BARLEYmax™

Better Nutrition Report

BARLEYmax™

This report is brought to you by The Healthy Grain

***BARLEY**max*™ *is a trademark of The Healthy Grain Pty. Ltd.*

The Healthy Grain provides Food Brand Owner customers and their markets around the world with unique, natural, nutritionally superior patentable wholegrains that enhance health and wellbeing.

AUSTRALIA'S CHRONIC DISEASE IMPERATIVE

The rise in lifestyle-related chronic diseases in Australia highlights the need for practical diet and lifestyle answers that can help lift the burden of chronic disease impacting so heavily on our nation. Consider the following taken from the 2014-15 National Health Survey[1]:

- *Over 11 million (63%) of adult Australians are considered overweight or obese*
- *Type 2 diabetes prevalence continues to rise with now over 1 million Australians with this condition*
- *Over 4 million adults have high blood pressure*
- *Obesity, heart disease, stroke, type 2 diabetes and cancer are the leading causes of preventable death.*

Despite the significance of the challenge, dietary change is a key weapon in the fight against chronic disease. There is good evidence that rebalancing the intake of particular foods can reduce chronic disease risk and improve health and well-being. In essence, Australians need to make 'simple yet effective' dietary changes to reduce chronic disease in this country.

Why simple changes? To enhance the prospects of the change being sustained in the long term. Of course, any change needs to be effective with good scientific evidence showing improved health outcomes.

Replacing refined grains with eating more wholegrains, like barley, is a good example of a simple change to make. Increased wholegrain intake is associated with a lower risk of certain cancers, heart disease, diabetes, stroke and may even help with weight control. While barley is perhaps less well known than other wholegrains, its health advantages are significant.

AN EVEN BETTER WHOLEGRAIN? THE CSIRO CHALLENGE

The benefits of wholegrains are well known but CSIRO scientists could see there was room for improvement and the potential existed to enhance the nutritional potency of wholegrains, like barley.

So began an intensive, multifaceted program of scientific investigation within CSIRO that culminated in the development of ***BARLEY****max*™*, a high fibre wholegrain with the potential to amplify the nutritional benefits of wholegrains.*

"Barley is an underutilised healthy cereal grain. We set out to enhance the nutritional attributes even further, especially to enrich the main forms of fibre important for promoting digestive health. The barley that is most commonly grown has a husk covering the grain and is used for the malt and beer market. We developed BARLEYmax™ as a naked grain because it is ideal for incorporation into foods as a wholegrain."

Dr Zhongyi Li,
Principal Research Scientist, CSIRO

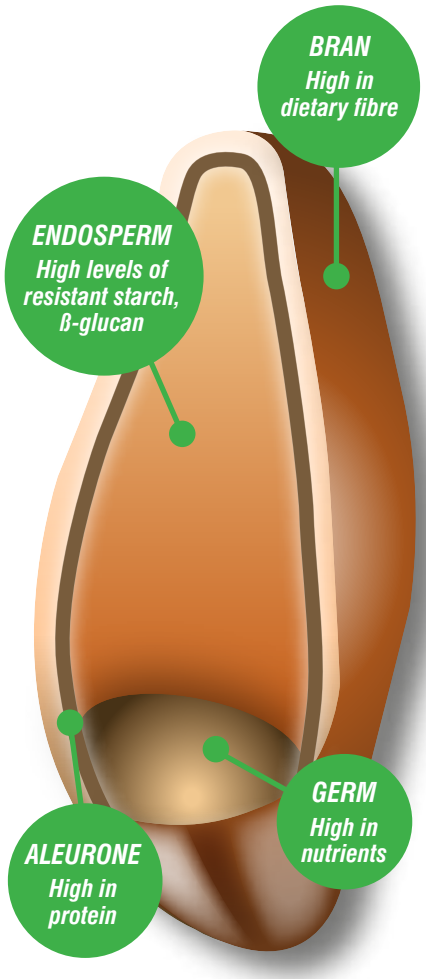
THE BARLEY*max*™ STORY

CSIRO has a long history of interest in barley as a grain with human health benefits. In the late 1990s, CSIRO researchers developed a collection of new non-GM barley grains and assessed them for their potential to improve health by delivering high levels of resistant starch and other dietary fibre components.

