BARLEYMAX®

WHOLEGRAIN. PREBIOTIC. FIBRE.

A nutritional powerhouse, unlocked to meet consumer demand & key health outcomes.

Thank you for your interest in BARLEYMAX®.

Below are the potential health claims that can be made through the inclusion of BARLEYMAX® in your product, plus a snapshot of the available supporting evidence.
If there is a health claim or attribute that is of particular interest to you, our team would love to partner with you to support your product development & enhancing your substantiation dossier.

Health concern	BARLEYMAX® attribute	Activity / Effect	Claims	References
Digestive	High dietary fibre Resistant starch	BARLEYMAX® wholegrains are rich in soluble fibre, insoluble fibre and resistant starch, which is shown to improve indicators of bowel health. Resistant starch encourages the growth of healthy bacteria in the bowel, 'prebiotic effect'. Resistant starch produces short chain fatty acids which promote intestinal health.	Resistant starch improves favourable gut microbes, such as the bacterial species: Bifidobacterium, Prevotella, Akkermansia and Megamonas Each of these promote bowel movement frequency and healthier stools for better intestinal health, and the prevention of constipation. Two weeks of daily BARLEYMAX® consumption can improve the gastro-intestinal tract and digestive systems.	**BARLEYMAX® Research** Swapping white for high-fibre bread increases faecal abundance of short-chain fatty acid-producing bacteria and microbiome diversity: A randomized, controlled, decentralized trial. **Supporting Research** Dietary Fibre Modulates the Gut Mirobiota Effect of Diet on the Gut Microbiota: Rethinking Intervention Duration Resistant Starch: Impact on the gut microbiome and health Impact of Resistant Starch Type 3 on Fecal Microbiota and Stool Frequency in Thai Adults with Chronic Constipation Tandomized Clinical Trial
Cardio-vascular	Wholegrain Beta glucan Healthy fats	Three servings of wholegrains have been shown to reduce risk of heart disease by up to 40%. Consumption of beta glucans helps to reduce or control serum cholesterol levels. Monounsaturated and polyunsaturated fats tend to lower blood cholesterol.	The soluble dietary fibre in BARLEYMAX® improves serum cholesterol levels, in particular lowering low density lipoprotein cholesterol and total cholesterol levels. 1 serve of BARLEYMAX® per day can improve total cholesterol levels. BARLEYMAX® is a high quality carbohydrate which can improve cardiovascular health. Beta glucan regulates cardiovascular function via the bile acid receptors Takeda G Protein-Coupled Receptor 5 (TG) and Farnesoid X Receptor (FXR) which reduces inflammation and modifies the dilation and constriction of blood vessels – the vascular tone.	**Supporting Research** Wholegrain consumption and risk of cardiovascular disease, cancer, and all cause and cause specific mortality: systematic review and dose-response meta-analysis of prospective studies Dietary carbohydrate quality, fibre-rich food intake, and left ventricular structure and function: the CARDIA study The gut microbiota and cardiovascular health benefits: A focus on wholegrain oats Beta-Glucans Supplementation Associates with Reduction in P-CresylSulfate Levels and Improved Endothelial Vascular Reactivity in Healthy Individuals

