

Cultured Cereal Beverages

Tantalise your customers
with new infused
glucose-free
fruit



Cultured cereal beverages

Tantalise with infused glucose-free fruit.

by Paul Ever s

Growth in natural beverages is likely to focus on healthier options, as consumers demand more than a refreshment moment.

Cereal beverages are an innovative platform for consumers' favourite age-tested drinks. Alko International has developed an authentic, genuine beverage concept while preserving an all-natural and environmentally friendly clean-label with a simple identifiable cereal and fruit combination.

Key is the total elimination of glucose by culturing, a groundbreaking innovation that once again confirms Alko's undisputed technological leadership.

Inspired by molecular science, these 100 percent glucose-free-fruit cereal beverages can be transformed into a plethora of market opportunities conceptualised by sheer imagination and proprietary technology of cultured aerobic processing.

Formulation techniques

In short, a cereal beverage is made from ingeniously concentrated extracts of wheat, barley, oat, and rice. The connotations of refined and pure syrup extracts are slowly

cultured where after slowly infused with cultured glucose-free fruit juices.

Subsequently, these bases are the mainframe vehicles for cultured enhancement at specific pH levels creating designed product properties synonymous for vitamin, mineral as well as bioactive enrichment while delivering a superior tasting low glycaemic index (GI) beverage.

Glucose-free-fruit natural cereal beverages are also ideal platforms to carry antioxidants, particularly polyphenols that have potential to act as chemo preventive and cardiovascular health agents by attracting harmful free radicals. To date more than 6,000 different plant flavonoids have been identified.

The flavonoids can be divided into a number of sub-categories, such as flavonols from fruits and vegetables and proanthocyanidins from chocolate, berries and wine.

Novel technology

Beverage research company, Alko International has introduced an all-new naturally flavored and 100 percent glucose-free-fruit juice that is infused into a cultured cereal base and intended for consumers looking to actively reduce sugar intake.

Reduction of glucose intake is an essential part of pro-active health management, especially in view of the

rapidly emerging epidemic of (pre)diabetes type-2.

Consumers simply have had enough with the high and low spikes of food and beverage hidden sugar intake that can severely play havoc on needlessly triggering insulin responses.

Glucose-free-fruit infused cereal beverages are the new opportunities for a proactive lifestyle and wellbeing while securing specific nutritive advantages such as regulating low glycaemic index characteristics.

Cereal drinks are premium products that can be seen as a recreation of what Mother Nature has given to the world. Alko International – being ahead of the curve of product innovation got a major boost by the Harvard School Public Health (HSPH) April 2009 report that challenges American beverage companies to take empty sugars out of soft drinks and urges the creation of a new category. As it happened, Alko has been diligently researching this new concept and their (cultured) cereal beverages are a multi-layered approach to shift to a lower sweetness norm, without compromises, so people can adjust their palates without sacrificing expectations.

In the pipe...

The next few years will showcase a new and reinvigorating beverage lineup.



Table 1: Processing Sequence

- A flattening hammer mill treat germinated carefully selected grains such as barley, wheat, and oat.
- The grain blend is then mixed with rice followed by the addition of spring water prior to par boiling.
- Once the pre set temperatures have been reached the cooked blend is purified until clear and then cultured with specific microorganisms and concentrated.
- This concentrate is then further diluted with more spring water, while additional natural ingredients are added: grain extract, fruit extract.
- The final manufacturing step is UHT packing and aseptic filling.
- As a possible alternative, cold or hot fill followed by pasteurisation.
- Packing options: laminated paper, PET, alu-can, or glass bottle.