Many of the grains of interest had their origins in the Tibetan plateau, one of the few regions of the world where barley has been used as a staple food for thousands of years. One line stood out with unique fibre characteristics and this was used to breed ***BARLEY****max*.™ *CSIRO was then able to call on the expertise of its nutritional scientists to undertake rigorous studies to substantiate the predicted health attributes of* ***BARLEY****max*.™

Through an extensive program of experimental studies, including a number of human trials, it was shown that a range of foods produced with ***BARLEY****max*™ *ingredients as their key ingredient, had a low glycemic index and glycemic load and also produced positive changes in a range of biomarkers of bowel health. Determined to bring the health benefits to as many people as possible, CSIRO formed a Joint Venture with Australian Capital Ventures Ltd to breed new* ***BARLEY****max*™ *varieties and began working with food manufacturers to create products containing* ***BARLEY****max*™ *for consumers. That joint venture became The Healthy Grain company in 2014. In December 2016, the Teijin Group of Japan became the third major shareholder in The Healthy Grain. A range of products have been developed including breakfast cereals, wraps, breads, porridges and muesli bars. New ranges have been launched in Japan in 2016 and the US in 2017.*

BARLEYmax™ IS A NUTRITIOUS WHOLEGRAIN



BARLEYmax™ GRAIN

Wholegrains have been part of the human diet for thousands of years. And there are good reasons why they feature in dietary guidelines around the world. Regular consumption of wholegrain foods has been associated with better health and a reduction in chronic disease risk.

***BARLEY**max™ is a wholegrain cereal of the type health authorities recommend we consume each day.*

What is a wholegrain?

Wholegrains retain all three components of the natural grain, including the bran, germ and endosperm. When grains are refined, one or more of these parts are removed.

The health power of wholegrains

Eating wholegrain foods are associated with:

- ***Lower heart disease and stroke risk***
- ***Lowering the risk of type 2 diabetes***
- ***Reducing the risk for certain cancers***
- ***Lower cholesterol and blood pressure***

Eating wholegrain foods may also:

- ***Assist with weight control***
- ***Improve bowel health and regularity***
- ***Provide important nutrients like fibre, folate, vitamin E, magnesium, B vitamins, zinc and antioxidant phytochemicals.***

The health benefits of wholegrains

Almost daily a new superfood or ingredient is promoted as the answer to our chronic disease problems. All too often these claims are based upon inadequate research leaving the public confused as to which foods are likely to deliver meaningful health benefits.

In contrast, the population studies linking regular wholegrain consumption to better health and well-being are impressive and consistent. Good quality research published in credible journals by reputable scientists reflects the value of wholegrains in addressing some of the most pressing chronic disease issues.

Just how good wholegrains are for us was unveiled in a recent major scientific review looking at diet and chronic disease.[2] Covering decades of research and hundreds of studies, the review found that plant foods, especially wholegrain foods, were linked to a lower risk of type 2 diabetes, overweight and obesity, cancer and cardiovascular disease.

Did you know?

Increasing wholegrains to four serves a day may reduce the risk of heart disease by as much as 40% – more than double that of cholesterol lowering margarines.[10]

Heart disease and stroke

A 2016 systematic review and meta-analysis found that three extra servings of wholegrains per day was linked to a lower risk of heart disease by 22%.[3]

Type 2 diabetes

A review of 16 studies concluded that eating three servings of wholegrains daily could lower the risk of type 2 diabetes by almost a third.[4]

Cholesterol and blood pressure

Wholegrains containing soluble fibre, such as barley, have the capacity to help reduce LDL cholesterol levels.[5]

The increased intake of wholegrains has also been linked to lower blood pressure.[6]

Bowel health

The fibre found in wholegrains helps to improve digestive health and regularity.[7]

Body weight

A review of 15 studies found that eating three servings of wholegrains daily is linked to a lower body weight and less belly fat.[8] Dietary fibre's ability to increase satiety and therefore decrease subsequent hunger, along with altering the secretion of hormones related to food digestion, are likely mechanisms.[9]

The potency of wholegrains

Wholegrain foods offer even greater protection than other foods commonly promoted for heart health. Increasing fruit and vegetable intake can reduce the risk of heart disease by 10-15% while increasing wholegrains to four serves a day can reduce heart disease risk by up to 40%.[10]

WHAT MAKES WHOLEGRAINS SO HEALTHY?

Wholegrains naturally contain hundreds of antioxidants and phytonutrients plus vitamins, fibre, protein and minerals all working together to deliver real benefits to those who include them regularly in their diet.

Once a grain is refined, there can be considerable loss of nutrients, so it is best to ensure at least half of your grain servings each day are wholegrain.

Did you know?

Compared to its refined counterpart, wholegrain wheat contains:

- ***75% more fibre***
- ***60% more iron and thiamine***
- ***80% more folate[11]***

How many wholegrains do you need?

