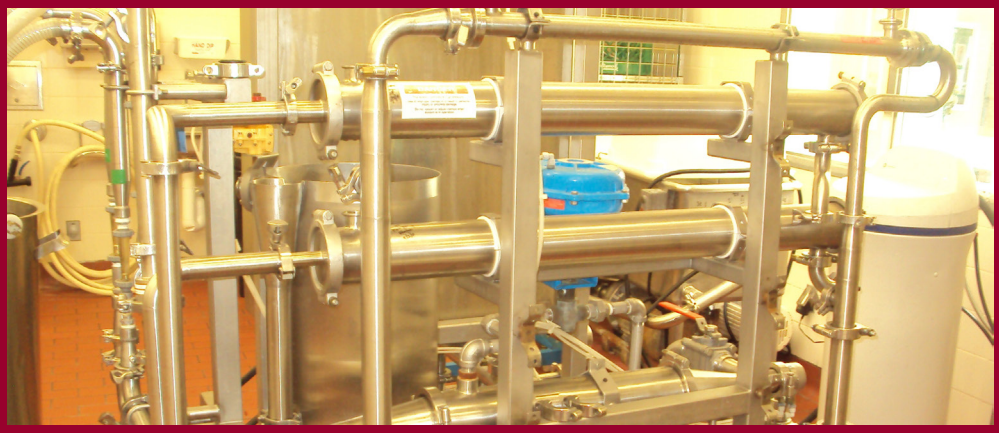
International Specialised Skills Institute

International trends and regulatory requirements of dairy-based functional foods



Bronwyn Turton

2010 Higher Education and Skills Group / International Specialised Skills Institute Overseas Fellowship

State Government Victoria
Department of Education and Early Childhood Development

ISS Institute Inc
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i. Executive Summary

In Australia, there is growing awareness of lifestyle diseases and the possible use of nutraceuticals to help prevent or manage the symptoms of these diseases. There is also an increasing recognition of the importance of preventative management by health organisations and industry associations.

Mainstream media advertising of food industry products have provided emphasis on the importance of having a healthy diet. This heightened public awareness and interest in the relationship between diet and health has consequently driven a demand for more functional foods.

The development and regulation of these foods is challenging. Food processors are linking health benefits to their products to increase product differentiation. Consumer awareness of the health benefits of nutraceutical products is increasing in Australia; however, the overall level of understanding is still comparatively low.

Australian regulator, Food Standards Australia New Zealand (FSANZ) developed a new policy for Health, Nutrition and related claims. The new policy was be ready for consideration in April 2011.

The Fellow travelled to the United States of America and Canada with an aim to develop an awareness of international policy and trends in relation to labelling claims for functional foods and the skill sets required for innovation and application to be practised in the dairy industry.

This report provides a foundation that encourages the Australian government acting through the National Preventative Health Strategy to disseminate clearly established information about nutraceuticals and functional foods to the Australian population.

It further encourages the Australian government to adequately fund TAFE institutions, particularly to provide equipment and expertise within the food science and technology areas of education in an effort to assist industry to develop innovative expertise in the functional food and nutraceutical arena.

It encourages the food processing industry and its associates to promote an emphasis on functional foods and nutraceuticals when developing new products by actively participating in, and supporting, educational programs provided by TAFE institutions.

It invites the cooperation of the International Specialised Skills Institute, with the NCDEA and Dairy Australia, to invite specialists from overseas to run workshops on the benefits of functional foods and nutraceuticals derived from dairy and other foods.

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ii. Abbreviations/Acronyms

Cal Poly	California Polytechnic College
DA	Dairy Australia
DEIP	Dairy Export Incentive Program
DIAA	Dairy Industry Association of Australia
DPPSP	Dairy Product Price Support Program
DPTC	Dairy Products Technology Centre – California Polytechic College
FDA	Food and Drug Administration
FMMOs	Federal Milk Marketing Orders
FSANZ	Food Standards Australia New Zealand
GOTAFE	Goulburn Ovens Institute of TAFE
HACCP	Hazard Analysis Critical Control Point
HESG	Higher Education and Skills Group (formerly Skills Victoria)
MILC	Milk Income Loss Contract
NCDEA	National Centre for Dairy Education Australia
NHP	Natural Health Product
SHIME	Simulator of the Human Intestinal Microbial Ecosystems
TAFE	Technical and Further Education
VFITB	Victorian Food Industry Training Board

iii. Definitions

Functional Foods

There is no universally agreed legal definition of 'functional foods'. However, functional food products can be described as any food or food component that may provide demonstrated benefits or reduce the risk of chronic diseases, above and beyond basic nutritional functions. (FSANZ, 2006).[1]

