method of production in Philippi's region of Germany utilises the Weinheimer Sourdough Scale. This scale of percentages and ratios in pre-fermented flour determines bread characteristics and aligns the bread production with national laws regarding labelling and ingredients. Megee learned how the timing and ratios of this scale could be manipulated with the use of three different rye-based levains:

- Berliner short sour levain—a levain with a higher percentage of starter culture in order to increase enzyme activity and yeast production
- Salt sour levain—a levain with a small percentage of salt added in order to retard enzyme activity, slowing maturity
- Spontaneous sour levain—a levain with no commercial purchased sour culture, but that is reliant upon the natural fermentation properties of rye flour.

# The International Experience

As mentioned earlier, the milling of different particle sizes impacts dough hydration and the eating characteristics of the baked product. With the use of a small flour mill, Philippi demonstrated the ease with which signature bread can be modified and changed through milling whole grains while still remaining true to the Weinheimer Sourdough Scale.

## Puratos Innovation Centre (PIC)

### Groot-Bijgaarden, Belgium

**Contact:** Stéphane Van Cauwenbergh – Innovation Center Manager:

Puratos is a bakery ingredient company; founded in 1919 it has grown steadily into a multinational company, encompassing three major brands:

- Belcolade—manufacturers of fine grade Belgium chocolate
- Puratos—manufacturers of bakery ingredients and enzyme supplements
- PatisFrance—manufacturers of patisserie ingredients and non-dairy creams and desert fillings



*Megee and Deroo at Puratos Innovation Center*

Puratos is considered by many to be the market leader in enzyme technology and bread improvers. Their motto—'reliable partners in innovation'—is exemplified through a dedicated centre of innovation and product design, located in their Brussels head office. The Fellow had the opportunity to attend a five-day tailored 'in-service' from August 30th to September 5th, 2009 at the Puratos Innovation Center, gaining valuable insights into the enzyme technology that is set to influence the baking industry—not just in Australia or Europe but worldwide.

### Puratos Tailored 'In-service' Training

**Instructor:** Waldo Deroo

Deroo is a Technical Advisor in Bakery for Puratos. His role is to travel around the world training bakers in the use of the Puratos products and educating them in enzyme technological advances and how this impacts the baking industry.

#### Objectives

- To gain a practical understanding of dried sour dough additives
- To develop knowledge of the use of enzyme technology and its application in bread-making systems
- To investigate the culture and products of European bakeries and patisseries, with a particular view to assessing which products and practices can be implemented in Australia
- To use ingredients and technologies currently unavailable in the Australian Baking Industry.

# The International Experience

## Outcomes

Puratos has designed a powdered sour dough concentrate additive used in the production of sourdough artisan breads. This product, O-tentic, contains its own fermentation properties, is applied as a percentage based upon flour weight (4 per cent) and is available in three varieties:

- O-tentic Original—a powdered levain for production of generic artisan style breads, such as baguettes and Vienna loaves
- O-tentic Napolitana—a powdered levain designed for 'Italian style' products, such as pizza bases and crusty breads
- O-tentic Sweet—a powdered levain for the creation of sweet-enriched products, such as panettone and brioche.

O-tentic is based upon a live active sour levain culture and is added to bread formulation either in straight dough applications or as a pre-ferment. A firm believer in the traditional bread-making process, Megee does, however, recognize the convenience and ease of such a product in producing high quality breads. Although obviating some of the rituals and time-honoured techniques, O-tentic still imparts authentic fermentation flavours and excellent final loaf characteristics.

In additional support to the O-tentic range, Puratos has developed the Sapore range of additives. These are powdered or liquid applications sourced from different sourdough cultures and pre-ferments that are origin-based from around the world. There are 17 applications in the range; two are enzyme active, five are pasteurised, and ten are powdered and are suited to particular grain types.

The development of this and similar 'cutting edge' baking technology and innovation is destined to impact artisan bread-making. The cost-effective nature of such products will inevitably lead to high-volume bread producers being able to style artisan breads into their own product ranges, thus opening up artisan bread to a greater market share.

Megee also gained experience with bread improvers and dough conditioners such as Soft'r Actvi-Plus range and S500. These are products with advanced enzyme technology that can enhance dough conditioning, crust texture, storage life, dough's machinability and crumb integrity. Megee used these applications in a range of products, such as laminated pastries (such as Danish pastries and croissants) and ready-to-eat bakery snack items (such as Salato Savory Snacks and Dolce Sweet Snacks).

Often the idea of convenient and premixed products is anathema to healthy eating. While training at Puratos, Megee was exposed to a range of Puratos 'Great Taste And Wellness' premixes. These premixes are designed to align themselves with the promotion of healthier eating. The resultant pre-mix bread formulations contain whole grains, fibre and nutritional additives that attempt to address needs in different aspects of modern society; such as women's health, where the premix is enriched with Vitamin B9 (folic acid) and omega 3.

