The BARLEYmax
Better Nutrition Report

W A Y S  T O  B E T T E R  N U T R I T I O N

- Is a Nutritious Wholegrain
- Contains Resistant Starch
- Delivers Soluble Fibre
- Has a Low Glycemic Load
- Is a Rich Source of Insoluble Fibre
- Provides Powerful Antioxidants
- Offers Prebiotic Properties
- Includes Healthy Fats

For Health Professional Use
AUSTRALIA’S CHRONIC DISEASE IMPERATIVE

The cold hard facts of chronic diseases in Australia highlight the need for practical, effective diet and lifestyle solutions that can help lift the burden of chronic disease impacting so heavily on our Nation. Consider the following*:

- Type 2 diabetes prevalence has doubled in the last twenty years
- 2.5 million Australian adults are obese
- An additional 4.9 million Australians are overweight
- Obesity, heart disease, stroke, type 2 diabetes and cancer are the leading causes of preventable death
- Obesity alone cost Australian society and governments over $58 billion in 2008

Facts such as these have prompted the Public Health Association of Australia to conclude:

“…Australia is facing a chronic disease crisis”

Despite the significance of the challenge, dietary change is a key weapon in the fight against chronic disease. There is clear evidence that increasing 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.

Eating more wholegrains, like barley, is a good example.

Increased wholegrain intake has been shown to reduce the risk of certain cancers, heart disease, diabetes, stroke and even help with weight control.

While barley is perhaps less well known than other wholegrains, its health advantages are significant. In fact, foods containing a certain amount of barley soluble fibre can make a specific health claim in the USA.

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 BARLEYmax, a high fibre wholegrain with the potential to amplify the nutritional benefits of wholegrains.

“Our initial aim with BARLEYmax was to enhance the nutritional qualities of standard barley. Once this was achieved, it was important to make the improved grain available to the consumer via the food industry so all Australians could benefit from CSIRO’s breakthrough.”

Dr Bruce Lee, Director of the CSIRO Food Futures National Research Flagship

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.

From this quest one particular gem emerged – a new type of barley grain that went on to become BARLEYmax.

CSIRO brought together scientists from its Plant Industry and Food and Nutritional Sciences divisions to work on understanding and substantiating the health attributes of BARLEYmax, under the CSIRO Food Futures National Research Flagship.

Through an extensive program of experimental studies, including a number of human trials, it was shown that a range of foods produced with BARLEYmax as their key ingredient had a low glycemic index and also produced positive changes in a range of biomarkers of bowel health.

Given these successful results, CSIRO formed a Joint Venture with Australian Capital Ventures Ltd to breed new BARLEYmax varieties and begin working with food manufacturers to create products containing BARLEYmax for consumers. The joint venture has licensed Austgrains Pty Ltd to manage the production and supply of BARLEYmax grain to Australian food manufacturers.

This Food Futures Flagship development program demonstrated that BARLEYmax not only enhances the positive nutritional attributes of a range of consumer foods, it improves texture and enhances flavour with a pleasant ‘nutty’ taste that sets it apart from other barley grains.

The BARLEYmax Story

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1. Is a Nutritious Wholegrain

BARLEYmax is a Nutritious Wholegrain
There is enormous interest in wholegrains because their regular consumption has been associated with better health and vitality and a reduction in chronic disease risk (see below). BARLEYmax 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
Wholegrains have been shown to:
- Protect against heart disease and stroke
- Assist with weight control
- Reduce the risk of Type 2 diabetes
- Improve bowel health and regularity
- Lower cholesterol and blood pressure
- Protect against certain cancers
- Provide important nutrients like fibre, folate, vitamin E, magnesium, B vitamins, zinc and antioxidants

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.
WHAT MAKES WHOLEGRAINS SO HEALTHY?
Wholegrains are naturally rich in a number of important nutrients that work together to improve health outcomes. Nutrients like:

- **Protein**
  - For cell growth and repair
- **Fibre**
  - For good digestive health
- **Vitamins**
  - Both B group as well as vitamin E
- **Minerals**
  - Calcium, zinc, magnesium and iron
- **Antioxidants**
  - May reduce the impact of damaging compounds such as free radicals.