Nutraceutical

A nutraceutical is a food or food component that is claimed to have health benefits, including treatment and prevention of disease. In 1989, Doctor Stephen DeFelice, M.D., Foundation for Innovation in Medicine, derived the term 'nutraceutical' from 'nutrition' and 'pharmaceutical'.[2] Basically, it is used as a marketing term. Such products may range from isolated nutrients, dietary supplements and specific diets to genetically engineered designer foods, herbal products, and processed foods such as cereals, soups and beverages. It is important to note that this definition applies to all categories of food and parts of food, ranging from dietary supplements such as folic acid, used for the prevention of spina bifida, to chicken soup taken to lessen the discomfort of the common cold.

There is no definition within Food Standards Australia New Zealand (FSANZ)[3] or the US Food and Drug Administration.[4] Health Canada define nutraceuticals as 'a product isolated or purified from foods, and generally sold in medicinal forms not usually associated with food and demonstrated to have a physiological benefit or provide protection against chronic disease.[5]

Skills deficiency

The focus of ISS Institute Fellowship research is on applied research and investigation by Australians overseas.

The objectives are to enable the required improvement in the innovative skills not currently available in Australia, and the subsequent dissemination and sharing of those skills within the relevant Australian Industry, Education, Government or the Community

Sustainability

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".

1. Acknowledgements

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 ISS Institute are our Fellows. Under the **Overseas Applied Research Fellowship Program** the Fellows travel overseas. Upon their return, they are required to pass on what they have learnt by:

1. Preparing a detailed report for distribution to government departments, industry and educational institutions.
2. Recommending improvements to accredited educational courses.
3. Delivering training activities including workshops, conferences and forums.

Over 200 Australians have received Fellowships, across many industry sectors. In addition, recognised experts from overseas 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.

In this context, the ISS 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 ISS Institute's work.

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

1. Acknowledgements

Fellowship Sponsor

The Victorian Government, Higher Education and Skills Group (HESG) formerly Skills Victoria, is responsible for the administration and the 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 the ISS Institute. The Fellow would like to thank them for providing funding support for this Fellowship.

Supporters

- Doug Eddy, National President, Dairy Industry Association of Australia (DIAA)
- Shane Hellwege, Executive Officer, Rural and Manufacturing Industries Division, Goulburn Ovens Institute of TAFE (GOTAFE)
- Dr Mani Iyer, Program Manager – Product Innovation, Dairy Australia (DA)
- Ian Nicholson, Executive Officer, Victorian Food Industry Training Board (VFITB)
- Michael Robinson, Commercial Manager, National Centre for Dairy Education Australia (NCDEA)-Processing,Gilbert Chandler Campus

1.1 Employer Support

Goulburn Ovens Institute of TAFE have supported this Fellow in providing time to travel overseas and prepare required reports.

1.2 Organisations Impacted by the Fellowship

1.2.1 Government

Knowledge and understanding of international trends and practices will support Australian dairy manufacturers (among the primary stakeholders) in their quest for high value market opportunities that align with the Federal Government's National Preventative Health Strategy and the growing global and domestic 'functional food' market.

1.2.2 Industry

Awareness of the advances in the areas of food technology and new manufacturing methods being used by the international functional food industry may provide new options for use of functional food products within Australian dairy market.

1.2.3 Professional Associations

The Dairy Industry Association of Australia (DIAA) is a means by which the outputs of this fellowship can be transferred to its members and stakeholders who can translate the outcomes into beneficial outcomes for the general industry.

1.2.4 Education and Training

Knowledge and experience gained through this fellowship may provide insights into how best to develop or enhace skill sets included in existing courses and training programs to suit the needs of the dairy industry in building expertise in the area of functional foods.

1.2.5 Community

Our increased understanding of the health promoting effects and value added properties of foods, is driving more consumers to take a proactive role in managing their health. A wider range of available local products within the market may persuade other consumers to seek out alternative health management products, with a focus on prevention rather than treatment.