Megee also trained in three par-bake products, with different formulations and techniques. These were unfermented frozen dough, pre-fermented frozen dough and double-baked frozen products. The vital ingredient in par-bake products is the bread improver used and its influence on stopping maillard reaction and caramelisation of the crust. Temperature regulation is also important as this has an effect on the thawed product's crust flake and texture.



## The International Experience



*Processing Danish pastry, which contains improvers and dough conditioners*



*Par-bake products produced at PIC*

### Concluding Remarks

Megee's Fellowship encompassed traditional artisan-style bread-making and the introduction of these qualities into modern rapid dough systems. The Fellowship exceeded expectations, particularly with regard to understanding the more scientific processes involved, both with reference to physical characteristics of the dough and how manipulating the underlying chemical reactions can have a dramatic effect upon the final loaf, its storage and eating qualities.

The SFBI aspect of the Fellowship brought a greater knowledge of the Raymond Calvel method of artisan bread manufacturing. But, it also married practical, technical and theoretical application of the fundamental rheological functions and affects of the ingredients used within bread production.

Although not containing a great deal of the theory and history which underpins traditional German baking, the German Breads workshop ensured that the Fellow developed a sound hands-on experience in the suitability of whole grains, minimally processed grains and specialty flours.

The health implications of these breads align well with the Australian Government's Guide to Healthy Eating Policy, which encourages Australians to have a larger percentage of whole grain and cereals in their diets. Combining this imperative with the public's increasing desire and appreciation of specialty breads, Megee's acquired knowledge from the SFBI will enable bakers to be better educated in producing more unique and region-specific breads, vital in enriching both the baker's expertise and the public's palate.

Though an advocate of traditional methods, Megee's experiences in the Puratos component of the Fellowship also enriched his understanding of the total baking industry. Megee recognises that advances in enzyme technology will have a dramatic effect upon the production of artisan breads, both in the home-bake market and in large-scale commercial ventures. The Australian Baking Industry can only benefit from the exposure and dissemination of these procedures and techniques.

# Knowledge Transfer: Applying the Outcomes

Megee is confident that the outcomes of the Fellowship will have many practical applications in the future direction of the Australian Baking Industry through improvements in the training and educational environment.

Information learned has been immediately disseminated through the TAFE system in the Certificate III in Food Processing (Sole Trade Baking) and Certificate III in Food Processing (Combined Trades). The Fellowship experience will also impact the development and delivery of the Certificate IV in Food Processing. In addition to these nationally accredited courses, Megee will also use this information to enrich the baking sector through professional development, conferences, workshops and national training for both local and international baking competitions.

The aim of this training and 'in-servicing' is to broaden the knowledge base of tradespersons and to lift the profile of the 'craft' aspects of the industry so that bakeries can have a great variety of products to meet customer needs and expectations.

Megee can see the skills acquired having application not only to sole trade bakeries and franchises, but also creating connections with the hospitality industry, particularly the restaurant and café sector. This greater understanding of artisan bread-making by restaurateurs and café operators lends itself to signature breads tailored to the specific menus and overall style of the restaurant, enhancing the diners' experience.

Such complementary cross-industry application will have flow-on effects into the vocational education system, with trainers and teachers embracing the different artisan bread methods and techniques.

# Recommendations

## Government

Currently (2009–2010) the training package is under review in the food processing industry. It is imperative that this redevelopment includes a much greater emphasis on increasing the skill level required in the industry, without lowering the standards needed to achieve a Certificate III and beyond to Master Artisan level. This will require an increased consultation with industry stakeholders in order to raise the profile of the craft of baking, in particular the specialised skills needed in artisan baking.

The Fellow's experience in Europe reinforced the need for greater regulation on what types of product can be called 'sourdough' and 'artisan bread'. Implementation of more stringent labelling and food regulation laws will ensure that there is greater transparency for the consumer and increased quality protection for the skilled artisan manufacturer.

The current changes to the baking industry occurring in Europe, such as the developments in enzyme technologies, would greatly benefit the Australian Baking Industry. Unfortunately, the tyranny of distance and related costs mean that access to these developments is limited. Government needs to address the level of support and incentives for such overseas bakery businesses to invest in the Australian market. Such support would ensure that product ranges are made available to the industry, with flow-on effects impacting facility and research development and infrastructure.

**Proposed Action:** The Fellow is to work with appropriate government bodies and peak industry bodies (such as AgriFood Skills Australia) and become involved in facilitating an increased level of consultation with all industry stakeholders. This consultation is to be undertaken with the specific intent of raising the profile and understanding of the specialised skills needed, including more stringent labelling laws and incentives for overseas investment leading to greater research and development.

## Education and Training

Currently the methods of producing artisan bread are varied. Greater collaboration and communication between training providers would result in a standardised delivery of methods, such as the Raymond Calvel system, in artisan baking.

