

Innovation in Grain Production: Hi-maize® (Penford Australia)



What is Hi-maize®?

Hi-maize® is a food ingredient which is high in **resistant starch** (starch which resists digestion in the small intestine). It is produced from a variety of maize developed in Australia. Hi-maize® can be added to foods to increase the resistant starch content without changing the taste or texture. Evidence from research studies indicates that resistant starch plays a role in maintaining healthy bowel function.



Why was the product developed?

Starch, the main storage carbohydrate in maize (corn), has a wide range of industrial and food uses. The main components of starch are two types of glucose polymers, amylose and amylopectin, which differ in their molecular structure. The functionality of starch is determined by the proportions of amylose (linear structure) and amylopectin (branched structure) in starch. Regular corn contains 28% amylose to 72% amylopectin.

In 1975, Starch Australasia commenced a research program to grow and develop uses for high amylose maize starch, particularly in foods.

With increasing recognition of the possible role of resistant starch in the prevention of bowel cancer, interest in the use of high amylose starch in foods for nutritional and functional reasons increased. The amount of resistant starch and dietary fibre in starch increases with the proportion of **amylose in starch**.

How was the product developed?

Using conventional selective breeding techniques, maize hybrids containing 55 to 65% amylose were bred and adapted to Australian growing conditions. The starch from these hybrids were examined to determine the level of amylose required to achieve specific properties, such as paste viscosity, cooking temperature and levels of dietary fibre and resistant starch.

A hybrid containing 80% amylose was selected which provided a starch that had good agronomic performance and a high level of resistant starch and dietary fibre as well as favourable properties allowing it to be incorporated into a wide range of foods. This starch is milled using conventional wet milling processes in Australia.

In 1993, the first commercially available resistant starch product in the world was released under the trademark, Hi-maize®. Its development required agricultural research, manufacturing expertise and food technology.



Description of final product

- Hi-maize® is a natural product, grown in Australia, which does not contain material from genetically modified organisms or artificial additives and does not require any chemical pre-treatments.
- Its white, fine, free-flowing granules means it can easily be incorporated into foods to add dietary fibre and resistant starch without adversely affecting their organoleptic properties (taste, texture and appearance). For example, Hi-maize® has been added to foods such as bakery products, bread, breakfast cereals, pasta and noodles, snack foods, soups, cereal drinks, yoghurt and select dairy products,
- In addition to its health benefits, the functional properties of Hi-maize®, such as its low level of water absorption, improves the quality of food products, e.g. the crunchiness of breakfast cereals; the keeping, freezing and toasting quality of bread; and the 'al dente' texture of pasta.

Nutritional advantages of Hi-maize®

- It is a good source of resistant starch which may play an important role in reducing the risk of bowel cancer.
- It is a good source of **dietary fibre** and can boost the dietary fibre content of foods without affecting the taste, appearance or texture of foods.
- The pre-biotic properties of Hi-maize® mean that it provides food for beneficial bacteria in the colon and in so doing, promotes bowel health. Hi-maize® has been added to foods (e.g. yoghurt) providing a food source which improves the survival of these bacteria in the food itself as well as in the colon. Via its pre-biotic role, Hi-maize® can help reduce pathogenic bacteria and in this way, may reduce the risk of bacterially induced diarrhoea.
- Hi-maize® lowers the **glycaemic index** of foods into which it is incorporated.
- Gluten-free - a good source of dietary fibre for people with coeliac disease.
- Low in bulk - increases the fibre content of texture modified meals.

Packaging and labelling

- Available in 25 kg moisture barrier, multi-wall paper bags.
- Recommended labelling includes maize starch, corn starch, maize cornflour, high amylose starch or starch.

Marketing

The key commercial features of Hi-maize® relate to its potential health benefits and its versatility in that it can be incorporated into a wide range of foods. As a result, Hi-maize® can assist in product innovation and helps to differentiate established food products from their competitors.

Penford Australia, the company which owns and markets Hi-maize®, has played a role in raising awareness of the role of resistant starch in the prevention of bowel cancer and funding research on the various health benefits of resistant starch:

- In 1995/96, seminars and brochures were provided to health professionals to help raise awareness of the science behind resistant starch.
- Penford Australia continues to communicate new research findings to health professionals.
- Promotional activities inform the consumer as to the nutritional benefits of Hi-maize®. Examples of promotional activities to date include print advertising, public relations activities and support from key organisations such as the Cancer Council.

Since Hi-maize® is an ingredient, it is marketed to food companies for incorporation into food products. A marketing plan was developed in 1995 by professionals with marketing, technical and nutritional expertise to identify food industry opportunities for Hi-maize®. Manufacturers needed to understand that food applications of Hi-maize® differ from that of traditional uses of starch (i.e. as a thickener).

Penford Australia works closely with food manufacturers in developing new food products that include Hi-maize®. In addition, food products that use Hi-maize® (called the host brands) can carry the well recognised Hi-maize® logo on their packaging. By using the Hi-maize® logo, the host brands are in a better position to promote their nutritional benefits, plus the host brands can benefit from the promotional activities for Hi-maize® carried out by Penford Australia.

Hi-maize® is protected by both Australian and international patents which protect and control its preparation, composition and use in foods. These patents offer commercial protection and it means that in some cases, Hi-maize® can be offered to a food company on an exclusive basis. In this way, the food company can benefit from market differentiation and hence a sustainable competitive advantage.