The Australian Guide to Healthy Eating recommends adults eat around 4-6 serves of cereal foods daily, most of which should be wholegrain.[12]

Research has shown that Australian adults are eating just 21 grams of wholegrains each day.[13]
This is less than half the recommended target of 48 grams per day.
***BARLEY**max*™ *is a wholegrain cereal of the type that health authorities recommend we consume each day.*

Wholegrains for breakfast?

Wholegrain foods can be consumed at any time throughout the day. However, breakfast provides a great opportunity to make a wholegrain start to the day and research shows that this can have a significant impact on health.

In a large study to examine the effect of wholegrain breakfast cereals on the risk of cardiovascular disease, researchers examined the intakes of breakfast cereals reported by over 92,000 male physicians in the US.[14]

They found that over the five years of the study, men who consumed one or more servings of wholegrain breakfast cereals per day had a 20% lower risk of cardiovascular disease compared to men who rarely consumed wholegrain breakfast cereals.

THE BENEFITS OF FIBRE IN BARLEYmax™ WHOLEGRAIN

BARLEYmax™ Fact

Adding BARLEYmax™ to a diet based on refined cereal foods more than doubled the total fibre content of the diet.[15]

BARLEYmax™ *has greater quantities of fibre compared to other wholegrains and delivers more of all three important fibre types: soluble fibre, insoluble fibre and resistant starch. In fact,* ***BARLEYmax™*** *is the highest fibre wholegrain with resistant starch and represents a significant source of this beneficial type of fibre in the diet. Outside of the broader role of fibre, research is now turning to the role that specific types of fibre, like resistant starch, called prebiotics, can have on health. Prebiotics are fermented by the gut microbiota and alter the colonic microflora balance towards a healthier composition.*

"The evidence suggests that the three main types of fibre, soluble, insoluble and resistant starch, offer a range of important health benefits and so we should aim to consume a combination of different types of fibre daily".

Dr Tony Bird, Principal Research Scientist, CSIRO.

How much fibre do you need each day?

Australia's peak health authority, the National Health and Medical Research Council (NHMRC) in its Nutrient Reference Values report[16] developed a set of Adequate Intake figures for dietary fibre that are designed for general good health (see table below).

Importantly, the NHMRC's Nutrient Reference Values report also highlighted the important role fibre plays in reducing the risk of a range of lifestyle conditions.

"Increasing dietary fibre intakes have been linked to lower rates of obesity, cardiovascular disease, diabetes and certain cancers."[16]

NHRMC Adequate Intakes for Dietary Fibre

Males	Adequate Intake (g/day)	Females	Adequate Intake (g/day)
1-3 years	14	1-3 years	14
4-8 years	18	4-8 years	18
9-13 years	24	9-13 years	20
14-18 years	28	14-18 years	22
19+ years	30	19+ years	25
-	-	Pregnancy	25-28
-	-	Breastfeeding	27-30

Suggested Dietary Target to reduce disease risk.
Women 28g per day, Men 38g per day.

Source NHRMC

BARLEYmax™ CONTAINS PREBIOTICS

There are many different types of dietary fibres with different physical and physiological properties. ***BARLEY****max*™ *has a large number of different fibres, both insoluble and soluble and amongst the soluble fibres are several with demonstrated prebiotic properties.*

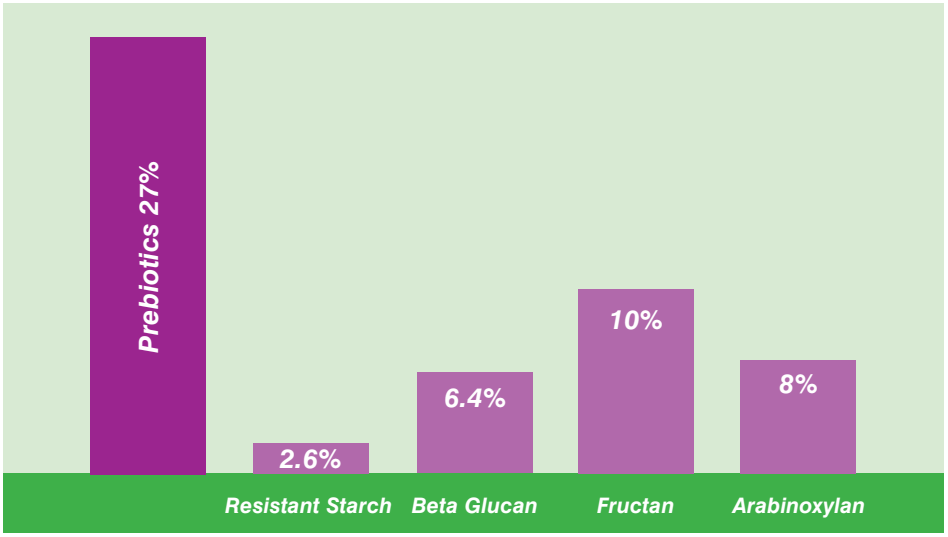
Prebiotics act as a fuel to enhance the growth or activity of beneficial bacteria in our digestive system such as Bifidobacteria and Lactobacillus to improve health.[17] *Other benefits of prebiotics include improvement in gut barrier function and host immunity, and a reduction of potentially pathogenic bacteria subpopulations.*[18]