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Type 2 Diabetes	Resistant starch Arabinoxylan Beta glucan Low Glycemic Index (GI)	Resistant starch helps to maintain blood sugar levels by increasing the body's sensitivity to insulin. The benefits of low GI foods are similar to those offered by pharmalogical agents that also target postprandial hyperglycemia. Prevention of insulin resistance > pre-diabetes.	Eating three serves of BARLEYMAX® per day (~10g resistant starch) improves insulin sensitivity via enhancing butyrate signaling systems and increasing GLP-1 to enhance insulin secretion, reduce glucagon release, slow gastric emptying, and promote satiety.	**Supporting Research** Dietary carbohydrate quality, fibre-rich food intake, and left ventricular structure and function: the CARDIA study The gut microbiota and cardiovascular health benefits: A focus on wholegrain oats Beta-Glucans Supplementation Associates with Reduction in P-CresylSulfate Levels and Improved Endothelial Vascular Reactivity in Healthy Individuals
Obesity prevention	Wholegrain High dlietary fibre Low Glycemic Index (GI)	WHO found that a high fibre intake was the only dietary component with 'convincing evidence' to protect against weight gain and obesity. Foods that are low in GI, keep you feeling fuller for longer, reduce the temptation to snack throughout the day.	The dietary fibre in BARLEYMAX® wholegrain, such as resistant starch "reshapes" the gut microbiotia to aid in weight loss. The mechanism is via modifying the bile-acid ratio, reducing inflammation by improving the gut-wall barrier and as a result, impeding fat absorption. New evidence emerging that dietary fibre intake, such as resistant starch can alter gene expression of glucose-lipid metabolism to improve glycemia levels and reduce fat storage. Obesity is associated with significant gut dysbiosis, which can be rectified with BARLEYMAX® consumption as a result of the direct dietary fibre actioning on the gut microbiota and gut cell lining. There are "obese" microbiota and "lean" microbiota. Eating higher dietary fibre levels re-purposes the micro-orgamisms within the gut to better facilitate leanness. Appetite cues and the feelings of fullness are improved after 1 week of BARLEYMAX® consumption.	**BARLEYMAX® Research** Short-Term Effect of Additional Daily Dietary Fibre Intake on Appetite, Satiety, Gastrointestinal Comfort, Acceptability, and Feasibility **Supporting Research** Dietary Fibre Modulates the Gut Microbiota Low diversity gut microbiota dysbiosis: drivers, functional implications and recovery Integrated Analysis of Gut Microbiome and Adipose Transcriptome Reveals Beneficial Effects of Resistant Dextrin from Wheat Starch on Insulin Resistance in Kunming Mice Resistant starch intake facilitates weight loss in humans by reshaping the gut microbiota

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Mineral absorption	Resistant starch Beta glucan Arabinoxylan Variety in dietary fibre	There is evidence a diet containing fermentable carbohydrates can increase the absorption of calcium. A low calcium intake is recognised as one of the risk factors for osteoporosis, osteopenia and bone fractures.	Resistant starch in BARLEYMAX® reduces the pH of the colon which increases the solubility of calcium and magnesium allowing them to be more easily absorbed into the bloodstream. BARLEYMAX® contains a unique combination of dietary fibre which strengthen the gut cell lining which enables better absorption of minerals such as calcium, magnesium and zinc into the bloodstream. The prebiotic dietary fibres in BARLEYMAX® contribute to a release of minerals in the distal colon, which improve their absorbability.	**Supporting Research** The unresolved role of dietary fibers on mineral absorption Intestinal Absorption and Factors Influencing Bioavailability of Magnesium-An Update Impact of resistant starch: Absorption of dietary minerals, glycemic index and oxidative stress in healthy rats Nutrition and Gut Health: Preparation and Efficacy of Resistant Starch Dietary Native Resistant Starch but Not Retrograded Resistant Starch Raises Magnesium and Calcium Absorption in Rats Nondigestible Carbohydrates and Mineral Bioavailability
Free radicals	Wholegrain	Free radicals, if not inactivated by antioxidants can damage DNA in the cells. Wholegrains, such as BARLEYMAX®, are a vital source of antioxidants, containing a higher antioxidant capacity than many fruits or vegetables.	BARLEYMAX® can favourably re-configure the gut's composition, to support the body's natural defense systems – both directly though improving the gut's health status and also indirectly via supporting the body's anti-inflammatory and anti-oxidation pathways. The beneficial dietary fibre in BARLEYMAX® support the body's ability to regulate radical species.	**Supporting Research** Molecular and cellular responses to oxidative stress and changes in oxidation-reduction imbalance in the intestine Gut as the Largest Immunologic Tissue The gastrointestinal tract: A major site of antioxidant action? A Diet Rich in Fat and Poor in Dietary Fiber Increases the In Vitro Formation of Reactive Oxygen Species in Human Feces Impact of Dietary Fibers on Nutrient Management and Detoxification Organs: Gut, Liver, and Kidneys