2. About the Fellow

Name

Bronwyn Turton

Employment

Project Leader, NCDEA Processing, Gilbert Chandler Campus,

Goulburn Ovens Institute of TAFE

Qualifications and Accredited Courses

- Certificate of Applied Science (Science laboratory), Preston College of TAFE, 1983
- Diploma in Applied Science (Food Technology), Moorabbin College of TAFE, 1987
- Recognition of Prior Learning Assessor Program, Broadmeadows College of TAFE, 1994
- Graduate Certificate in Education and Training, Victoria University, 1995
- Project Management for Workplace Training, Western Melbourne Institute of TAFE, 1996
- Graduate Diploma in Education and Training, Victoria University, 1996
- Conducting Assessment (Cert IV in VET), Kangan Batman Institute of TAFE, 1997
- Graduate Certificate in Training (Action Learning), Kangan Batman Institute of TAFE, 1998
- Food Safety Auditing Course, AQIS Training Services, 1999
- Consulting Skills Training, Neuro Linguistic Program Training, 2002
- Diploma of Business (Frontline Management), Kangan Batman Institute of TAFE, 2004
- Certificate IV in Assessment and Workplace Training, Kangan Batman Institute of TAFE, 2005
- Master of Education (Work and Learning Studies), Monash University, 2006
- Implementing Safe Quality Food (SQF) Systems, SQF Institute, 2007 (a division of the Food Marketing Institute)
- Graduate Certificate in Leadership in Education, Victoria University, 2008
- Certificate IV in Training and Assessment, Goulburn Ovens Institute of TAFE, 2010

Membership/s

- Professional Member of the Australian Institute of Food Science and Technology (AIFST) since 1998.
- Member of Dairy Industry Association of Australia (DIAA)
- Member of Australian Association for Food Protection (AAFP)

2. About the Fellow

Brief Biography

Bronwyn Turton is an experienced teacher (18 years), employed as a Senior Educator for the past three years at NCDEA, Gilbert Chandler Campus. She has taught across many levels of the food industry, from the Graduate Certificate in Food Industry Management, through to Certificate I in Food Processing.

The Fellow has also been very involved in the implementation of quality systems in industry (part time employment in the food industry, 2000 – 2007) in the role of Food Safety Supervisor. She has been instrumental in the writing and implementation of Hazard Analysis Critical Control Point (HACCP) programs and the writing and implementation of Food Safety and Quality Manuals (as the recognised Safe Quality Food (SQF) expert).She is a trained HACCP/Food Safety Auditor and has led HACCP and SQF teams.

Turton has a strong and ongoing commitment to the concept of lifelong learning and is constantly updating her individual knowledge by personal activities, professional development, attendance at relevant conferences, meetings and trade shows.

3. Aims of the Fellowship Program

The Fellowship has provided the opportunity to investigate international trends, manufacturing practices and workforce development needs for dairy-based (including sheep, goat and non-bovine species) functional foods, in particular:

- Awareness of products developed and marketed overseas
- An insight into overseasconsumer trends
- Awareness of international policy and trends in relation to labelling claims for functional foods
- Awareness of the skill sets required for innovation and application to be practised in the dairy industry
- Create a link with the California Polytechnic Dairy Products Technology Centre (DPTC) at Californian Polytechnic State University, USA
- Create a link and undertake a training program (Penn State Cultured Products) at Penn State University, USA
- Create a link and investigate the Functional Foods and Nutraceuticals program at the University of Guelph, Canada.

4. The Australian Context

Functional foods are considered as those foods which are intended to be consumed as part of the normal diet but contain bioactive substances that offer the potential of enhanced health or reduced risk of disease. Examples of functional foods include foods that contain specific fatty acids (e.g. Omega-3) or dietary fibre (e.g. beta glucan), or biologically active substances such as phytochemicals or other antioxidants or probiotics with live beneficial cultures.

In Australia, the growing occurrences of lifestyle diseases is driving demand for nutraceuticals, to help prevent or manage chronic conditions.[6] Consumers are being provided with examples of the importance of preventative health by industry organisations and associations such as The Omega-3 Centre Inc., National Heart Foundation, The Glycemic Index Limited and Australian Self Medicating Industry. Enterprises marketing functional food products using mainstream media such as the television, radio, print and the internet have provided emphasis on the importance of having a healthy diet. This heightened public awareness and interest in the relationship between diet and health has consequently driven a demand for more functional foods.

Challenges exist in the development and regulation of these foods.[7] Suppliers of nutraceuticals face significant challenges including: raising consumer awareness and understanding of nutraceuticals and their linked health benefits, creating effective product differentiation, overcoming process and formulation challenges in new product development and sustaining proactive marketing efforts. Consumer awareness of the health benefits of nutraceutical products is increasing in Australia, however, the overall level of understanding is still comparatively low.

A new policy for health, nutrition and related claims has been developed by FSANZ. The new policy was be ready for consideration in April 2011. [8] Health claims do exist in the USA, Japan and in some parts of Europe. Some people are in favour of health claims being used in Australia as they feel that they will help people choose foods that may benefit their health. Alternatively, other people feel that health claims may lead to confusion amongst consumers and encourage people to eat highly processed 'super foods' rather than a variety of healthy foods.