The most well-researched prebiotics include fructans, arabinoxylans, the soluble fibre beta-glucan and resistant starch.[18,19] ***BARLEY****max*™ *contains high levels of all of these prebiotics.*

Is BARLEYmax™ suitable for people on a low-FODMAP diet?

FODMAPs are carbohydrates that are not fully digested in our bodies. For some people, FODMAPs are considered a trigger for irritable bowel syndrome (IBS). A low-FODMAP diet is now an accepted approach to trial under the guidance of a dietitian to help manage IBS. Many of the health benefits attributed to BARLEYmax™ are from its high prebiotic content, which includes some of the FODMAP carbohydrates such as fructans. For someone on a low-FODMAP diet, it is recommended to limit foods high in FODMAPs during the initial trial phase period and then to slowly reintroduce such foods as tolerance improves during the second phase of the diet when the diet is liberalised.

Prebiotics in BARLEYmax™



BARLEY*max*™ *wholegrain is a natural product, as such there will be year to year variation in its nutritional levels.*

The benefits of butyrate

Butyrate is a crucial metabolite in the human colon, as it is the preferred energy source for colon cells, contributes to the maintenance of gut barrier function, and has immunomodulatory and anti-inflammatory properties.

Fructans are polymers of fructose and are the naturally occurring storage carbohydrates in many plants. Fructans with a shorter chain length are termed fructo-oligosaccharides (FOS) while inulin is a fructan with mostly longer chain lengths. Arabinoxylans are one of the main components of the cell wall of cereal grains and a major source of fibre in the diet.

Fermentation of prebiotics by colonic bacteria gives rise to the production of short-chain fatty acids (SCFA) such as acetate, propionate, butyrate and lactate. The presence of SCFA in the intestines contributes to a lower pH, a better bio-availability of calcium and magnesium, and inhibition of potentially harmful bacteria.[20]

Although there is still much investigation required to develop our understanding in this field, the potential to capture the benefits of prebiotics in relation to measurable health outcomes is promising. The evidence for health benefits of ***BARLEY****max*™ *is positive in regards to its prebiotic potential.*[21]

Prebiotics work together

Food is more than the sum of its individual ingredients, so when it comes to prebiotics, a wholefood approach acknowledges the diversity of prebiotic substances found in food that may act synergistically. Bacteria possess carbohydrate-binding modules and an extensive set of enzymes that allow for the digestion of a wide variety of fibres.[18]

Having a variety of dietary soluble and insoluble fibres such as cellulose, hemicelluloses, pectins, fructans, beta-glucan and resistant starch is more supportive of a varied gastro-intestinal microbial community compared to a diet that has a less diverse prebiotic mix.

The benefit of prebiotics acting together in a high-fibre food was seen in a randomised-controlled trial using ***BARLEY****max*™ *given to 17 healthy adults for 4 weeks. Compared to whole-wheat or refined cereals foods, consuming* ***BARLEY****max*™ *resulted in higher fecal weight, a lower faecal pH, and greater production of beneficial short-chain fatty acids (SCFA) including butyrate.*[15]

BARLEYmax™ CONTAINS RESISTANT STARCH

Did you know?

Resistant starch produces more than twice the amount of butyrate than wheat fibre.[26]

Most starches are digested and absorbed into the body through the small intestine, but some starches resist digestive attack by the enzymes present and pass through to the large intestine where they act as dietary fibre and improve digestive health. This type of starch is called 'resistant starch'.

Why is resistant starch so important?