Table 2: Novel Beverage Concepts Based on Grains

Basically there are four conceptualised beverages formulated on all-natural grains; wheat, barley, oat, and rice. Exactly how Mother Nature intended:

1. A cereal beverage in which naturally occurring starches are converted in minute amounts of residual glucose and fructose, where after culturing is removing glucose, resulting in a nutritionally superior 'fun' drink for children.
2. Cultured juices where antioxidant packed 'superfruits' is ingeniously harmonised with lactobacillus providing subtle and very tantalising, yet authentic flavour and taste creations.
3. Cultured cereal juices that are infused with glucose-free fruits, creating an unparalleled beverage breakthrough technology and targeted for a growing number of people with special dietary requirements or restrictions i.e. diabetes type-2.
4. Rice cereal beverages formulated with stable emulsified soluble rice fibre that offers packed nutrition for lifestyle consumers in need of a steady flow of energy and protein throughout their busy day.

Probably the most important breakthrough development is the cultured cereal based drinks.

By using proprietary technology, the glucose is removed from fruit and replaced by an all-natural sweetener made from the leaves of the stevia plant (Rebandiana Reb-A).

Stevia sweetener has recently (December 2008) been approved by the US FDA and is some 200 times sweeter than glucose.

It is expected that also the EU will categorise this natural plant leaf sweetener under the EU Novel Foods regulation.

There is little doubt that stevia's natural claim will position this ingredient as a major competitor to the more artificial sounding names such as sucralose, acesulfame-K and aspartame.

Now that a groundbreaking all-natural zero calorie sweetener is available, glucose-free-fruit cultured cereal based juices will soon become a game changing beverage without the burden of consuming high-loaded sugary drinks such as cola pops and (sport)energy drinks. ►



Diabetes Control Beverages

It is estimated that of the 6.4 billion people on planet earth, 1 billion are overweight of which some 400 million are clinically obese (BMI >30). The latter group rises quickly and is expected to reach 700 million by 2015. A fast growing number of people are diagnosed with (pre)diabetes; an autoimmune disease that is irreversible and has no cure. An overwhelming number of diabetes sufferers, estimated at 95% of all cases, are classified as type-2 with an average loss of life expectancy of 10 years, mainly due to the increased risks of cardiovascular diseases. Although diabetes is part genetic, it is clear that type-2 is also spurred by obesity and inactivity. Lack of exercise seems to accelerate the onset of this degenerative disease. In case of diabetes type-2, the body's cells are not sufficiently receptive to insulin, or the pancreas produces too little or both. Ready-to-drink beverages are an ideal vehicle to deliver nutrients and nutraceuticals to connect physiology with behavior. In target beverages, such as low glycaemic index (GI) carbohydrates and micronutrients need to harmonize to exert desired effects. For example, in cereal beverages that have low glycaemic index properties, appetite suppressors as well as blood glucose regulators can be assimilated in one and the same beverage. These bottled drinks also may contain nutritive water- soluble fiber and sweeteners for taste optimization.

Alko International has created a unique bottled ready-to-drink beverage concept addressing the intrinsic needs for people affected with diabetes type-2. Essential for diabetes type-2 plan is the presence of active management of blood glucose levels. One of the clinically proven macro-ingredients to manage blood glucose spikes that occurs after every meal or food intake, is InsuVital (DSM). InsuVital is highly hydrolysed casein – a sub-fraction of milk protein – that needs to be consumed before or after food intake. InsuVital has proven to reduce blood sugar spikes without the risk of creating hypoglycemia. Full and complete interaction of ingredients in a great tasting ready-to-drink target beverage is by no means an easy task. Challenges using multiple ingredients are

taste, flavour, colour, solubility, bioavailability, pH stability, safety and toxicity. Just for stability alone, one has to overcome obstacles such as temperature, oxygen, light as well as beverage flocculation and degradation issues.



Alko Research has been able to develop a proprietary processing system that delivers extraordinary superior tasting shelf-stable bottled beverages while safeguarding the performance of active ingredients. For a diabetes type-2 control beverage this could mean combining a low GI carrier and casein-based InsuVital together with, for example, water-soluble rice fibre, chromium picolinate, phytosterols and diacylglycerol. The latter is a digestible oil (ADM) that passes less fat into the bloodstream and lowers serum triglyceride levels.

Infusing yoghurt

To top it off, on the heels of these glucose-free-fruit cultured cereal beverages, another concept is now being readied for market launch.