Strengths

- Quality of Australian manufactured dairy products
- Australia's clean and green reputation
- Product diversification for Australian dairy manufacturers
- Development of value added dairy products
- Marketing skills and experience of Australian dairy industry.

Weaknesses

- Training and education for industry
- Understanding of market requirements.

Opportunities

- Define new market for dairy products
- Demand for niche market products
- Australian market demand
- Development of targeted training/education program.

Threats

- Knowledge gap when compared to overseas competitors.

5. Identifying the Skills Deficiencies

There are examples of areas in Australian Industry where there is a weakness in the innovative skills, knowledge, experience, policies, and/or formal organisational structures to support the ongoing successful development and recognition of individuals and the particular sector.

The focus of all ISS Institute Fellowships is on applied research and investigation overseas, by Australians. The objectives will be to enable the required enhancement and improvement in the innovative skills not currently available in Australia, and the subsequent dissemination and sharing of those skills throughout the relevant Australian Industry, Education, Government bodies, and/or the Community.

5.1 Knowledge of International Trends

- Gather information about current products developed and marketed overseas
- Determine the bioactive components and their functional value
- Develop an awareness of consumer attitudes to the use of food additives and packaging types by manufacturers and their environmental impact
- Develop an awareness of future trends

To develop an awareness of the trends in dairy food products, components and standards applicable internationally and to provide this information to the Australian industry to further develop its viability and long-term competitive position.

5.2 Knowledge of International Policy in Regards to Labeling Requirements

- Develop an awareness of international policy and trends in relation to labelling claims for functional dairy foods.

To ensure that the Australian dairy industry is aware of labelling standards and future trends being developed and maintained internationally.

5.3 Workforce Skill requirements

- Develop a knowledge of the skill sets identified internationally for innovation and application as practised in dairy manufacturing overseas
- Consider the impact of this knowledge on Australian dairy educational facilities
- Develop recommendations to Australian dairy educational facilities to ensure that relevant courses compare favourably to international offerings.

To understand the skill sets required and develop educational recommendations that will enable the Australian dairy industry and relevant educational activities to be recognised as innovative and comparable to international activities.

6. The International Experience

6.1 Destination 1

Californian Polytechnic State University (Cal Poly), San Luis Obispo, California, USA Cal Poly is public university located in San Luis Obispo, halfway between San Francisco and Los Angeles on California's Central Coast.

Californian Polytechnic State University

The Cal Poly Dairy Products Technology Centre (DPTC), was formed in 1986 to help meet the growing needs of California's dairy industry for applied research, industry training and more trained graduates for careers in the dairy/food industries. Cal Poly has an established infrastructure of technical expertise, physical facilities, equipment, and industry relationships to address many current and future needs of California's dairy industry. The DPTC is recognised in the United Sates as a focal point for training in dairy foods. It houses a dairy herd of approximately 300 cows (Holstein and Jersey) and a working creamery which manufactures and sells cheese and ice cream products to local businesses.

CalPoly Cheese

CalPoly Milking Parlour

6. The International Experience

Contact:

Dr. Nana Farkye, Professor, Dairy Products Technology Centre

Dr. Nana Farkye

Dr. Farkye's areas of specialisation are dairy chemistry and technology, cheese technology and ripening, and dairy fermentations. His recent interests are in the areas of specialty cheeses, Hispanic cheeses, cheese flavour development, dairy fermentations, and food enzymology. He currently teaches the Cheese and Fermented Dairy Foods program which includes various fermented dairy products, including cheeses, buttermilk, sour cream, and yogurt. He holds three U.S. patents and three international patents on no-melt cheese and controlled-melt cheese technology, has authored nine book chapters, and numerous encyclopaedia and journal articles.

Objectives

The DPTC was formed with similar purpose to the National Centre for Dairy Education Australia (NCDEA). That is for the, "Provision of customer focused training and consultancy solutions to develop and improve individual and organisational performance, productivity and overall business success. Delivery of education and training that is responsive and proactive to industry and student learning needs".

It was hoped that a link could be created and networks formed between the NCDEA and the DPTC to exchange information, resources and promote discussion and innovation in providing dairy industry training to address current and future needs. These include an awareness of the trends in market products, manufacturing technologies and changes in legislation.

Outcomes

Dr Farkye was able to provide me with a guided tour of both the milking and processing facilities and we spent time in discussion about the differences and similarities between the Australian and North American dairy industries.

Noted similarities in milk production were; reduction of number of dairy farms, increase of herd size and slightly increasing milk production outputs. Climate change did not seem to be a topic of concern.