Similarly, the collaborative development of courses that exceed current Certificate III training will provide a clearer career path and increased expertise for Australian bakers. Options such as the current development of a Certificate IV and the adoption of the European model of a Masters in Baking would contribute to achieving this end.

Attention also needs to be focused upon the balance between on-the-job training and traditional TAFE delivery. The exposure of trainees to processes other than those solely offered by their place of employment broadens their skill base and knowledge and ultimately has the effect of enriching their workplace.

**Proposed Action:** The Fellow proposes to liaise between training providers (such as bakery RTOs) in order to develop a more consistent and uniform approach to course content and design. The added benefits of such increased consistency would effectively provide greater access to skills for bakers and aid in establishing a uniformity of prerequisite skills and courses, such as FDFRBAB3A – Produce Artisan Breads, FDF30603 – Certificate III in Food Processing (Retail Bakery – Bread), FDF30703 – Certificate III in Food Processing (Combined Trades).



## Recommendations

Such consistency of skills is vital for access to and the development of further Certificate IV qualifications or proposed the Master Artisan level in Baking studies. The Fellow can foresee obvious flow-on effects into the workplace from such liaison.

### Professional Associations

Associations also have a role to play in the promotion of artisan bread training through their ability to connect and communicate directly with bakery businesses. This is imperative for the industry to continue growing through the dissemination of information and support. Their increased promotion of the industry as a skill and craft, with all of the requisite ongoing educational implications, would mean that baking moves away from its current perception as a 'lower entry job option'.

In line with this, the promotion of varied business models—not just the current predominant franchise model—will ensure diversity within the industry.

There would also be advantages in closer alignment of the food technology and cereal sciences with the baking industry. If the associations adopt a similar 'paddock to the plate' campaign (and its underlying ethos) as that of Meat and Livestock Australia, the consumer and baker will have a greater understanding and appreciation the holistic process from 'mill to meal'.

**Proposed action:** The Fellow is to advise the Baking Industries of Australia (such as the Australian Society of Baking, Baking Industry Association NSW, Baking Industry Association of Victoria, etc) of suggestions regarding the development of an educational advertising campaign in which both bakers and consumers cultivate a more holistic understanding of the journey from grain to artisan bread.

### ISS Institute Inc

The continued support of the ISS Institute for leading Australian bakers and educators, through programmes like the Fellowship, will ensure that the Australian Baking Industry will remain current with international movements in baking, relieving some of the relative isolation which Australia has suffered in the past. Specifically the ISS Institute could further support baking in Australia through Fellowship grants in the research of gluten-free breads, artisan pastries and an examination of breads from an Asian and Eastern European origin.

Even the very fact that the ISS Institute supports and recognises the Australian Baking Industry as a part of their 'specialty skills' spectrum, has implications for raising the profile of baking in Australia. Essentially the commitment of the ISS Institute lends the industry greater weight in achieving recognition as a highly specialised craft and this prestige will assist in attracting other funding and promotional opportunities.

**Proposed Action:** The Fellow will propose further suggestions for future ISS Institute Fellowships in the following areas:

- Gluten-free bread research
- Artisan pastries
- The Application of enzyme technologies upon the future of the Australian Baking Industry
- Research into origins, practices and the increasing growth in demand of Asian-style breads
- Further research into origins, practices and unique flavor profiles of breads from an Eastern European origin.

# Recommendations

## Further Skills Deficiencies

### Gluten-free Products

The increased identification of gluten intolerance within the Australian population indicates that there is a growing need for further research and development of high quality gluten-free products.

### Artisan Pastries

Following a similar pattern to the growing appreciation of artisan breads, sweet-yeasted products and artisan pastries are currently undergoing an initial phase of experimentation. The concepts and ideologies behind the artisan bread methods have readily transferable principles to the discipline of artisan pastry and this growing field would benefit from further research.

### Enzyme Technology

Megee's investigations into the current trends of the use of enzyme technologies in bread manufacturing revealed that this area should be flagged as a future phase in modern baking production. Its ramifications upon the international baking scene are potentially revolutionary and the Australian Baking Industry will need to keep abreast of future developments.

### Breads of Asian and Eastern European origin

With an increasing proportion of the Australian population recognising their ties with Asia, it stands to reason that there will be an expansion of Asian-style bakery product demand. This is not to say that the demand for European style breads will decline. On the contrary, the increasingly adventurous Australian palate seems set upon artisan breads experiences, tastes which possibly could be found in Eastern European styles of bread.

# References

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# Attachments

The following attachments/course notes are held by and available from the Fellow, Scott Megee, at Holmsglen Institute of TAFE:

**Attachment 1:** San Francisco Baking Institute Course Notes:

- German Breads, Thorsten Philippi, Instructor
- Artisan III: Advanced Breads, Didier Rosada, Instructor

**Attachment 2:** Puratos NV (Brussels) Recipes File and product information

**Attachment 3:** PatisFrance Recipes File and product information

**Attachment 4:** Belcolade Chocolate Recipes File and product information