Infusing 5 percent yoghurt creates a blend of aromatic dairy essence providing an opaque and smooth taste and flavor sensation.

100 percent glucose-free-fruit cultured cereal beverages with antioxidant-laden fruits will open up the market to a much wider scope for product innovation and will target consumer groups that are determined to pursue active lifestyles without the guilt of excessive calorie-intake and increased risks of early health deterioration.

These ready-to-drink beverages ideally fit into a properly balanced diet that may improve cognitive health, mood, stress

level, energy, brain functions and age related degenerative diseases such as macular disease like cataract and glaucoma.

Whatever bioactive claim made, the key to wide consumer acceptance still remains taste and flavour.

Alko International not only created these beverages, but also invested in superior processing equipment to safeguard quality parameters.

The author Paul Evers is founder and President/CEO of Alko Research BV.

Table 2: Examples of a Ready-to-Drink Cereal Beverages

- Children's drinks
- Sport drinks
- Adult drinks
- Breakfast on-the-go
- Low GI drinks

Source: Alko International/Döhler

Cereal Beverage Lifestyle Concepts

Alko International has pioneered cereal beverage lifestyle concepts. The obvious and logical choice for these concepts are 'healthy fun drinks' without the classical overload of a high amount of refined sugars. Additionally to this are the ongoing development projects of interconnected well-being and nutritive opportunities as an emerging solution for lifestyle and age-related conditions. This cereal beverage concept will be hugely relevant for active nutrient management for all age groups while delivering individual wellness and taste & flavour varieties.

Ready-to-drink and no-sugar added beverages ideally fit into a properly balanced diet that may improve cognitive health, mood, stress level, energy, brain functions and age related degenerative diseases such as macular disease like cataract and glaucoma.

Especially connotations of cereal beverages infused with dairy yoghurt present a groundbreaking progress of nutrient optimisation. Dairy protein, including its many premium amino acids, peptides, and bioactive performance can be a welcome tool to address specific nutritive targets.

Nutritionally, cereal beverages have a clean and green sustainable consumer image and appeal. These natural beverages can be dense in nutrients and bio-active factors which enhance general wellbeing such as comfort and pleasure, while dissipating food cravings, just to mention but a few. These cereal beverages are a significant contributor to the refreshing effect while stimulating blood circulation in the mucous membrane of the mouth. Whatever nutraceutical or medical claim made, the key to wide consumer acceptance still remains taste. No matter how nutritionally superior, the beverage must have an immediate taste and flavor acceptance. Alko International has not only developed a proprietary blend of sweeteners to ascertain taste superiority, but as well invested like no one else, in processing equipment to support these claims.



Soluble stabilised rice bran

A non-dairy solution for premium nutri-beverages and much more.

by Henk W. Hoogenkamp

The World Health Organisation (WHO) has recognised that rising levels of chronic diseases are linked to unbalanced eating habits and lack of physical activity. For food and beverages this often means to actively and sometimes aggressively reduce simple sugar intake while increasing intake of nutritive fibre.

Stabilised rice bran functions as a base material for a number of speciality ingredients. Using specific enzyme technology, stabilised rice bran can be conditioned to fractionate in various compounds such as water-soluble fibre enhanced with a natural occurring emulsion of rice protein and rice oil.

The manufacturing process includes a water-extracted non-chemically enzyme treated powdered emulsion structure of soluble stabilised rice bran and rice germ. The ingredient contains nutritive-dense fractions of B-complex vitamins, phytonutrients, antioxidants and minerals. As such, soluble stabilised rice bran provides ingredient solutions for healthy formulations.

Soluble stabilised rice bran is an unique combination of an integrated protein : oil emulsion and soluble fibre fractions. This

functional ingredient is showing strong potential as a non-dairy solution for a plethora of everyday's food and beverage products.

Fat-filled powder

First and foremost, soluble stabilised rice bran can be used as a (part) milk fat powder substitute for applications such as cream sauces and cream soups. The fat-filled powder also shows potential for health supplements for both the general population or target consumer groups.