Dairy processing enterprises were also following similar trends i.e. decreasing number of suppliers making larger quantities of product from larger processing facilities. The need for product innovation has not been seen as important for the processing sector by educators at Cal Poly. The key federal policies of the American dairy industry were put forward as a possible explanation:

The United States of America federal dairy policy has essentially five components:

1) Dairy Product Price Support Program (DPPSP)

Under the DPPSP, the federal government stands ready to purchase butter, cheese, and non-fat dry milk from dairy manufacturers at specified minimum prices. This prevents market prices for dairy products from dropping below support levels.

2) Federal Milk Marketing Orders (FMMOs)

Marketing orders were created in the 1930s to balance market power between farmers and milk handlers while reducing 'destructive competition' between milk producers. FMMOs mandate minimum prices

that processors in milk marketing areas must pay producers or their agents (like the dairy cooperatives) for delivered milk depending on its end use. Under FMMOs, the farm price of approximately two thirds of the nation's fluid milk is regulated in ten geographic marketing areas. Some states, California being the largest, have their own milk marketing regulations instead of federal rules.

3) Milk Income Loss Contract (MILC) Program

Under the Milk Income Loss Contract (MILC) Program, participating dairy farmers nationwide are eligible for a federal payment whenever the minimum monthly price for farm milk used for fluid consumption (called 'Class I') in Boston falls below a set minimum price. Eligible farmers then receive a payment equal to 45 percent of the difference between the set minimum target price and the lower monthly price. The payment quantity is limited to approximately 1.35 million kilograms of annual production (equivalent to about a 16 cow operation). USDA's Farm Service Agency administers the MILC Program.

4) Dairy Export Incentive Program (DEIP)

First authorized in 1985, the Dairy Export Incentive Program (DEIP) provides cash bonus payments to U.S. dairy exporters, subject to limits on both quantity and value. The program was initially intended to counter foreign—mostly European Union—dairy subsidies (while removing surplus dairy products from the market), but subsequent farm bill reauthorizations have added market development to the role of DEIP.

5) Import Barriers

Legislation to implement the World Trade Organization (WTO) Uruguay Round Agriculture Agreement amended Section 22 to prohibit the application of quantitative import limitations or fees on products from other WTO members. Tariff Rate Quotas (TRQs) for dairy products were established in the U.S. tariff schedule.10. Importers of dairy products under the low tariff in a TRQ must apply for a license from USDA. No license is required for over quota imports, which are subject to a higher tariff.

Facilities at Cal Poly were most impressive. The milking herd is on the same site as the processing facility and consists of approximately 300 Holstein and Jersey cows (two calvings per year provide a constant supply of raw milk). They are managed and maintained by a full time farmer who is assisted by agricultural students undertaking farming and veterinary studies. The milk is collected by tanker owned by Cal Poly and product transfers are undertaken by students.

Membrane Plant CalPoly

The processing and

6. The International Experience

laboratory testing facilities are supported by manufacturers of dairy equipment and dairy manufacturers within the state. As such, it is well equipped with current technology and allows for production required to service local business. Students within the dairy processing programs at Cal Poly are full time undergraduates with little or no workplace experience.

6.2 Destination 2

Pennsylvania State University, University Park, Pennsylvania, USA

Penn State University

Contact/s

Dr Robert Roberts

Dr. Robert F. Roberts, Associate Professor of Food Science, Dairy Products Technology Centre, Penn State University

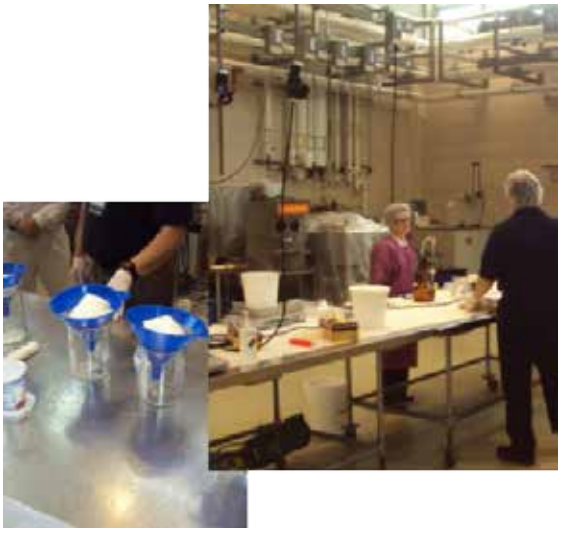
Dr. Robert's research is focused on quality of fermented dairy products such as yogurt and sour cream; on developing molecular techniques to characterise and enhance survival of probiotic bacteria, specifically bifidobacteria, used in dairy products, and development of probiotic-containing dairy products for use in clinical trials. He is member of both the Microbial Food Safety and Ingredients as Materials impact groups and teaches within Extension Programs, Dairy Foods Manufacturing, Ice Cream Short courses, Cultured Products Short courses and Pasteuriser Operator Short courses