Evaluation of the success of Hi-maize®

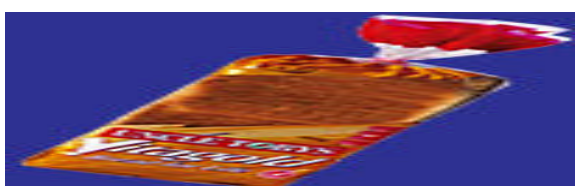
- Demand for Hi-maize® in the first 18 months after its launch, led to increased demand for maize cropping.
- Export sales account for 25% of sales volume.
- In 1995, Hi-maize® won the AIFST Industry Innovation Award.
- Hi-maize® has been incorporated into a wide range of new food products, which have been very successful, including McDonald's Australia hamburger buns and muffins and Buttercup Wonder White® bread.

Innovation in grain processing technology – Nature's Gold™/VitaGold® (Goodman Fielder)



What is Nature's Gold™?

Nature's Gold™ is a natural flour product, rich in nutrients and dietary fibre, derived from a novel milling process developed by Goodman Fielder Milling. In 1995 Quality Bakers used Nature's Gold™ to produce VitaGold®, a pre-sliced, packaged bread under the Uncle Tobys brand. Uncle Tobys is part of the Goodman Fielder food company.



Why was the product developed?

Although the aleurone cell layers of the wheat grain are rich in nutrients, particularly vitamins and minerals, they are trapped inside the thick cell layers. The fibrous layers of the aleurone and bran layers are relatively indigestible resulting in wheat bran being unpalatable. For this reason, the aleurone and bran layers are normally separated from the flour during milling. In wholemeal flour, even though aleurone layers are maintained in the flour, absorption of nutrients into the body is prevented by the thick cell layers.

After many years of research and development to find alternative uses for the bran layer of wheat, the research team at Goodman Fielder Milling perfected a novel milling system for capturing its nutritious components.



How was the product developed?

Nutrients can become more available by destruction of the aleurone cell walls. The research team at Goodman Fielder Milling developed a milling technique which releases these nutrients from the aleurone layers, making them available for absorption in the human body.

This new milling technique fractures the aleurone cell walls, releasing the rich store of nutrients from within the cell walls and then separates the contents from the fibrous grain layers.

Description of final product

- Nature's Gold™ is a natural product.
- The golden flour has easy particle dispersment providing mixing simplicity and consistency. It produces a soft, fine textured golden bread with no visible fibrous bits (e.g. VitaGold®).
- Products made from Nature's Gold™ (e.g. VitaGold®) have a milder flavour with no

aftertaste.

- Its bulk handling characteristics makes it compatible with most food manufacturing systems.
- Nature's Gold™ has been 'instantised' to stabilise and protect the integrity of its nutrients and to provide a low microbial content. This ensures a hygienic raw material with strong keeping qualities. No specific storage facilities are required to store the product.

Nutritional advantages of Nature's Gold™

- Nature's Gold™ is richer in dietary fibre, protein, vitamins and minerals compared to wholemeal flour (see Table 1).
- Bread made from Nature's Gold™ (e.g. VitaGold®) contains 7.4g dietary fibre per 100g - higher than typical white bread (2.7g per 100g), mixed grain bread (5.1g per 100g) or wholemeal bread (6.5g per 100g).
- The protein found in Nature's Gold™ is of a higher quality than regular wheat flour.
- Goodman Fielder have funded research to investigate the nutritional benefits of Nature's Gold™. Research conducted by the CSIRO indicates that folate contained in Nature's Gold™ is easily absorbed by the body. A preliminary study conducted by the CSIRO indicates that consumption of 100 g of Nature's Gold™ produced an increase in blood folate levels equivalent to that achieved from a 500 µg dose of synthetic folic acid.

Table 1: Nutrient content of Nature's Gold™ and wholemeal flour (per 100 g dry weight)

	100 g Nature's Gold™	100 g wholemeal flour ^{1,2}
Thiamin	2.25 mg	0.42 mg ¹
Folic Acid (Folate)	610 µ g	57 µ g ²
Vitamin E	8.2 mg	1.4 mg ²
Iron	22.1 mg	3.0 mg ¹
Zinc	6.81 mg	1.2 mg ¹
Magnesium	366 mg	102 mg ¹
Potassium	893 mg	315 mg ¹
Selenium	30 µ g	NA

1. National Food Authority. NUTTAB 95. Canberra: AGPS; 1995

2. Holland B et al. McCance and Widdowson's The Composition of Foods. Fifth Edition. Cambridge: The Royal Society of Chemistry and Ministry of Agriculture, Fisheries and Food; 1993

Product Development

Because it is naturally rich in nutrients, Nature's Gold™ can be used to enhance the nutritional value of food products. Nature's Gold™ is patented and available for use only to businesses within the Goodman Fielder food company. It has been used to make bread (VitaGold®), pasta and breakfast cereal (e.g. Healthwise for your heart).

VitaGold®

Consumer Research

Consumer research indicated that consumers, who prefer wholemeal bread, wanted a high fibre, nutritious bread which is lighter in colour; has a soft, fine texture without fibrous 'bits'; a milder

flavour with no aftertaste; and that keeps as fresh as white bread. In conventional wholemeal bread the fibrous layers of the grain traverse the crumb resulting in a chaffy, unpalatable mouthfeel. With Nature's Gold™, the bran becomes part of the bread crumb structure and the fibrous mouthfeel is avoided.

Furthermore, consumers favour products produced from natural ingredients. Nature's Gold™ therefore provided the opportunity to meet consumer demands.