When resistant starch reaches the bowel, like other prebiotics, it is fermented by the bacteria present and generates a range of beneficial changes. These can impact our digestive and metabolic health in a number of ways, including:

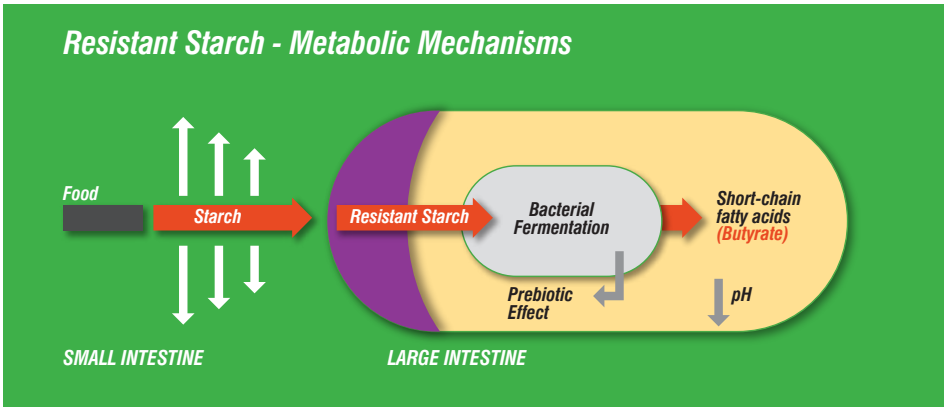
- *Beneficially increasing stool bulk giving a mild laxative effect which promotes 'regularity'[22]*
- *Encouraging the growth of healthy bacteria in the bowel – the 'prebiotic effect'[23]*
- *Producing SCFA (in particular butyrate) which promote intestinal health[24]*
- *Maintaining healthy blood sugar by increasing the body's sensitivity to insulin.[23,25]*

How much resistant starch do you need?

CSIRO has recommended that intakes of resistant starch should be more than 20 grams per day, which is almost four times greater than a typical western diet currently provides.[27]

An estimate of resistant starch intake for Australian adults derived from the most recent National Nutrition Survey, suggested the range of intake to be from 3-9 grams per day with adult men consuming more resistant starch than women.[28]

As the suggested intakes for resistant starch are significantly higher than current consumption, there is considerable scope to increase resistant starch consumption across the population.



Fibre and bowel cancer – the African paradox

Despite the adoption of 'Westernised diets' by indigenous South Africans, leading to much lower dietary fibre intakes than most Western populations, colon cancer rates remain low in the urban black South African population.[29]

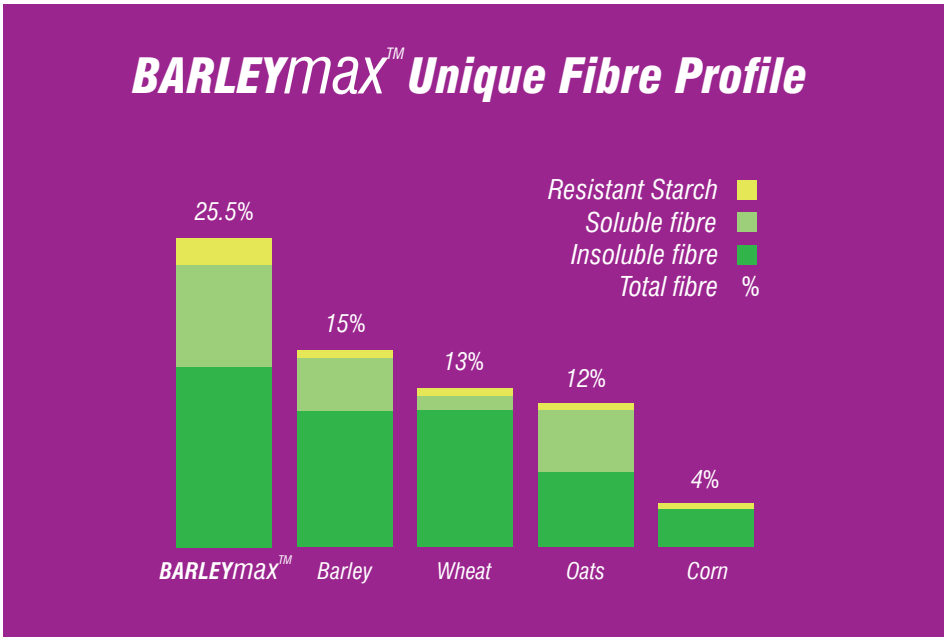
This surprising result may be due to the regular consumption of cold maize porridge by this group. When this porridge is consumed cold, as it often is, the porridge is rich in resistant starch, formed when the porridge cools.

Prebiotics and mental health

Our gut does more than help us digest food – it can also affect our mental health. New developments in a rapidly emerging field of research shows that the gut has a two-way communication link with the central nervous system – and we call this the gut-brain axis. Eating a mixture of different foods with different types of prebiotics in them can influence which bacteria are most active in the gastrointestinal tract. These bacteria in turn produce a range of different substances, some of which are linked to lowering stress and anxiety.