NOT ALL WHOLEGRAINS ARE EQUAL
BARLEYmax has superior quantities of fibre compared to other wholegrains and delivers much 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.

HOW MANY WHOLEGRAINS DO YOU NEED?
The current dietary guidelines recommend we should eat at least four serves of grain-based foods everyday.11 At least half of these serves should be wholegrains.1

This works out to be 48 grams of wholegrain per day.14

Research has shown that only 34% of Australian men and 21% of women meet the recommended number of wholegrain servings each day.15

WHOLEGRAINS – A NUTRITIONAL POWERHOUSE!
Wholegrains naturally contain literally hundreds of antioxidants, 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 advisable to ensure at least half of your grain servings each day are wholegrain.

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 study17 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.

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 intake of wholegrain foods clearly protects against heart disease and stroke.”

“Carbohydrate-rich foods should be wholegrain.”

Ingrid Flight and Peter Clifton, CSIRO18

DID YOU KNOW?
Australian men need to triple their intake of wholegrains while women need to increase their intake five fold in order to meet recommended levels.15

DID YOU KNOW?
Compared to its refined counterpart, wholegrain wheat contains:
- 75% more fibre
- 60% more iron and thiamine
- 80% more folate16
2. Contains Resistant Starch

BARLEYmax contains resistant starch
BARLEYmax is a rich source of resistant starch – the third and most recently discovered type of fibre. Importantly, in addition to its resistant starch content, BARLEYmax also contains the more traditional forms – soluble and insoluble fibre. Studies indicate that resistant starch provides a range of important benefits and has recently been included in Australia’s dietary fibre recommendations by the nation’s peak health authority, the National Health and Medical Research Council.19

WHAT IS RESISTANT STARCH?
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 like dietary fibre and improve digestive health. This type of starch is called ‘resistant starch’.20

WHY IS RESISTANT STARCH SO IMPORTANT?
When resistant starch reaches the bowel it is broken down (fermented) by the healthy 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’ 21

✓ Encouraging the growth of healthy bacteria in the bowel – the ‘prebiotic effect’ 22

✓ Producing compounds called short chain fatty acids (in particular butyrate) which promote intestinal health23

✓ Maintaining healthy blood sugar by increasing the body’s sensitivity to insulin24

SHORT CHAIN FATTY ACIDS
Resistant starch has its most important effects via bacterial fermentation in the large bowel, which leads to the production of a number of compounds collectively called Short Chain Fatty Acids.25

Considerable interest has focused on the benefits of one acid in particular, butyrate, as it is considered especially important for bowel health. In addition to it being a favoured fuel source for cells lining the colon25, butyrate has also been shown to facilitate other important physiological changes including the capacity to:

• Reverse neoplastic changes in vitro26

• Inhibit the growth and proliferation of tumour cells in vitro27

• Induce apoptosis (programmed cell death) of damaged cells before they can become malignant28

HOW MUCH RESISTANT STARCH DO WE CONSUME?
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/person/day with adult men consuming more resistant starch than women.29

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.31

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.

RESISTANT STARCH, FERMENTATION AND COLON 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 colon cancer.32

In fact, the human colon is one of the most densely populated natural habitats known to science with the human body containing an order of magnitude more prokaryotic cells than it does mammalian ones.33

The bacterial flora in the gastrointestinal tract should be considered ‘an organ within an organ’ exerting considerable metabolic capability.