The ingredient is known under the Branded name RiSolubles and is a high-performance powder consisting of soluble fibre embedded in a stable emulsion of rice protein and rice oil. Unlike many other sources, soluble stabilised rice bran is hypoallergenic, contains no trans fat and no cholesterol.

Soluble stabilised rice bran provides multiple health benefits such as the ability to help maintain healthy levels of cholesterol, insulin and blood glucose, providing phytosterols including micronutrients gamma oryzanol. The ingredient is ideal for use in nutri-beverages, rice milk, nutri-bars and other emerging new foods.

Soluble stabilised rice bran is created from GMO-free rice that only nature can provide. The hypoallergenic natural ingredient is treated with specific enzymes that provide the quality and clean label declaration demanded by most consumers.

Formulation benefits

Substituting dairy ingredients in time-tested food and beverages can be a vexing challenge. Dairy ingredients have taste and sensory attributes that are very difficult to match.

However, soluble stabilised rice bran has shown promising properties in (part) replacing dairy ingredients in case of food label issues, or to meet cultural, religious or nutritional requirements.

The powdered emulsion disperses easily in cold liquids and produces a smooth, high-



quality texture and mouthfeel in salad dressings, sauces and soups, and in fillings for nutri-bars, turnovers and beverages. Because of their heat tolerance, soluble stabilised rice bran yield superior results in foods intended for extra heat treatment, including microwaving. The premium ingredient will withstand downstream processing such as heat, shear and use in a range of acidified foods and beverages.

Nutri-beverages

Soluble rice fibre is of particular interest for incorporating in ready-to-drink beverages. Soluble rice fibre not only improve healthy cholesterol levels, it also contributes to weight loss.

It has been clinically determined that soluble rice fibre suppresses the appetite by boosting satiety, helping the consumer feel fuller for longer.

Rice-based ready-to-drink beverages are an ideal delivery vehicle to bring nutrients and nutraceuticals to target consumer groups. Modern lifestyle consumers probably want to look for long-term health solutions and benefits by natural products that promote healthy weight and wellbeing.

RiSolubles powdered emulsion contains rice protein (10%), rice oil (30%), total ➤





carbohydrates (55%), including soluble fibre (6%).

The resulting wide-spectrum ingredient is a free-flowing powder with a slight sweet honey-like taste profile.

The ingredient demonstrates rapid dispersibility and solubility with no adverse responses to minerals such as sodium and calcium.

These properties uniquely allow use in a rice-based beverage that can serve as a carrier for design drinks with high tolerance – including low pH stability – without affecting flavour and general balance and mouthfeel. Altogether, design beverages are innovative ways to effectively reduce calorie intake and compensate for any deficiency in nutrition,

while maintaining important attributes such as refreshing taste sensations normally associated with full-sugar beverages.

Extended energy release

The water soluble stabilized rice fibres are known for their capacity to act as sugar substitutes and thus can be involved in extended energy release. This unique feature may contribute to reducing daily energy intake. Unlike regular sugar, rice fibres are a complex carbohydrate that is only partially digested.

As a result, there is less burden on the interprandial blood glucose and insulin as is the case when simple sugars are consumed. In a way, much like protein, rice fibre acts as a satiety ingredient.

The soluble rice fibres are fermented slowly in the digestive tract leading to progressive production of short-chain fatty acids and providing energy over a prolonged period of time.

New opportunity

Rice bran has long been considered as a polluting by-product at the source of rice milling. In the last few years however, rice bran has been transformed in a highly functional ingredient while maintaining a wide range of nutritional advantages.

The ingredient contains high quality bio-available branched-chain amino acids with high digestibility scores. Generally the heating properties and conditions determine the characteristics of functional proteins. This is also true for rice bran.

The protein: oil microparticle dispersion present in soluble stabilised rice bran can be used as a stable base for healthy fruit juices providing an opaque appearance.

When used in a rice-based fruit beverage, the soluble stabilised rice bran remains stable at lower pH ranges with no phase separation or sedimentation.