Recent research in mice fed several prebiotic ingredients including fructo-oligosaccharide (FOS) found measurable improvements in anxiety, cognition and stress-related behaviours when exposed to stressful conditions.[30] Prebiotic-fed mice also had lower levels of stress-induced hormones and immune factors.

Having the right mix of prebiotics in the diet may be one way to support our mental health. Foods high in prebiotics like ***BARLEY****max*™ *are the types of food that are already recommended for us to be eating lots more of for overall health so improved mental health may be another benefit to add to the list.*



BARLEY*max*™ *wholegrain is a natural product and there will be year to year variation in its nutritional levels.*

BARLEYmax™ CONTAINS SOLUBLE FIBRE

BARLEYmax™ Fact

BARLEYmax™ contains high levels of beta glucan – a type of soluble fibre.[35]

What is soluble fibre?

As the name suggests, soluble fibres are those forms of dietary fibre that are soluble in water. This includes pectins, gums and mucilages, which are found mainly in plant foods. Soluble fibre dissolves in water forming viscous gels and is easily fermented by the microflora of the large intestine. Good sources of soluble fibre include fruits, vegetables, barley, seed husks, flaxseed, dried beans, lentils and peas.

Why do you need soluble fibre?

According to the National Heart Foundation, there is good evidence to show that soluble fibre can lower LDL cholesterol levels and can therefore reduce heart disease risk.[31] The presence of soluble dietary fibre in carbohydrate foods also influences the glycaemic response after a meal. Plus, soluble fibre can help with keeping you regular.

How does soluble fibre lower cholesterol?

During the digestive process, the soluble beta-glucan fibre blocks the re-absorption of cholesterol back into the body so that more of this cholesterol is lost naturally from the body. Barley, especially ***BARLEY****max*™*, is high in beta-glucan. A recent systematic review and meta-analysis of barley beta-glucan and cardiovascular disease risk found that barley beta-glucan lowers the more harmful LDL-cholesterol.[32]*

A review of the ability for barley to lower blood cholesterol stated:

"Health practitioners should feel comfortable recommending barley beta glucan to their patients to help reduce total cholesterol and LDL cholesterol concentrations…" [33]

How does soluble fibre lower post-prandial glucose?

Barley and oat beta-glucans are very high molecular weight polysaccharides that exhibit high viscosities. This high viscosity increases the viscosity of the meal bolus in the stomach which reduces mixing of the food with digestive enzymes and delays gastric emptying. Increased viscosity also retards the absorption of glucose. This makes beta-glucan effective in lowering the post-prandial glucose response to a meal.[34]

BARLEYmax™ IS A RICH SOURCE OF INSOLUBLE FIBRE

Did you know?

Colorectal cancer is the second most common cancer in both Australian men and women.[38]

Why do you need insoluble fibre?

Insoluble fibre is largely responsible for keeping things moving, adding bulk and helping to maintain normal functioning of the bowel. In many high fibre foods, the insoluble fibre component is the predominant form and large population studies have shown that high fibre diets can protect against conditions such as colon cancer.[36]

Bigger Is better!

When it comes to the size of stools, the idea that 'bigger is better' really does apply. Compared to a diet containing refined cereal products, those subjects consuming foods made with BARLEYmax™ had a 33% increase in stool size.[15] Bigger really is better!

The link between fibre and colorectal cancer

There is growing recognition of the important connection between diet and bacterial metabolism in the colon and specifically how the interaction can impact on important diseases like colorectal cancer.

The World Cancer Research Fund (WCRF) in their most recent Continuous Update Project report from 2017 on the role of diet and physical activity in the prevention of colorectal cancer,[36] state:

"There is strong evidence that consuming foods containing dietary fibre decreases the risk of colorectal cancer."

The WCRF outlined possible mechanisms to explain the link between dietary fibre and colorectal cancer. Fibre is fermented within the bowel, forming short-chain fatty acids, such as butyrate which has known anti-proliferative effects. Other mechanisms by which greater dietary fibre intake may lower colorectal cancer risk include the reduction of intestinal transit time and increased faecal bulk, which would lessen the potential for faecal mutagens to interact with the colon mucosa, and a reduction of secondary bile acid production. High-fibre diets may also reduce insulin resistance, which is a risk factor for colorectal cancer.[37]

BARLEYmax™ HAS A LOW GLYCEMIC LOAD

BARLEYmax™ Fact

Compared to a breakfast cereal made with standard barley, breakfast cereal containing BARLEYmax™ produced a significantly lower rise in blood insulin levels.[38]

While many of us are familiar with the Glycemic Index or the GI, the concept of Glycemic Load (GL) is not so well known even though GI and GL are closely related.