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Immune system	High dietary fibre Prebiotic fibre Fructans	70% of an adult's immune system is located in the gut, so supporting the diversity and quantity of gut microbes enhances the immune system. Consumption of prebiotic fibres in BARLEYMAX® can lead to a change in the intestinal microflora, which supports immune system enhancement.	The production of short chain fatty acids is important for an intestinal immune response and also bodily immune responses; which is produced after eating high amount of dietary fibre. BARLEYMAX® has an ability to directly impact the immune system via its actioning on the gut microflora. It is generally recommended to consume 25-30g dietary fibre per day for optimal health; which in turn effects the immune system. But eating at least 3.3g dietary fibre per mega-joules is enough to improve the immune system. So only 1 serve of BARLEYMAX® per day is enough to support a healthy immune system.	**Supporting Research** The effects of dietary fibre on C-reactive protein, an inflammation marker predicting cardiovascular disease Strengthening the Immune System and Reducing Inflammation and Oxidative Stress through Diet and Nutrition: Considerations during the COVID-19 Crisis Intestinal microbiota-mediated dietary fiber bioavailability Role of dietary fiber in promoting immune health—An EAACI position paper Effect of Diet on the Gut Microbiota: Rethinking Intervention Duration Association between dietary fiber and markers of systemic inflammation in the Women's Health Initiative Observational Study High levels of butyrate and propionate in early life are associated with protection against atopy The associations between dietary fibers intake and systemic immune and inflammatory biomarkers, a multi-cycle study of NHANES 2015–2020
Gut axes	Wholegrain High dietary fibre Prebiotic fibre	The construction of BARLEYMAX® and its nutrition promotes the health of the gut; via production of short chain fatty acids, and in turn strengthens the communication channels (axes) from the gut to other organs, via the gut-skin axis, gut-lung axis, gut-liver axis, gut-kidney axis, gut-brain axis.	A high fibre diet (25-30g dietary fibre / day) can transform the gut in 24 hours. Through improving the state of the gut, the communication channels to other organs is also improved.	**Supporting Research** Gut liver brain axis in diseases: the implications for therapeutic interventions Going with the grain: Fiber, cognition, and the microbiota-gut-brain-axis Dynamic balance of the lung microbiome in health and respiratory diseases Microbes, metabolites, and the gut-lung axis Novel insights into immune mechanisms in acute lung injury: Focusing on gut microbiota and its metabolites

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Short Chain Fatty Acid production	Fructans Resistant starch Beta glucan Arabinoxylan	The 4 types of prebiotic dietary fibres in BARLEYMAX® act as food for the gut microflora, anaerobic intestinal microflora specifically use them which leads to a fermentation process and the development of short chain fatty acids. The short chain fatty acids, in particular proportionate, butyrate and acetate that are produced inside the gut, are taken up by the body and then lead to beneficial health effects around the body. The liver and peripheral blood to the colon take up the short chain fatty acids and then utilise them around the body. Butyrate is converted to energy production within the body, via blood and liver. In adults, about 10% of caloric requirements is from short chain fatty acid production. The heart, fatty tissue and kidneys metabolise acetate. Acetate is also used for energy development and for cholesterol formation and the development of long chain fatty acids. Propionate is important in the production of gluconeogenesis in the liver, which assist in maintaining bloody sugar levels.	BARLEYMAX® consumption has been shown to improve the production of short chain fatty acids. The fermentable fibres in BARLEYMAX®, such as resistant starch, beta glucan and fructans reach the distal colon where they act as food for the gut colony. The short chain gasses produced after the "food" digestion promotes a healthier gut. BARLEYMAX® improves the amount of total short chain fatty acids produced in the distal colon. Eating 1 serve of BARLEYMAX® per day for a month can improve the health of the gut. Whereby the production of short chain fatty acids is increased inside the colon. One serve of BARLEYMAX® per day for a month increases intestinal butyric production and fecal butyric concentrations.	**BARLEYMAX® Research** Swapping White for High-Fibre Bread Increases Faecal Abundance of Short-Chain Fatty Acid-Producing Bacteria and Microbiome Diversity: A Randomized, Controlled, Decentralized Trial Effect of Wheat Bran on Fecal Butyrate-Producing Bacteria and Wheat Bran Combined with Barley on *Bacteroides* Abundance in Japanese Healthy Adults Fiber-Rich Barley Increases Butyric Acid-Producing Bacteria in the Human Gut Microbiota Effects of BARLEYmax and high-β-glucan barley line on short-chain fatty acids production and microbiota from the cecum to the distal colon in rats Combined effects of BARLEYmax and cocoa polyphenols on colonic microbiota and bacterial metabolites *in vitro*