Research with dietary components like resistant starch supports a direct link between diet, colonic bacteria and colon cancer, with recent animal studies indicating high resistant starch diets may prevent colon carcinogenesis.33

RESISTANT STARCH REDUCES DAMAGE OF HIGH PROTEIN ‘FAD’ DIETS
CSIRO research34-37 has shown the popular trend of high protein, low fibre diets may damage the bowel. It also found increasing fibre and specifically resistant starch can prevent such damage in animal studies.

The research also found resistant starch reduced DNA damage and reversed mucus thinning in the bowel caused by diets high in fat and protein and low in fibre.

DID YOU KNOW?
Bowel cancer is the second most common cancer in both Australian men and women.38

Cool Carbs Rich in Resistant Starch
Cooked then cooled potatoes, pasta and rice contain resistant starch

“When pasta, rice or potatoes are cooked and still hot the starch contained in these foods is more readily digested. But when it cools, some of the starch molecules aggregate and become resistant to digestion. So, more resistant starch is formed.”

Shane Landon, Accredited Practising Dietitian

Resistant starch produces more than twice the amount of butyrate than wheat fibre.29

DID YOU KNOW?
**New Fibre Recommendations Include Resistant Starch**

In a global first for any government health authority, the recommendations of Australia’s National Health and Medical Research Council specify a resistant starch component in their fibre intake advice32—reflecting its considerable contribution to human health.

“We considered the scientific evidence showing a positive impact of resistant starch on digestive health convincing and warranted inclusion in the new fibre intake recommendations.”

Dr Katrine Baghurst, Chair, Nutrient Reference Values Working Party.

**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.39,40

In fact, indigenous South Africans continue to have colon cancer rates 10 times lower than their white counterparts in the same region.39

This surprising result may be due to the regular consumption of cold maize porridge. Maize porridge is a dietary staple among black Africans and when consumed cold, as it often is, the porridge is rich in resistant starch (a form of ‘cool carb’ discussed earlier).

The higher levels of resistant starch are considered to play a role in the low rates of colorectal cancer observed in indigenous Africans.41

**BARLEYmax Better Nutrition Report**

**3. Delivers Soluble Fibre**

**Resistant Starch - Metabolic Mechanisms**

**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 mucilage, which are found mainly in plant foods. Good sources of soluble fibre include fruits, vegetables, barley, seed husks, flaxseed, dried beans, lentils and peas.42

**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.43

Plus, soluble fibre can help with keeping you regular.42

**HOW DOES SOLUBLE FIBRE LOWER CHOLESTEROL?**

During the digestive process the soluble beta glucans fibre blocks the re-absorption of cholesterol back into the body so that more of this cholesterol is lost naturally from the body.46

Of course, to help manage or prevent increases in LDL cholesterol in your blood, you should also try to limit foods such as the amount of saturated fat (found in fatty meats, full cream dairy products, deep fried foods, pastries, crisps) in the diet.46

**HOW MUCH DO YOU NEED?**

A large analysis of 67 published studies investigating the cholesterol lowering effects of fibre showed a small but significant effect at three grams of soluble fibre per day. At this level of intake there were worthwhile reductions in both total as well as LDL cholesterol.45

The Food and Drug Administration in the USA permits a health claim for barley products as a source of soluble beta glucans fibre that can, as part of a low saturated fat diet, reduce the risk of coronary heart disease.47

A recent 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…”48

**BARLEYmax Fact**

BARLEYmax contains high levels of beta glucan – a type of soluble fibre.44
BARLEYmax Has a Low Glycemic Load
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 they 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.

It should be noted that the Glycemic Load 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 slow release of glucose into the bloodstream.

Why Is Controlling Glycemic Response Important?
Type 2 diabetes has emerged as 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.

In a recent study, breakfast cereal made with BARLEYmax gave a lower glucose and insulin response compared to a breakfast cereal made with standard barley.

Lower levels of insulin in the bloodstream are considered beneficial to reduce the risk of insulin resistance and diabetes.

The CSIRO research team investigating the impact of BARLEYmax 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.”