In 1995, wholemeal bread represented 20% of the total market and was declining at 11%. Farrer's Gold, a Buttercup bread made from Nature's Gold™, had previously been launched. However, issues in relation to eating quality needed to be addressed to meet consumer demands.

Product Development

The Research and Development division collaborated with Goodman Fielder Milling to meet the specifications of the Marketing Division. Specifically, a product was required which had the eating quality of white bread but looked different to wholemeal bread. It also had to have a consumer-friendly ingredient list by avoiding the use of preservatives.

To differentiate VitaGold® from other packaged bread products at the time, it was baked as a high top loaf. The top of the loaf was dusted with white flour and the loaf cut into thick slices (one size only). VitaGold® was one of the first packaged breads to be baked as a high top with white dusting. The use of preservatives was avoided by preserving the bread naturally with vinegar.

Marketing

A decision was made to launch the new product, VitaGold®, under the Uncle Tobys brand to better position its superior nutritional qualities by using the established health attributes of this brand.

VitaGold® is a good source of folate and qualifies for participation in the Folate Pilot Health Claim campaign organised by ANZFA.

VitaGold® is low in fat and high in carbohydrate and dietary fibre. It is a good source of thiamin, folate and niacin and a source of iron, zinc, magnesium and potassium (see Table 2).

Table 2.: Nutrient Content of VitaGold® Bread (per serve = 2 slices)

Energy	780 kJ	Niacin	5.1 mg
Protein	7.2 g	Folate	79 µg
Fat	1.7 g	Iron	2.4 mg
Carbohydrates (total)	35 g	Zinc	1.8 mg
Dietary Fibre	4.2 g	Magnesium	72 mg
Sodium	335 mg	Potassium	210 mg
Thiamin	0.43 mg		

Reference Stenvert NL. New high fibre bread - Farrer's Gold. Food Australia. 1995; 47(10): 462-463.

Wonder White® (Buttercup®)



Wonder White® is a pre-sliced, packaged white bread which was developed by Quality Bakers under the Buttercup® brand in 1994. Quality Bakers Australia Ltd is part of the Goodman Fielder food company.

Why was the product developed?

- i. Consumer research identified the need for a high-fibre bread with the appearance, texture and taste of white bread. Over 50% of mothers prefer to buy multigrain or wholemeal bread, but 80% of children aged 8-15 years prefer the taste and soft texture of white bread.
- ii. The discovery of Hi-maize™, a natural ingredient milled from a specially developed maize grown in Australia, provided the opportunity to produce an innovative high fibre bread which looks and tastes like regular white bread but contains twice the fibre of regular white bread.
- iii. Developing a bread which kids love to eat and mothers are happy to feed to their children had the potential of increasing bread consumption in this age group (rather than replace consumption of other brands). Hence, the new product could increase the overall volume of bread sales.
- iv. This innovative product could be differentiated from other bread products and command a premium pricing position.



How was the product produced?

A working group from the Hi-maize Taskforce, who were investigating food applications for Hi-maize™, focused on its use in bread. Members of the working group had expertise in:

- Marketing - Buttercup®'s Marketing division
- Product development - Buttercup®'s Research and Development division (R&D)
- Hi-maize™ technology - Starch Australasia
- Nutrition - Goodman's Fielders' corporate dietitian.

The Marketing Division briefed R&D on the nutritional and taste specifications for the new product. It had to taste soft and fluffy and the eating quality had to be not significantly different from regular white bread. Nutritionally, it had to have significantly more dietary fibre than regular white bread, but with the same nutritional quality as other Buttercup® breads (i.e. low in fat and rich in carbohydrate). R&D worked with Starch Australasia (now Penford Australia Ltd) to achieve these specifications.

Technologically, the innovation was the development of Hi-maize™, a new ingredient in bread-making. Research was required to achieve the right balance of ingredients to produce a soft, fluffy and tasty loaf. To achieve product differentiation, the size of the loaf was increased from the regular 680 g to 700 g by using bigger tins. The bread was made using regular commercial

bread-making techniques.

Extensive research was conducted to gauge acceptance of the product prior to its launch. Without even tasting the product, 87% of consumers within the target group reported an intention to purchase the product. After tasting the product, 95% intended to purchase it.

The dietitian worked with marketing to develop the communication campaign and define the target audience for the campaign.

The final product

Physical appearance

- Looks and tastes like regular white bread.

Nutritional value

- Wonder White® has double the dietary fibre content of regular white bread and significantly more dietary fibre than multigrain bread.
- Contains resistant starch, a type of dietary fibre that differs from wheat fibre and other insoluble dietary fibre found in regular bread, including wholemeal.

Packaging

- Pre-sliced, packaged 700 g loaves in sandwich and toast slices (a smaller loaf, called "Wonder White® Lunchbox (size)" was produced in response to a need for bread that fits into school lunchboxes but was later withdrawn due to lack of sales volume).
- Packets of six English muffins.
- Crumpets - were not well supported by the market and so were withdrawn.

Labelling/nutrition claims

- "High in fibre with Hi-maize™" is displayed in a prominent position under the Wonder White® logo on all packaging.
- It is classified as 'a good source of dietary fibre' with a dietary fibre content of 5.7 g per 100 g.
- As a result of on-going research, the dietary fibre content of Wonder White® has been increased in order to substantiate the claim, "Now with twice the fibre" and "Double the fibre of regular white bread".