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Cancer prevention	Wholegrain High dietary fibre Prebiotic fibres	Part of cancer formation and development is believed to be due to bodily inflammation and formation of mutant cells. The wholegrain and dietary fibre in BARLEYMAX® lower bodily inflammation. Phytonutrients including antioxidants in BARLEYMAX® wholegrain may inhibit cancer cell formation. Dietary fibre binds to carcinogens and expels them from the body. The prebiotic effect faciliates growth differentation of normal colon cells which prevents tumor cell growth. Note: the aetiology of cancer is highly complex and cancer development is multi-factorial so other factors should also be considered in cancer prevention strategies, including physical activity levels and genetics.	Colo-rectal cancer may be prevented from a high fibre diet (25-30 g dietary fibre per day) – the origin is not well understood. But adding 1 serve of BARLEYMAX® to your diet per day can promote the production of short chain fatty acids which reduces the amount of cholesterol in the colon, it is believed to prevent the development of cancer cell growth and cell apoptosis. BARLEYMAX® has 25.9g insoluble dietary fibre per 100g, which reduces the risk of cancers- in particular colo-rectal cancers. The specific amount is unknown but a high dietary intake can reduce the likelihood of development.	**Supporting Research** Associations between dietary fiber intake and mortality from all causes, cardiovascular disease and cancer: a prospective study Intestinal microbiota-mediated dietary fiber bioavailability
Inflammation	High dietary fibre Prebiotic fibres	Consumption of BARLEYMAX® produces short chain fatty acids, which reduce bodily inflammatory markers. Improvement to intestinal microflora reduces inflammation risk in adjacent organs.	Resistant starch in BARLEYMAX® improves bacterial and overall microbial diversity in the gut. This prevents inflammation and promotes anti-inflammatory actions to support gut homeostasis. 5g of resistant starch per day can lower bodily inflammation, for overall health 6g per day is recommended. Eating 2 serves of BARLEYMAX® per day supports this intake. Eating 10g per day of a diverse blend of prebiotic dietary fibres can lower systematic inflammation. BARLEYMAX® contains a unique blend of 4 prebiotics to deliver on this requirement.	**Supporting Research** Effects of a diverse prebiotic fibre blend on inflammation, the gut microbiota and affective symptoms in metabolic syndrome: a pilot open-label randomised controlled trial Resistant Starch: Promise for Improving Human Health

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Gastro-intestinal discomfort	High dietary fibre	High amounts and types of dietary fibre promote better laxation. Stools are softened and bulkier, which leads to easier bowel movements. Bowel movement frequency is improved.	12g BARLEYMAX® per day promotes better gastro-intestinal functioning, via more regular bowel movements, smoother laxation, bulkier stool weight and production of short chain fatty acids for a healthier gut microbiota.	**BARLEYMAX® Research** Effects of BARLEYmax and high-β-glucan barley line on short-chain fatty acids production and microbiota from the cecum to the distal colon in rats **Supporting Research** A review of the pharmacobiotic regulation of gastrointestinal inflammation by probiotics, commensal bacteria and prebiotics Intestinal microbiota-mediated dietary fiber bioavailability The effects of waxy barley on defecation, sleep, mental health, and quality of life: a randomized double-blind parallel-group comparison study
Gastro-intestinal conditions	Prebiotic fibres	Bifidobacterium is increased in the gut, which reduces diarrhoea symptoms. Bloating and gas is reduced when the balance of microbiota is shifted - this can occur after prebiotic consumption. Bloating and intestinal discomfort occurs with inflammation, which is reduced with prebiotic consumption.	5g of prebiotic dietary fibres is recommended to achieve these benefits. There are over 6g of prebiotic dietary fibres per serving, so 1 serve per day is enough to support the production of *bifidobacterium sp.* and reduce regular bloating.	**Supporting Research** Prebiotic effect of oligofructose after 2 weeks supplementation with a low dose: A randomized, double-blind, placebo-controlled, cross-over study Health Effects and Sources of Prebiotic Dietary Fiber