The Fellow undertook the one week workshop 'Cultured Dairy Products'. This course provides participants with an overview of basic dairy technology and the manufacture of cultured dairy products, including buttermilk, sour cream, cottage cheese, yogurt, and cream cheese. Lectures and laboratory exercises address milk composition and coagulation, metabolic and technological aspects of starter cultures and flavouring systems for cultured dairy products. It is conducted by Dr. Roberts for those currently working in industry and includes the following expert speakers:

- Dr Arun Kilara, Food +Nutrients Consultant, North Carolina State University, Department of Food Science
- Dr John Coupland, Professor of Food Science, Dairy Products Technology Centre, Penn State University
- Dr Stephanie Doores, Associate Professor of Food Science, Undergraduate program Co-ordinator, Penn State University
- Dr MirjanaCuric-Bawden, Principle Scientist, Chr. Hansen Laboratory Inc.

6. The International Experience

Whilst undertaking this program, the Fellow had the opportunity to speak with all of the lecturers, laboratory staff and fellow students who were from dairy processing enterprises across the United States.



Filtration

Objectives

By undertaking the short course in Cultured Dairy Products, it was hoped that the Fellow would be provided with information on the direction and trends of cultured dairy products in North America, particularly in the area of probiotics and functional foods. The Fellow also hoped to be exposed to the latest in food labelling issues around these products and the knowledge and skills gaps within the North American workforce that were being addressed during the short course. It was also hoped that a link between Penn State University and the NCDEA could be formed to provide a means of future exchange of information.

Outcomes

Attendance at the Dairy Cultured Products short course was most beneficial. The Fellow discovered that the trends and direction of cultured dairy products in the US are similar to here in Australia but appeared to be growing at a slower rate. The innovations in the market were being driven by the manufacturers of the cultures used as a raw material for producing the products and not necessarily by the manufacturers themselves. The quickest growing market seemed to be on the West Coast, discussion in the classroom suggested this was perhaps because of the emphasis of body image and healthy lifestyles promoted in the warmer states.

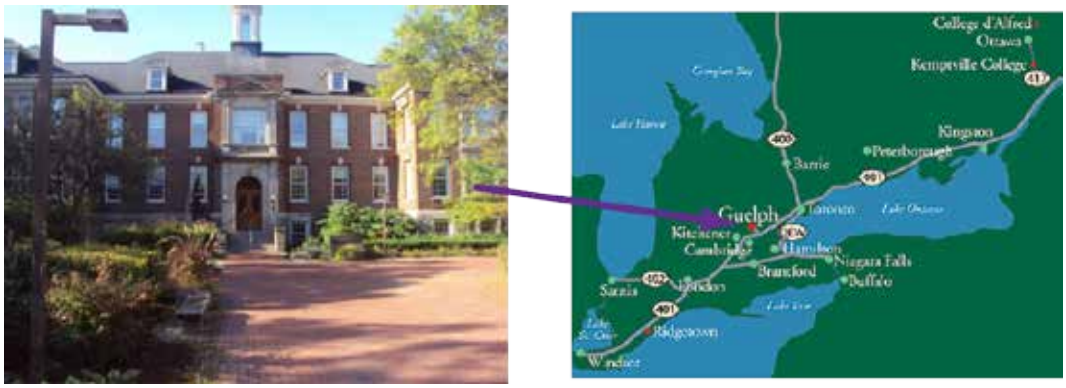
Labelling of functional foods and probiotics was raised and there was much discussion about health claims that are allowed under the current US legislation. The requirement under the Food and Drug Administration's (FDA) Fair Packaging and Labelling Act 1966, is that an application for recognition of a claim on a food label be made to the FDA with evidence to support the claim. If the FDA deem the supporting evidence sufficient, approval is given. This process takes up to 270 days. If a claim is disproven by scientific evidence after the claim has been allowed, it must be removed.

Laboratory and classrooms were well maintained, resources were up to date and support staff (final year students, being paid a minimum wage) were knowledgeable and helpful. Processing facilities were modern and efficiently run. The processing is managed by teamsters (unionised workers) that are on the full time payroll. The products produced at the Creamery are so popular that on days when football games are held, there are very long queues of people waiting to get their ice cream before the game!

There were two social functions run throughout the program and were attended by all participants, including all lecturers. This provided ample opportunity for discussion and networking.