Marketing

- **Target group**
Boys and girls aged 8-15 years and their mums.
- **Positioning**
Hi-maize™ was introduced as a unique rich fibre source that is so finely ground that it's invisible. The "invisible fibre", Hi-maize™, positioned Buttercup® Wonder White® as a "soft white bread which looks and tastes exactly the same as regular white bread but contains an invisible dietary fibre".
- **Strategies**
Advertising on television, bill boards and buses as well as print advertising (back to school features). The product launch in 1994 was supported by a \$2 million promotional campaign featuring an invisible baker to reinforce Wonder White®'s "invisible fibre" positioning with consumers.

Point-of-sale material

- Brochures
- In-store recipe cards.

Below-the-line activities

- Registration of the Wonder White® products with the School Canteen Association
- An awareness campaign to health professionals (GPs, dietitians and home economists)
- Development of a fun website for kids (www.wonderwhite.com.au)
- Presentations at conferences and parents' groups
- Display at the Easter Show.

Distribution of product

Available at all supermarkets and convenience stores.

Evaluation of product's success

- Not only the target market, but also a secondary market (fathers), are using the product. Men like the big, thick slices and the fact that it has no bits.
- Wonder White® captured 12% of the white bread market 20 weeks after its launch and increased the size of the white bread market by 8%.
- The total bread market grew by 2% in a declining market.
- Wonder White® has therefore encouraged more people to eat bread which is consistent with the Australian Dietary Guidelines.
- Wonder White® is the second largest brand in the bread market, with 14.5% unit share and 15.7% value share of the white bread segment. This represents approximately \$80 million in national sales each year (Nielsen Scandata 1998).

The success of Wonder White® is primarily due to the simplicity of the advertising message. Consumers are interested in the fact that it is high in fibre and that it tastes good. They are not interested in too much detail. They just want a simple product that delivers, particularly in terms of taste.

Evaluation of the initial campaign therefore indicated that the product should be maintained in terms of taste, but the dietary fibre content be increased. Consequently, the fibre content was increased to substantiate the claim "Double the fibre of regular white bread". On-going market research continues to determine how the product can maintain market share.

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Burgen® Soy-Lin™ (Tip Top® Bakeries)



Burgen® Soy-Lin™, produced by George Weston Foods, was the first soy and linseed bread to be sold in Australia and could be considered the first most complete functional food available to consumers.

Why was the product developed?

- A study published in the British Medical Journal in 1990 showed that phytoestrogens in soy and linseed could have a significant impact on menopausal symptoms¹.
- Consultation with nutrition professionals suggested that a food product that contained significant concentrations of phytoestrogens from soy and linseed could be used as an alternative, or in addition to, Hormone Replacement Therapy (HRT).
- Consumer research indicated that some women do not want to use HRT and would prefer to achieve similar benefits by consuming an inexpensive food product.
- Phytoestrogens, such as lignans (in linseeds) and isoflavones (in soy) may help to reduce the risk of hormone-related cancers.
- Linseeds are also high in omega 3 fatty acids (alpha linolenic acid). Studies suggest that omega 3 fatty acids found in plant foods may help to reduce the risk of heart disease.
- George Weston Foods Limited therefore saw an opportunity to develop a suitable product containing a significant quantity of phytoestrogens and omega 3 fatty acids for the Australian diet.
- Bread was considered the most suitable product since it would be perceived as a substitution food, rather than an addition to the total diet of weight conscious post menopausal women.

How was the product developed?

In 1994, George Weston Foods Limited, the Monash Medical Centre and the Royal Women's Hospital (Melbourne) collaborated in a study on the effect of phytoestrogens in soy, linseed and wheat on menopausal symptoms.

After extensive product development, George Weston Foods developed a bread which supplied a significant quantity of phytoestrogens for study participants to consume each day. The double blind, randomised controlled trial confirmed that soy and linseed, consumed as soy and linseed bread, are of benefit in the relief of menopausal symptoms in post-menopausal women².

The chosen formulation involved careful consideration of the study's research results. The balance of soy, linseed and wheat had to be carefully calculated to optimise the phytoestrogen level as well as omega 3 fatty acids. It was also extremely important to achieve maximum flavour and overall product acceptability.

The final product

Physical appearance

- Burgen® Soy-Lin™, is a fermented style bread containing kibbled soy, linseed and kibbled wheat.

Nutritional value

- A good source of phytoestrogens (4 slices of Soy-Lin per day provides
- 220 mg of isoflavones and lignans)
- A good source of omega 3 Fatty acids (4 slices contains 3.5 g alpha linolenic acid)
- Low Glycaemic Index (36)
- High in dietary fibre (4.4 g per serve)
- Contains 10% of the RDI for Calcium
- Contains 10% of the RDI for Phosphorus
- Good source of folate
- Contains no artificial colours or flavours
- Meets the National Heart Foundation criteria for sodium, fat, sugar and fibre.

Packaging

- Burgen® packaging is distinctive, has stand out and suits the unique feel of Burgen® as well as reflecting its heritage and premium quality. The package is focused on conveying taste and ingredient cues. A large amount of the bag is left clear so the consumer can see the bread.