Two Cereals Compared – A Human Trial at CSIRO
To determine the effect of BARLEYmax on blood glucose, a breakfast cereal was made using either standard barley or BARLEYmax. The GI and the GL were then measured and compared. The results are revealing:

Glycemic Index
The cereal made with BARLEYmax had a low GI = 50
The cereal made with standard barley had a high GI = 77

Glycemic Load
The cereal made with BARLEYmax had a GL of just 10
The cereal made with standard barley had a GL 2.5 times higher = 25

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<thead>
<tr>
<th>Glycemic Index</th>
<th>Glycemic Load</th>
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<tr>
<td>BARLEYmax</td>
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<tr>
<td>Standard Barley</td>
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BARLEYmax Is A Rich Source of Insoluble Fibre
BARLEYmax contains a higher total fibre level than any other grain. That’s because BARLEYmax contains much more of all three types of dietary fibre we need each day – that is, soluble fibre, insoluble fibre and resistant starch.

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.

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 developed a set of Adequate Intake figures for dietary fibre that are designed for general good health (see table below).

<table>
<thead>
<tr>
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<th>Males Adequate Intake(g/day)</th>
<th>Females Adequate Intake(g/day)</th>
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<tbody>
<tr>
<td>1-3 years</td>
<td>14</td>
<td>1-3 years 14</td>
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<td>4-8 years</td>
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<td>19+ years</td>
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<td>Pregnancy 25-28</td>
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<td>Breastfeeding 27-30</td>
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</table>

Disease prevention- Women 28g per day  Men 38g per day

Source: NHMRC

REDUCING CHRONIC DISEASE RISK
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.”

The NHMRC aims to provide recommendations to actually reduce disease risk – termed Suggested Dietary Targets (SDT).

SDT’s for dietary fibre
Men – 38 grams/day
Women – 28 grams/day

DIETARY FIBRE AND BODY WEIGHT – IS THERE A CONNECTION?
The global burden of obesity continues to increase both in terms of ill-health as well as direct economic cost to the community.

Diet and lifestyle have long been recognised as modifiable risk factors for excess weight gain. However, in the search for answers, the role of a high fibre diet in the prevention of weight gain is often overlooked.

In its global report, Diet, Nutrition and the Prevention of Chronic Diseases, the World Health Organisation identified a high intake of fibre as the only dietary component with the ‘convincing evidence’ required to protect against weight gain and obesity.

What Does the Heart Foundation Say About Fibre?
The Heart Foundation recommends that, as part of your total fibre intake, you should consume at least six grams of wholegrain fibre per day.

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.

This is exactly the type of fibre found in BARLEYmax.

MIX IT UP
When it comes to fibre the best advice is to mix up the types of fibre – to obtain the benefits of all of the three main types of fibre – soluble, insoluble and resistant starch.

“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, CSIRO.

BARLEYmax Fact
Adding BARLEYmax to a diet based on refined cereal foods more than doubled the total fibre content of the diet.
BARLEYMAX CONTAINS POWERFUL ANTIOXIDANTS
It is important to eat foods that are rich in antioxidants to help neutralise free radicals. These 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.\textsuperscript{57}

If free radicals are not inactivated, they can damage all types of cells in the body, including our DNA, the genetic material that sits at the heart of every cell in the body. It has been estimated that there are 10,000 oxidative ‘hits’ to our DNA per cell per day.\textsuperscript{58}

Wholegrains are an important source of antioxidants\textsuperscript{59} and have been found to have a higher antioxidant content than many fruits and vegetables.\textsuperscript{60}

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.\textsuperscript{60}

“Antioxidant activity is one of several factors…responsible for the observed efficacy of wholegrains in the daily diet to reduce chronic disease”.\textsuperscript{60}

VITAMIN E
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-tocotrienol).\textsuperscript{61}

Higher intakes of Vitamin E have been promoted as a means of helping reduce chronic disease risk in Australia with Suggested Dietary Intakes of 19 mg for men and 14 mg for women.\textsuperscript{52} Recent animal research has also suggested a possible role for the gamma- and delta – tocotrienol forms of Vitamin E in cancer prevention.\textsuperscript{52}

Relative to standard barley, BARLEYmax provides a higher total for all forms of Vitamin E.