The GI relates to the release of glucose into the bloodstream of a 50-gram portion of carbohydrate food compared to an equal portion of glucose. On the other hand, the Glycemic Load (GL) considers the impact on the blood glucose levels of the entire food – as eaten in a normal serving. As such, some health professionals prefer GL as it is reflective of normal eating patterns as opposed to the 50-gram portions used in the laboratory to determine GI.[39]

The GL is determined by multiplying the GI value of the food in question by the amount of available carbohydrate in a standard serving of that food and dividing by 100.

For both GI and GL, the lower the figure the better as this reflects a slower release of glucose into the bloodstream.

Why is controlling glycemic response important?

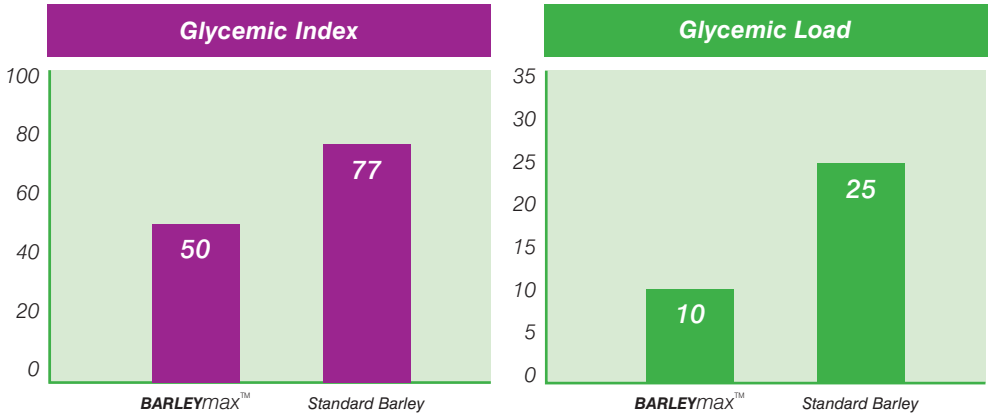
Type 2 diabetes is a significant chronic condition in Australia, and like many other industrialised nations, the prevalence of the condition is increasing. Improving the diet is recognised as central to both the management as well as the prevention of Type 2 diabetes. Moderating the glucose response to foods is acknowledged as a viable dietary strategy in this regard.[39]

*In a clinical trial with healthy volunteers, **BARLEY**max™ as part of a breakfast cereal was shown to give a lower glucose and insulin response compared to a breakfast cereal made with standard barley.[40] Lower levels of insulin in the bloodstream are considered beneficial to reduce the risk of insulin resistance and diabetes.[41]*

*The CSIRO research team investigating the impact of **BARLEY**max™ on blood glucose and insulin considered this new ingredient…*

"…may be of value in foods designed to assist in the prevention and management of diabetes"[40]

The GI and GL of BARLEYmax™ and standard breakfast cereal



Did you know?

At just 35 grams of carbohydrate per 100 grams, BARLEYmax™ has around half the available carbohydrate content of other popular grains such as wheat, oats and brown rice.

Low-carbohydrate diets have gained popularity in recent times, and for many people they find such an approach an effective way to control body weight and even to manage diabetes. Looking at the evidence, low-carbohydrates can be an effective way for reducing body weight and perform on par with traditional dieting approaches over a time frame of a year or greater.[42]

***BARLEYmax™** is much lower in available carbohydrate (starch) than other wholegrain cereals, making it an ideal choice for people who wish to consume less carbohydrates in their diet, but still gain all of the health benefits that wholegrain foods can provide.*

For people with diabetes, recent research from the CSIRO has found that a low-carbohydrate diet can be an effective way to manage blood sugar.[43] *Over 24 weeks, people following a low-carbohydrate diet saw similar improvements in glycemic control as people on an energy matched high carbohydrate diet.*

In their most recent nutrition therapy recommendations for diabetes, the American Diabetes Association removed any set level of recommendation for carbohydrate intake for people with diabetes.[44] *Instead they acknowledged that dietary advice should be based on individualised assessment of current eating patterns, preferences, and metabolic goals.*

BARLEYmax™ CONTAINS POWERFUL ANTIOXIDANTS

Antioxidants are found in many foods and may prevent some of the damage caused by free radicals by neutralising them. Free radicals are highly reactive, unstable compounds produced naturally within the body as well as being derived from external sources such as cigarette smoke, environmental pollutants and ultraviolet light.