Labelling

- The following nutrient and health claims are made on the package:

i. Folate health claim

Soy-Lin® contains 160(g of folate per serve. As it contains more than 40 (g of folate per serve, it is eligible to make the following folate health claims:
 "Contains Folate for a Healthy Baby" and " Increased maternal folate consumption in at least the month before and 3 months following conception may reduce the risk of neural tube defects in babies. A serving of this food contains 40% of the 400 (g** per day intake of folate recommended for women of child-bearing age."
 "** The RDI for adults is 200 (g of folate per day. It is recommended that women consume a minimum of 400 micrograms per day in at least the month before and at least the first 3 months following conception."
 As per recommendations from ANZFA, the following statement consistent with healthy eating is included on the package "Enjoy a wide variety of foods".

ii. Glycaemic Index (GI) = 36

iii. Phytoestrogens:

Total: 137 mg/100 g Per serve: 109 mg
 Total Isoflavones: 27 mg/100 g
 Total Lignans: 110 mg/100 g

iv. Cholesterol

Meets the requirements for "Cholesterol Free" or "No Cholesterol" claim.

v. Dietary Fibre

High In Fibre.

vi. Iron

Contains Iron.

vii. NHF Heart Tick

Complies with the requirements of the NHF.

viii. Nutrition Information Panel

Since the above nutrient and health claims are made on the package, the following nutrition information panel is provided:

Energy		809kJ	1011kJ
Calories		189Cal	236Cal
Protein		12.4 g	15.5 g
Total Fat		5.6 g	7.0 g
Alpha Linolenic Acid (Omega 3)		1.8 g	2.2 g
Saturated Fatty Acids		Max 16%	Max 16%
Polyunsaturated Fatty Acids		Min 65%	Min 65%
Monounsaturated Fatty Acids		Min 19%	Min 19%
Carbohydrate — total		23.8 g	29.8 g
— sugars		1.9 g	2.4 g
Dietary Fibre		4.4 g	5.5 g
Folate	80%	160 µ g	200 µ g
Iron	20%	2.4 mg	3.0 mg
Cholesterol		Nil	Nil
Sodium		293 mg	366 mg
Potassium		254 mg	317 mg

Marketing

Target group

- Female shoppers 45+ years old
- People with reasonably high disposable incomes
- Smaller households of 1-3 people
- Older singles and adult households
- "Taste seekers".

Positioning

- Taste, Health*, Indulgence
- "The tastiest treat- MY BREAD".

As the product has continued on the market, scientific research has proven further benefits in consuming soy and linseed products, which is why the product is referred to as a multifaceted functional food. Evidence suggests that phytoestrogens may help to relieve the symptoms of menopause and reduce the risk of developing hormone-related cancers (breast and prostate). Soy protein has also been shown to reduce blood cholesterol levels.

Branding

- A name that reflects taste, quality ingredients and health
- Burgen® suggests heritage and authenticity
- Has small German/European bakery associations.

Strategies

Advertising & Promotion

- Major launch in 1997 through TV and print with a definite focus on Soy-Lin® and the health properties associated with the brand.
- In 1998/99, the message shifted towards a greater focus on taste with the "Love Bites" and "Hot Love" campaign, a highly targeted national campaign featured on billboards, buses/trams, magazines and radio.
- Magazines also featured recipe card inserts in "Vogue Entertainment and Travel" and the "Daily Telegraph Food and Wine" section.
- A more recent advertising message, "Once Bitten, Forever smitten", reinforces the "my bread" positioning.

Public Relations

- Public interest in Burgen® Soy-Lin® was initially generated by announcing the menopausal benefits of Soy and Linseed at the International Congress on Menopause in Sydney 1996.
- Much activity focused around the launch of Burgen® Soy-Lin® in 1997.
- Launch of Soy-Lin® received a huge media reception gaining nationwide coverage on TV, radio and in print media.
- The product was featured on Australian Television by interviewers and principal medical researchers about the potential nutritional benefits of soy and linseed.
- Leaflet information was developed for GP distribution nationally.
- Rosemary Stanton, a high profile nutritionist, was used to interface with the media as a recognized and trusted nutrition expert interviewed for television, radio and published articles for print.

In-store activities

- "Flavour of the Month" in-store product sampling, aimed at building consumer awareness of the Burgen® range, involved:
 - Distribution of a variety of Burgen® gourmet sandwiches inside supermarkets.
 - Gourmet sandwich recipe cards
 - Burgen® sampling booths with uniformed demonstrators
- Point-of-sale material included off-location display units, posters, wobblers and shelf strips.

Distribution

- Available in grocery and convenience stores in all states except Tasmania and Northern Territory.
- Geographic and demographic analysis is considered when ranging products in stores whereby areas with a greater concentration of white collar, high disposable income earners would feature a wider product range.
- All major supermarkets range the Burgen® Soy-Lin™ variant.

Success of the product

- Australian Institute of Science and Technology (AIFST) awarded George Weston Foods the 1998 Food Industry Innovation Award for Burgen's development and launch.

- When Burgen®Soy-Lin™ was launched it generated unprecedented interest and by early April 1997 accounted for 5.3% volume share of the total bread market and 23.4% of the grain bread category (Jorgensen et al 1998).
- A 2% increase in the value of the total bread market was recorded suggesting increased bread consumption.
- At its launch, the concept behind the research and the resulting product, Burgen®Soy-Lin™, captured the imagination and interest of the general public, the medical profession and the media. Burgen®Soy-Lin™ received overwhelming acceptance for its organoleptic acceptability and ease of incorporation into the everyday diet.
- There was a significant demand from women looking for an alternative to, or something to complement, their hormone replacement therapy. According to Jorgensen et al (1998, p. 298), Burgen®Soy-Lin™ created its own category by fulfilling a need in the community to easily incorporate a (functional) food, which is high in phytoestrogens and omega 3 fatty acids, into the diet without requiring a substantial change in eating habits.
- Other main competitors, including Riga, as well as hot bread shops, have subsequently developed soy and linseed breads.
- Burgen® is a niche brand which appeals to a small section of the bread market. Due to its size and density it does not have mainstream appeal.
It is used as a health bread for its health benefits by a large number of women over 50 years.
- It appeals mainly to adults due to the ingredients used in each variety.
- Soy-Lin™ is generally eaten toasted for breakfast or as a snack.
- Current Volume Share of Market:
 - Burgen® dominates the heavy bread segment.
 - The Burgen® range currently holds 66% volume market share.
 - Major competitor is Vogels who have a similar product offering.