The data shows that BARLEYmax is a potent source of natural antioxidants.
BARLEYMAX HAS PREBIOTIC PROPERTIES

Prebiotics act as a fuel to enhance the growth or activity of the friendly bacteria in our digestive system to improve health. Probiotics are live, healthy bacteria consumed via food, drinks or supplements.

Not surprisingly, pre- and probiotics are related with recent investigations examining the ability for prebiotics to assist in promoting bacterial colonisation in the bowel. It is possible that prebiotics act as enhancers of probiotic bacteria.

Resistant starches (such as those contained in BARLEYmax) can have prebiotic properties and some resistant starches may provide protection to beneficial Bifidobacteria as they travel through the upper gastrointestinal tract. Although there is still much investigation required to develop our understanding in this field, the potential to capture the benefits of prebiotics and probiotics in relation to measurable health outcomes is promising.

Preliminary evidence for BARLEYmax is positive in regard to its prebiotic potential.

BARLEYMAX CONTAINS HEALTHY FATS

We all need some fat in our diet. Fat is important for many body processes. Fat protects your organs, keeps you warm and helps your body absorb and move nutrients around. It also helps hormone production. However, some fats are better for you than others.

Categories of fats:
- Saturated
- Monounsaturated
- Polyunsaturated
- Trans fats

Saturated fats (found mostly in animal products) increase blood cholesterol, which is a risk factor in coronary heart disease. Monounsaturated and polyunsaturated fats tend to lower blood cholesterol.

Trans fatty acids are found in small amounts in milk, cheese, beef and lamb. Trans fatty acids are also created during the manufacture of some table margarines and in solid spreads used in the food industry.

Trans fatty acids behave like saturated fats in the body; they raise ‘bad’ LDL levels and increase the risk of heart disease. Unlike saturated fats, they also lower ‘good’ HDL cholesterol, so may be more damaging.

There is considerable interest in the role monounsaturated fats may play in reducing the risk of heart disease with researchers examining the Mediterranean diet where a high consumption of monounsaturated fats from olive oil (for example, in Greece and Italy) may result in low rates of coronary heart disease, regardless of body weight.

The two forms of polyunsaturated fats found in BARLEYmax also offer the potential to improve health with both playing a vital role in growth and development as well as improving the health of our arteries.

THE MOST RECENT ADVICE FROM THE HEART FOUNDATION

The Heart Foundation’s most recent review of the role of fats in cardiovascular health advises all Australians to:

“Replace Saturated Fats with Monounsaturated and Polyunsaturated fats to help reduce the intake of Saturated fat.”

The Heart Foundation also states:

“Polyunsaturated and monounsaturated fats are healthier fats that reduce the ‘bad’ cholesterol (LDL cholesterol) in your blood and increase the ‘good’ cholesterol (HDL cholesterol). This helps to lower your risk of getting heart disease.”

BARLEYmax contains a mixture of healthy fats.

BARLEYmax Fact
BARLEYmax contains a mix of healthy fats including monounsaturated fat as well as omega 6 and omega 3 polyunsaturated fats.

Fat Profile of BARLEYmax

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<th>Total Fat Content</th>
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7. Offers Prebiotic Properties

8. Includes Healthy Fats

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References

The BARLEYmax Better Nutrition Report was published by the BARLEYmax Joint Venture representing CSIRO and Australian Capital Ventures Ltd. The report has been developed to raise awareness and understanding of the unique combination of health-related attributes provided by BARLEYmax and is based on scientific evidence sourced from CSIRO research and key nutrition and health research publications.