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Cognition and memory	Wholegrain High in dietary fibre Prebiotic fibres	Production of butyrate, a short chain fatty acid, enhances learning and memory by strengthening the gut-brain axis and enhancing brain capacity. The brain and gut are so closely connected that by increasing diversity in the gut, there is better brain health and functioning. Dietary fibre and wholegrain intake is associated with lower risk of dementia.	Those that consume higher levels of dietary fibre perform better in brain-related activities. Diet quality is another factor, whilst it is not known the exact amount required for the benefit, eating a high fibre diet, especially soluble fibre is linked to reduced dementia, and improved cognition. It is known that eating less than 20g dietary fibre per day can increase the risk. Consuming 1-2 serves of BARLEYMAX® per day delivers on dietary fibre and soluble fibre to achieve the benefit.	**Supporting Research** Combined association of dietary fibre and cognitive function with all-cause and cause-specific mortality in older adults Dietary fiber intake and risk of incident disabling dementia: the Circulatory Risk in Communities Study Association between food and nutrient intakes and cognitive capacity in a group of institutionalized elderly people Added sugar and dietary fiber consumption are associated with creativity in preadolescent children Going with the grain: Fiber, cognition, and the microbiota-gut-brain-axis Role of dietary fiber and short-chain fatty acids in preventing neurodegenerative diseases through the gut-brain axis Effects of a diverse prebiotic fibre blend on inflammation, the gut microbiota and affective symptoms in metabolic syndrome: a pilot open-label randomised controlled trial
Sleep	Wholegrain	The body has a 'sleep committee' which requires 9 nutrients and hormones to be in adequate amounts in order to stimulate sleep. These are melatonin, seratonin, dopamine, adenosine, GABA, progesterone, magnesium, zinc, and B-group vitamins. Wholegrains are rich sources of zinc, B-vitamins and magnesium, and their digestion leads to seratonin production. Wholegrains also assist in the breakdown of adenosine tri-phosphate to adenosine di-phosphate to form adenosine.	Individuals with less than 13g of dietary fibre intake have less than 5 hours of sleep per night. Whereas those that eat more than 14g have more than 5. The gut microbiota can enhance sleep.	**Supporting Research** Butyrate, a metabolite of intestinal bacteria, enhances sleep Role of dietary fiber and lifestyle modification in gut health and sleep quality
Energy	Prebiotic fibres Short chain fatty acid production Wholegrain	The production of short chain fatty acid inside the colon assists in the body's development of energy production. The structure of BARLEYMAX® and it's wholegrain contains vital nutrients required for energy transport around the body, such as B-group vitamins.	Energy balance is improved with dietary fibre consumption. One to three serves of BARLEYMAX® per day can improve energy levels, through greater blood sugar balance and the feeling of fullness.	**Supporting Research** Therapeutic Benefits and Dietary Restrictions of Fiber Intake: A State of the Art Review The Role of Fiber in Energy Balance