References

1. Wahlqvist M, Wilcox G, Burger HG, Medley G. Oestrogenic effects of plant foods in postmenopausal women. *British Medical Journal* 1990; 301: 905-6; 1990.
2. Dalais FS, Rice GE, Murkies AL, Bell RJ and Wahlqvist ML. Effects of dietary phytoestrogens in post menopausal women, *Climacteric* 1998; 1: 124-129.
3. Jorgensen K, Suter DAI, Thomson WK, Dalais F, Rice GE and Wahlqvist ML. Burgen®Soy-Lin™: development of an innovative functional staple food. *Food Australia*, 50 (6): 1998; 297-299.

Hyfibe White® (Tip Top® Bakeries)



Hyfibe White®, first launched in 1978 by Tip Top® Bakeries, a division of George Weston Foods Limited, was the first national fibre increased white bread brand on the Australian market. Hyfibe White® revolutionised the white bread market by creating a new segment of fibre enriched white bread.

Why was the product developed?

Hyfibe White® was developed to meet the demands of consumers who preferred the taste of white bread but were attracted to the health benefits offered by wholemeal bread. Consumers wanted a nutritious bread with the same fibre content as wholemeal and the taste of regular white bread. At that time, there were no fibre enriched white breads available in the market nationally.

How was the product produced?

Hyfibe White® was formulated to be a white bread, low in fat and high in carbohydrate, similar to other white breads. The point of difference was the increased fibre content of the bread.

The product development team at Tip Top® Bakeries researched the health and functional benefits of a variety of high-quality ingredients, including wheat bran and vegetable fibre to enrich the fibre content of Hyfibe White® bread. The researchers found that the vegetable fibre ingredients not only offered high fibre benefits but were selected for their white colour and for their ability to absorb water. These characteristics of the fibre resulted in a moist, soft eating, crumb texture and a white crumb colour. In this way, the product was able to achieve a texture and appearance of white bread with the fibre content of wholemeal bread.

The final product

Physical appearance

- HyfibeWhite® bread is a soft and smooth, tasty, sliced white bread with increased fibre. The loaf weight is 700 g, with 19 slices (17 + 2 crusts) per package.

Nutritional value

- High in dietary fibre (4.4 g per serve).
- Contains soy fibre, wheat fibre, wheat bran and inulin.
- Meets the National Heart Foundation criteria for sodium, fat, sugar and fibre.

Packaging

- Available in medium slice thickness (great for both sandwiches and toast)
- The health benefits from the ingredients in Hyfibe White(are listed on the front of the pack to reassure consumers.

Labelling

i. 1. Nutrition Information Panel

Number of Serves	9.5 (17 slices + 2 crusts)	
Serving Size	74 g (2 slices)	
	per serve	per 100g
Energy	787kJ	1064kJ
.	(184Cal)	(248Cal)
Protein	7.1 g	9.6 g
Fat	2.1 g	2.9 g
Carbohydrate - total	34.6 g	46.7 g
- sugars	1.8 g	2.4 g
Dietary Fibre	4.4 g	6.0 g
Cholesterol	Nil	Nil
Sodium	333 mg	450 mg
Potassium	96 mg	130 mg

ii. Made in Australia

iii. High in Fibre

- Hyfibe White® is high in dietary fibre. In fact, two slices of Hyfibe White® provides 15% of your recommended daily requirement.
- Hyfibe® is "DOUBLE THE FIBRE*" of regular white bread. (*NUTTAB 1995; 2.9 g of dietary fibre per 100 g)

iv. Energy Giving

Hyfibe White® is a great source of energy. Nutritionists have long known the importance of carbohydrate foods like Hyfibe White® to supply energy to active and busy people.

v. Digestive Balance

Hyfibe White® contains inulin, a type of natural dietary fibre, known as a pre-biotic. Recent nutritional research indicates that pre-biotics can provide fuel for "good" bacteria in the digestive tract for improved digestive balance.

vi. Cholesterol Free

Like most breads, Hyfibe White® contains no cholesterol and is low in fat. Hyfibe White® also has the Heart Foundation Tick and endorsement by the Australian Institute of Sport

vii. Ingredient List:

Wheat Flour, Water, Baker's Yeast, Vegetable Fibre (3%), Gluten, Salt, Vinegar, Wheat Bran (1.7%), Vegetable Oil, Sugar, Inulin (0.1%), Soy Flour, Emulsifiers (481, 472(e)), Preservative

(282), Vitamin (Thiamin).

Marketing

Target group

- The primary target market for Hyfibe White® is adults who love white bread and want the health benefits of increased fibre.

Positioning

- Hyfibe White® has a unique position in the market place as a white bread that is perceived to be great for energy and sport. Hyfibe White® was launched in Australia in the late 1970's. From 1984 to approximately 1997, it was promoted as the "Footy Bread", primarily through Australian Rules Football. In the mid 1990's this expanded to incorporate Rugby League in the northern states.