6.3 Destination 3

University of Guelph, Guelph, Ontario, Canada



University of Guelph

The Food Science department at University of Guelph offers Ontario's only accredited Food Science program. The Bachelor of Science, Food Science major provides students with the opportunity to apply chemistry, microbiology and physics to the processing and development of food products and processes. The program also covers aspects of law, health, nutrition, and security as they relate to food safety and quality. Research based MSc and PhD thesis programs are also offered.

A Certificate in Food Science is offered through Distance Education. This five-course Certificate program is designed for individuals who are working full-time and seeking university level training in Food Science.

Contact/s

Professor H. Douglas Goff, Department Undergraduate Advisor

Prof. Doug Goff

- Dr Milena Corredig (Current research includes adding functional ingredients to milk)
- Dr Mansel Griffiths (Canadian Research Institute for Food Safety (CRIFS)
- Dr Arthur Hill (Chair, Department of Food Science and Technology, research focus is cheese technology)
- Dr. Genevieve S. Newton (Human Health and Nutritional Sciences, research focus is human nutrition).

Objectives

University of Guelph Food Science Department provide a program similar to that of the NCDEA – providing university level training to those who are working full time in the industry. A useful website which provides dairy science knowledge is also provided by Professor Doug Goff (and is well used by students within the Food Science and Technology program at the NCDEA). Guelph University have also recognised a gap in the training of the graduates and have offered an online program in Functional Foods and Nutraceuticals to post graduates.

6. The International Experience

It was hoped that the Fellow could gain an understanding of the labelling requirements governing functional foods within the programs being provided and compare them with relevant educational and regulatory activities in Australia.

Outcomes

The Fellow spent several days at Guelph University visiting the facilities and lecturers. This is a research facility and depends on research projects for funding. The facilities had recently been renovated and additional classrooms and laboratories had been added. The pilot processing facility was small but well equipped. It is managed and run by the research staff and their PhD research students.

Processing Centre Guelph

A highlight for the Fellow was to observe Dr Griffiths project 'Manipulation of Gut Microbiota Through the Consumption of Dairy Products' which is a study of the mechanisms by which dairy components are converted in the gut to molecules that confer health benefits. This study utilises the Simulator of the Human Intestinal Microbial Ecosystems (SHIME). Results gathered from this experiment will be beneficial in assisting the development of dairy and food products that can be tailored to human wellness and healthy ageing.

Programs run for undergraduates over the first two years are much the same as those provided by the NCDEA to their Diploma of Food Science and Technology. Surprisingly, the information website was not designed to be a free resource for all, but was in fact, an accidental outcome of the author not having a full understanding of the technology he was using to host the text for his first year cohort. As such, this website is not maintained.

The information is general and the decision was made to leave it online but considerations are being put toward the currency and maintenance of this information. It may become the duty of a research student or two.

The online Functional Foods and Nutraceuticals program is conducted by Dr Genevieve Newton and has only been delivered once to date. It has been popular with post graduates and it is anticipated it will run in the following year. Unfortunately, the Fellow is unable to undertake this program because the Canadian government do not allow international students to participate.

Labelling claims for functional foods are a little more complex than the United States model. They are regulated by the Food and Drug regulations (C.R.C., c. 870) or the Natural Health Product Regulations (SOR/2003-196) under the Canadian Food and Drugs Act (R.S.C., 1985, c.F-27). Firstly, it must be a defined whether the food in question is a Natural Health Product (NHP) or a functional food. Under the prescribed definitions, a food may be classified as both an NHP and a functional food, in which case, it is subject to the NHP regulations and is exempt from the Act and the provisions of the Food and Drug regulations as they relate to food. Functional food claims are then further classified as: risk reduction, nutritional or general health. Functional food claims regulations are dynamic and are expected to become more complex as new products are introduced to the market. The key to compliance with applicable law in Canada is to:

i. Determine the type of claim to be made on the product

ii. Determine how the product is to be classified (food or NHP) on the basis of guidance form Health Canada

iii. Determine whether the claim is risk reduction, nutritional or functional

iv. Ensure the claim complies with all applicable laws and regulations relating to the product.

6.4 Concluding Remarks

Comparison of the Australian dairy education and functional food regulation with the United States of America and Canada have provided an awareness of the similarities and highlighted differences between them.

Skill sets required for innovation and application in the dairy industry are, in particular, similar but there are clear differences in modes of delivery of the knowledge and skills required. The Australian delivery modes are clearly more innovative with the use of digital technologies and sympathetic to the needs of the learner. The overseas models observed by the Fellow are still very traditional 'chalk and talk'.