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Hypertension	High dietary fibre Beta glucan Prebiotic fibres	Beta-glucan, a soluble fibre, assists in balancing blood sugars, which lowers blood pressure. Propyonate and butyrate, the short chain fatty acids produced in the gut may exhibit a vasodilatory effect through relaxing blood vessels. Prebiotic fibres may positively effect the renin-aldosterone-system (RAAS), a system that regulates fluid balance in the body and also blood pressure. A healthier gut reduces the risk of high blood pressure.	BARLEYMAX® is high in dietay fibre, and very low in sodium which makes it the perfect option to improve blood pressure. It is recommended to consume more than 28g dietary fibre for women and more than 38g dietary fibre for men to lower blood pressure; with an extra 5g per day to reduce systolic blood pressure by 2.8mm Hg and diastolic blood pressure by 2.1mm Hg. Three serves of BARLEYMAX® per day is enough to support this change.	**Supporting Research** Recommendations for the Use of Dietary Fiber to Improve Blood Pressure Control The effect of dietary patterns on blood pressure control in hypertensive patients: results from the Dietary Approaches to Stop Hypertension (DASH) trial The dietary approaches to stop hypertension (DASH) clinical trial: implications for lifestyle modifications in the treatment of hypertensive patients Dietary Approaches to Stop Hypertension (DASH) Diet and Blood Pressure Reduction in Adults with and without Hypertension: A Systematic Review and Meta-Analysis of Randomized Controlled Trials
All causes morbidity	High dietary fibre Wholegrain	Three serves per day, or about 48g of dietary fibre can reduce the risk of all lifestyle diseases, including heart disease, Type 2 Diabetes and bowel cancers. The BARLEYMAX® nutritional matrix contains antioxidants, phytonutrients, vitamins and minerals which promote greater health and wellbeing.	There is a significant inverse relationship between eating a high fibre diet and all causes morbidity. Diets low in fibre, that is less than 10g dietary fibre per day, are associated with a higher risk of all lifestyle/non-communicable diseases. Eating one serve of BARLEYMAX® provides over 10g of dietary fibre, so it is an easy method to boost overall dietary fibre intake. Eating just one serve of BARLEYMAX® per day can improve total dietary fibre intakes to prevent all cause morbidity.	**Supporting Research** Human gut microbiota in health and disease: Unveiling the relationship Differences in Lifestyle-Related Behaviors Among Healthy Weight, Overweight, and Obese Groups: A Secondary Analysis of Data on 4714 Adults in Poland The impact of dietary fiber consumption on human health: An umbrella review of evidence from 17,155,277 individuals

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Mortality prevention	Wholegrain Prebiotic fibres	Insufficient wholegrain consumption is ranked just behind high salt intake as a leading cause of death (according to the Global Burden of Disease). An improved immune system due to gastro-intestinal support reduces the risk of early death.	With over 30% dietary fibre, BARLEYMAX® can prevent high cholesterol, improve blood pressure markers, promote satiety, support body weight and reduce overall inflammation. So for a small food item, there is a substantial reward. BARLEYMAX® contains an impressive 25.9% insoluble fibre, which has been shown to reduce the risk of all-cause mortality, especially cancer-related mortality.	**Supporting Research** Associations between dietary fiber intake and mortality from all causes, cardiovascular disease and cancer: a prospective study Dietary fiber intake and all-cause and cause-specific mortality: An updated systematic review and meta-analysis of prospective cohort studies Dietary Fiber Intake and Prostate Cancer Outcomes and All-Cause Mortality: Findings from a Secondary Analysis of the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Study Association between dietary fiber intake and obesity in US adults: from NHANES 1999-2018
Weight loss support	Resistant starch	Leads to the feeling of fullness, less hunger and snacking, and better weight control. Reduces the total caloric density of meals, which can lower the total caloric intake; whilst increasing the nutritional density of a meal / food.	There is no certain amount of dietary fibre that promotes weight loss, but a high fibre diet of at least 25g dietary fibre can reduce appetite and promote the feeling of fullness. BARLEYMAX® can also support weight loss by lowering the total energy intake of the food intake.	**Supporting Research** Dietary fiber and weight regulation Effects of isolated soluble fiber supplementation on body weight, glycemia, and insulinemia in adults with overweight and obesity: a systematic review and meta-analysis of randomized controlled trials Dietary fiber and body weight Can dietary viscous fiber affect body weight independently of an energy-restrictive diet? A systematic review and meta-analysis of randomized controlled trials Effects of Four Different Dietary Fibre Supplements on Weight Loss and Lipid and Glucose Serum Profiles during Energy Restriction in Patients with Traits of Metabolic Syndrome: A Comparative, Randomized, Placebo-Controlled Study