Branding

- The product was branded Tip Top® Hyfibe White® to communicate clearly to consumers the product's nutritional benefits; high in fibre.

Strategies

To create awareness of the product the following marketing support was used:

Promotions:

- Activities revolving around Hyfibe White®'s famous association with football.

Advertising:

- Television - 30 and 15 second TV commercials
- Outdoor - Tip Top® truck posters;

Internet Campaign:

- Banner advertising on high traffic flow search engines.
- Editorial pages on selected sites, such as Ninemsn's Good Medicine Site.
- Nutritional calculators and additional nutritional information were included in the Hyfibe White® section of the Tip Top® website.

Distribution of product

- Hyfibe White® has 100% distribution in supermarkets and corner stores throughout Australia.

Evaluation of product's success

- Hyfibe White® represents over 8% of George Weston Foods Limited bread sales and is an important brand in the Tip Top® Bread portfolio.
- Hyfibe White® has high loyalty and a strong brand image. Loyalty is an important measure of a brand's strength and potential. It is measured by the number of people who prefer Hyfibe White® over other brands and indicates that once it gets into the consumer's repertoire, it is more likely to be considered as a favourite brand of the household.
- Hyfibe White® has a strong brand image, which provides assurance to the future success

of the product. It is perceived by consumers to be a nutritious everyday bread for health and vitality. This is important for the success of Hyfibe White® as a mainstream bread, it must have everyday appeal.

Case Study Just Right® (Kellogg's®)



Just Right® is a breakfast cereal produced by Kellogg's® Australia in the early 1980s. It was one of the few breakfast cereal products to be developed and marketed for its health attributes at that time.

Why was the product developed?

Consumer research indicated the need for a tasty, low fat muesli-style breakfast cereal. Consumers wanted an alternative to toasted muesli because it was high in fat. Muesli was also perceived as being heavy. At that time, there was a limited range of tasty, wholegrain breakfast cereals available.



How was the product produced?

The Marketing department at Kellogg's® briefed the Product Development department on the specifications required for the new product which included:

- A muesli-like breakfast cereal
- Light in texture and flavour
- Low in fat
- Lower in salt and sugar than other breakfast cereals
- Tasty.

To maintain the crunchiness of toasted muesli, the flakes are sprayed with a light spray of sugar so that they stay crunchy in a bowl of milk. By coating the flake with sugar the product can also be made with less sugar, whilst maintaining the sweet flavour of regular flakes (because sugar on the surface of the flake tastes sweeter).

To provide the product with a different flavour, rye was added. Just Right® was the first breakfast cereal product to include puffed rye. The technology for puffing rye was developed as part of the product development process.

Kellogg's® pilot plant was used to make several formulations which were tested with consumers before production was scaled up. Pilot testing can involve several formulations and can take up to 18 months before the final product is produced.

The final product

Physical appearance

- A light, crunchy breakfast cereal made from whole wheat, rolled oats, puffed rye, sultanas and dried apricots.

Note - Due to quality issues with rye this ingredient has been replaced with triticale (a cross between wheat and rye).

This ingredient provides a similar flavour, texture and nutrition qualities as rye, but provides a bigger puffed grain.

Nutritional value

At that time, compared to other breakfast cereals, Just Right® was:

- Lower in fat than toasted and plain muesli.
- Lower in salt and sugar than most other breakfast cereals.
- High in dietary fibre.
- Contained added vitamins and minerals. Today, Just Right® contains added thiamin, riboflavin, niacin, folate and iron.

Packaging

- Just Right® was initially sold in 300 g and 500 g packages. It is now also available in 800 g packages.

All Kellogg's® packages include special liners to assure the shelf life of the breakfast for at least 12 months.

Labelling/nutrition claims

Australian food regulations require products making a "low salt" claim to contain less than 120 mg/100 g sodium. The salt content of Just Right® was decreased to meet this criterion in 1995/96. A serve of Just Right® provides 22 mg/100 g sodium.

All Kellogg's® products feature the "Kellogg's® Nutrition Guide" which summarises the key nutritional attributes of the product in terms of vitamin, mineral, protein, carbohydrate, cholesterol and sodium content.

Nutrition information on Just Right® packages includes a nutrition information panel and the following Nutrition Guide:

- Good source of 4 vitamins, including folate
- Good source of iron
- High in carbohydrates
- High in fibre
- Low in fat
- Low in salt
- No cholesterol
- No artificial flavours
- No artificial colours.

Marketing

Target market

- Females aged 20 to 35 years interested in nutrition, but also taste.

Positioning

- "Not too heavy, not too light".

Branding

- Earthy, bright colours (i.e. orange and yellow) were used, and continue to be used, in the packaging and advertising to communicate a healthy image.

Strategies

Comparative advertising communicated the "Not too heavy, not too light" positioning. Television commercials were mainly used as this was the primary medium of communication at the time.

Distribution of product

Just Right® was test marketed in NSW before being made available nationally in all supermarkets.

Evaluation of product's success

- Today, Just Right® features amongst the top 10 breakfast cereals sold in Australia. It is currently primarily consumed by the 35+ age group. Hence the initial target market continues to consume Just Right® .
- Two line extensions have been produced: Just Right Just Grains® (without dried fruit) and Just Right Fruit 'n Flakes® .