An excess of free radicals can damage all types of cells in the body including our DNA. It has been estimated that there are 10,000 oxidative 'hits' to our DNA per cell per day.[45] Antioxidants scavenge free radicals from the body's cells, and can help prevent or reduce the damage caused by oxidation. Some of the key nutrient antioxidants include vitamins A, C and E, and the minerals copper, zinc and selenium.

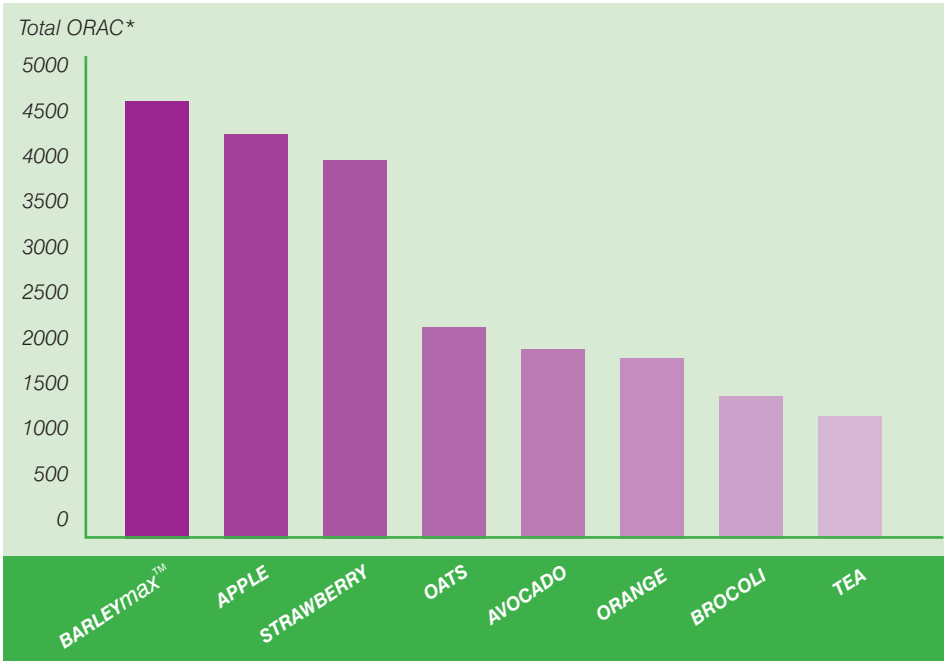
Wholegrains, which includes ***BARLEY****max*™ *are an important source of antioxidants and have been found to have a higher antioxidant content than many fruits and vegetables.[46] Dietary antioxidants along with nutritional attributes like fibre may be part of the reason wholegrains have been linked to disease risk reduction. Indeed, there may be synergistic actions between various wholegrain components that combine to improve health outcomes.[46]*

"Antioxidant activity is one of several factors responsible for the observed efficacy of wholegrains in the daily diet to reduce chronic disease".[46]

BARLEYmax™ Fact

BARLEYmax™ is a richer source of antioxidants than apples and strawberries, has twice the antioxidants of oats, three times the level of broccoli and four times that of tea.

Total Antioxidant Capacity



**Total ORAC Values = sum of hydrophilic - ORAC (H-ORAC) and lipophilic - ORAC (L - ORAC) reported in µmol of Trolox Equivalents per 100 grams. Source for other foods: US Department of Agriculture, Oxygen Radical Absorbance Capacity of Selected Foods, November 2007: BARLEYmax measured by CSIRO.*
The benefits of higher ORAC scores in humans needs more research.

VITAMIN E

BARLEYmax™ Fact

BARLEYmax™ has more than twice the level of total vitamin E (all forms) than standard barley*

*CSIRO laboratory measures 2009.

Vitamin E is the collective name for a group of fat-soluble compounds with distinctive antioxidant activities. Naturally occurring vitamin E exists in eight chemical forms (alpha-, beta-, gamma-, and delta-tocopherol and alpha-, beta-, gamma-, and delta-to-cotrienol).[47] The major role of vitamin E is to protect polyunsaturated fatty acids (especially those in cell membranes), from oxidation.

Higher intakes of vitamin E have been promoted as a means of helping to reduce chronic disease risk in Australia with recommended dietary intakes of 10 mg for men and 7 mg for women.[16] Relative to standard barley, ***BARLEY****max™ provides more than twice the total for all forms of vitamin E.*

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