The visit to two of the leading dairy education centres in the United States of America provided the Fellow with an awareness of the similarities between the content of delivery to students but the major difference in the financial support provided to dairy processors within the American dairy industry that are not afforded to their Australian counterparts. The need for innovation and provision of value added products to allow for higher profit margins is not as great a concern in North America as it is in Australia. They are guaranteed a minimum return on surplus milk supply by output as cheese and skim milk powder under the DPPSP.[9]

The Fellow was also provided valuable insights into the ability of these educational institutions to provide excellent facilities and learning experiences for their students – they are strongly supported by their state governments that use them as a showpiece for their state and by local industry which, in turn, rely on them as a source of workplace skill.

Trends for functional foods are very similar and it seems all markets will be driven by the needs and demands of the consumer as they become more educated in the benefits which may be gained from their use. Legislation and regulation will need to be dynamic to meet these changing needs around the food-medicine interface.

Links have been formed between the Fellow and staff at the Cal Poly Dairy Products Technology Centre, Penn State Food Science Centre and Guelph University Food Science department.

7. Knowledge Transfer: Applying the Outcomes

Outcomes from the overseas experience include developing an awareness of:

- The trends in functional food products and their components as applicable in the United States of America and Canada
- Labelling standards and future trends being developed and maintained internationally
- The skill sets required for a workforce to enable the competitive manufacture and innovation required to keep up with the growing demand for functional foods in Australia and overseas.

The insights and information obtained will be utilised in dissemination sessions as follows:

- Speaking to the delegates from within the dairy industry at the Dairy Australia Webinar mid July 2012
- Connecting Food Science and Technology students studying at NCDEA with like students from Penn State University by facilitating a synchronous open classroom conversation using digital technology (July/August 2012)
- Connecting Food Science and Technology students studying at NCDEA with like students from Guelph University by facilitating a synchronous open classroom conversation using digital technology (July/August 2012)
- Development of a learning program for employees within the dairy/food industry who wish to gain an understanding of functional foods production and regulatory requirements (2013 commencement).

8. Recommendations

Government

The Australian government is encouraged to:

- Address the issue of functional foods and nutraceuticals. The growing occurrences of lifestyle diseases are driving demand for functional foods and nutraceuticals to help prevent or manage chronic conditions. Consumers are being provided with examples of the importance of preventative health by many industry organisations and associations. Enterprises market functional food products using mainstream media such as the television, radio, print and the internet putting emphasis on the importance of having a healthy diet. This heightened public awareness and interest in the relationship between diet and health continues to drive a demand for more functional food products. Turton would like to see the Federal and State Governments assist in the dissemination of information about clearly established benefits of functional foods and nutraceuticals into the National Dietary Guidelines under the National Preventative Health Strategy to be used by nutritionists and to be taught in schools. This may assist in alleviation of the confusion of the public about these products
- Provide adequate government funding to learning institutions so they may be held up as a source of pride to the community and strong incentives for industry and equipment suppliers to support educational facilities with the supply of equipment and expertise in exchange for the provision of a source of highly skilled employees in a timely manner. Learning institutions, particularly TAFE, suffer lack of funding to provide up to date and new technologies. The model seen in the US and Canada appears to be symbiotic and most beneficial to the students.

Industry

Industry is encouraged to:

- Develop media campaigns to promote the concept of using foods clearly established as beneficial as an alternative health management product which has a focus on prevention rather than treatment
- Develop internal emphasis on innovative product development with a focus on functional foods and nutraceuticals
- Actively promote the further education of existing and new employees in functional food production and regulation
- Actively support educational facilities, such as TAFE, with equipment and availability of their facilities for development of their workforce.

Professional Associations

The Dairy Industry Association of Australia (DIAA) is encouraged to support the common goal of improving and strengthening the dairy/food industry by means of providing current and timely information on functional food components and marketing trends.

Education and Training

The NCDEA currently embraces the delivery of training in the dairy processing industry. The delivery of Certificate levels I - III is under a training package and Certificate IV and Diploma under dated curriculum. This curriculum is undergoing an overhaul and will be translated into a training package. This translation needs to include functional foods and nutraceuticals with an emphasis on new and developing trends. This will assist industry to build expertise in this area.

8. Recommendations

Community

Many within the community are confused or lack understanding about the health promoting effects of functional foods and possible alternative health management products such as nutraceuticals. The Australian and State governments are encouraged to consider providing funding to assist industry in the promotion and marketing of functional foods with a focus on prevention rather than treatment as a possible alternative to traditional forms of professional and structured medicine.

International Specialised Skills Institute

The ISS Institute has the potential to utilise its network of skilled Fellows and work in co-operation with the NCDEA and Dairy Australia to invite specialists from overseas to run workshops on the benefits of functional foods and nutraceuticals derived from dairy and other foods.

9. References

Endnotes

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