Case Study Quickpulse (Sanitarium)



Quickpulse, a range of pre-cooked pulse-based dishes, was one of the first pre-prepared pulse-based products available in Australia.

Quickpulse selects high quality, Australian-grown pulses which are cooked and packaged at low temperatures to preserve more nutrients. They are then vacuum-sealed in plastic packs to preserve freshness and require no refrigeration.



Why was the product developed?

- Several factors are contributing to an increasing awareness and use of pulses in the Australian diet:
 - A growing awareness of the health benefits associated with eating pulses.
 - Increasing number of health conscious Australians are choosing meat-free meals.
 - Vegetarianism is increasing, especially amongst young people.
 - Increased interest in pulses is also being driven by the multicultural composition of Australia's population.
- However, there are several factors constraining consumption including:
 - Lack of knowledge about how to cook pulses.
 - Many consumers are put off by the thought of the long preparation times that are traditionally associated with pulses.

Demand for a pre-prepared product which did not require pre-soaking of pulses, much cooking or meal preparation was therefore identified.

How was the product developed?

Peter and Terry Hogan set up a company in Sydney in 1989 to produce pulse-based products for the retail and food service markets. The company responded to consumer demand for a wide range of convenient, easy-to-prepare pulse products and pulse-based meal solutions. Recipes were developed with the help of BRI Australia's home economist. Today, Quickpulse is owned by The Sanitarium Health Food Company.

The technology used to manufacture Quickpulse is a thermal process technology, which has three objectives:

- Preservation - to prevent food spoilage and extend shelf life.
- Product safety - to protect the consumer's health, some microbes in foods can be harmful.
- Profitability - to be profitable (consumers will pay for the convenience of shelf life extension).

The thermal heat treatment must achieve commercial sterility, where there are virtually no health risks.

During production, an informal on-line taste panel is used. Three people taste the product to see if it is typical. If there is a concern with the taste, the Quality Assurance Department will test the product against a standard sample. If the product is then deemed unacceptable, the batch will be rejected.

The quality of the product is tested for the following:

- **Weight range** - pack should be filled so that nett weight is 455 g + 5 g.
- **Air gap** - should not exceed 2% of pouch volume.
- **Seal integrity** - should be checked at half-hour intervals, by visual inspection and pressure testing.
- **Labelling** - labels should be applied on the centre of the front and back panel, with an additional use-by sticker dated 12 months in advance of pack date applied to back label.
- **Product colour**, flavour, pack finish, pouch seal, coding and label application - should be assessed to ensure they are within specified limits.

The final product

Physical appearance

- **Chickpeas and lentils** - pre-cooked chickpeas and lentils, packed to commercial sterility, ready to use on their own or in cooking, packed in clear plastic pouches.
- **Chickpea & Curry** - pre-cooked chickpeas in a milk curry sauce, packed to commercial sterility, which is ready to consume.
- **Lentil Pasta Sauce** - pre-cooked brown lentils in a tomato sauce, packed to commercial sterility, which is ready to consume.

Nutritional value of Quickpulse compared to alternative or similar products

per 100 g	Canned Chickpeas	Quickpulse Chickpeas	Boiled Lentils	Quickpulse Chickpea & Curry	Quickpulse Lentil Pasta Sauce
Kilojoules (kJ)	408	430	294	280	160
Protein (g)	6.3	8.4	6.8	1.6	1.9
Fat (g)	2.1	1.9	0.4	2.6	0.2
Carbohydrate -Total (g)	13.1	13	9.5	9	7
- Sugars (g)	0.6	1.7	0.5	3.9	3
Sodium (mg)	250	<5	8	285	275
Potassium (mg)	140	424	220	490	390

- Quickpulse Chickpeas and lentils are similar to canned chickpeas and lentils, as well as those prepared from dried beans. However, unlike canned chickpeas and lentils, the Quickpulse products are low in salt, as no salt (or other ingredients) is used in their preparation.
- As alternatives to meat sauces, the Chickpea & Curry and Lentil Pasta Sauce provide more fibre, less saturated fat and no cholesterol. They are also both low in fat.
- Lentils and chickpeas, like all other legumes are sources of protein, fibre, vitamins,

minerals and natural phytochemicals. In addition, legumes have a low glycaemic index.

Packaging and Labelling

- Packaging involves a four-layer bag, three plastic layers, one foil layer.
- Pre-printed gusseted pouches are used (6 pouches per case).
- Use-by date - 12 months from date of production.
- Labelling contains an ingredient list and nutrition information panel.
- Serving directions, serving suggestions and nutrition claims are also shown.
- Product is shelf stable for its specified shelf life, however, it should be refrigerated after opening and consumed within two days.

Marketing

Quickpulse products are targeted to people who want to include more pulses in their diet (for health or cultural reasons), but who also want the convenience of not having to pre-prepare pulses. The branding Quickpulse conveys this positioning.

Consumers require simple recipes and meal ideas to show them how to use pulses in meal preparation as well as tips for quickly and easily preparing and cooking pulses.

Distribution

The Quickpulse range is located in the health food section of major supermarkets throughout Australia. These products are also used extensively by the food service industry as meal components and supplied to small but growing export markets.

Evaluation of product's success

In 1999, Peter and Terry Hogan were awarded the National Legume Award for Excellence from CLIMA, the national research centre for pulses in WA.

In the first three years, turnover of Quickpulse doubled each year.

In 2000, wet seed beans had a grocery value of \$21.2 million (+2% on the previous year). The market for pulses in sauce is therefore young and relatively underdeveloped.