The latter is due to the natural occurring pectin in the soluble fibre. However, it might be helpful to add some extra pectin – a negatively charged polysaccharide – to avoid phase sedimentation when stored over a prolonged time.

Glucose-free fruit

A very recent nutri-beverage innovation is a cereal drink made from ingeniously concentrated extracts of barley, rice, wheat and oat.

The connotations of refined and pure syrup extracts are slowly infused with glucose-free fruit juices. (Alko International) Subsequently, these bases are the mainframe vehicles for cultured enhancement at specific pH levels creating a lifestyle drink synonymous for vitamin and mineral enrichment, delivering a superior tasting low glycaemic index (GI) beverage.

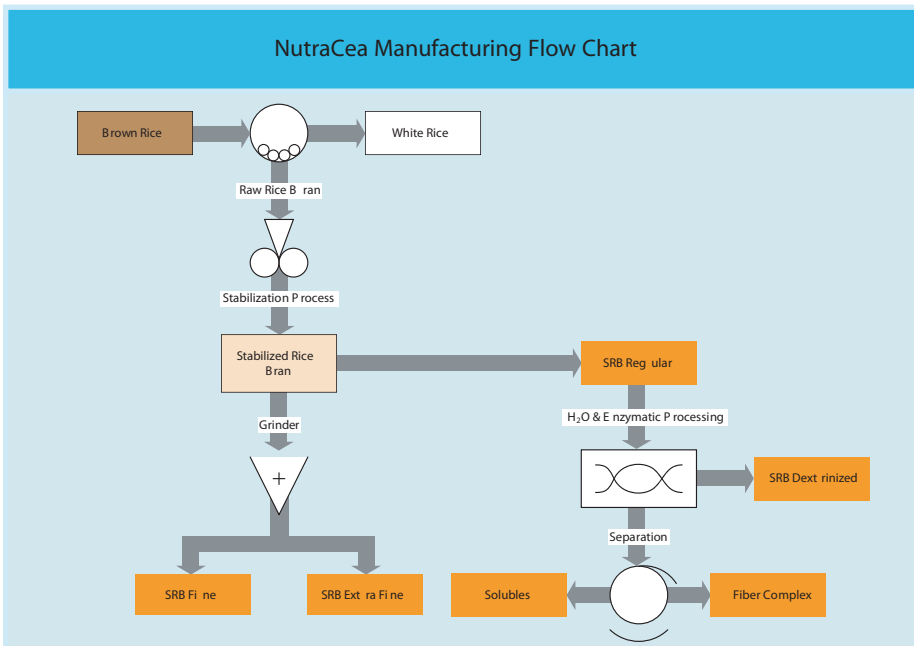
Cereal beverages target various consumer groups. Besides the aforementioned diabetes type-2, the beauty market will have these drinks enhanced by a combination of 'healthy' compounds such as aloe vera, vitamin B and L-carnitine. Then of course, are products that target specific effects such as stimulating, calming, mood or invigorating lifestyles.

Away from tradition

There are clear signs that the traditional sugar-laden carbonated high-calorie fizzy drinks are past its peak.

There is growing concern over health issues such as obesity, and carbonated soda beverages are increasingly seen as grouping unnecessary 'empty' calories and artificial ingredients. Besides, concerns about high-fructose corn syrups and artificial sweeteners only further increase negative perceptions of consumers. Subsequently, consumers who have a pro-active lifestyle are flocking to lighter and healthier options.

Fizzy drink alternatives such as cereal beverages – a concept pioneered by Alko International- are healthier, lower calorie drinks while also offering specific design nutritive needs. To further optimise flavour





and nutrition, these beverages can be infused with dairy yoghurt.

In endocrinological terms, eating a low GI meal increases the gut hormone glucagon-like peptide (GPL1). It is hypothesised that a low GI meal takes longer to digest and releases sugars into the bloodstream more slowly than a high GI meal. Most high GI meals contain over-processed foods such as white bread, doughnuts, cookies, sugary drinks (cola).

Increased levels of GPL1 in the bloodstream are a very potent hormone impulse for suppressing appetite that leads to satiety.

Enzymatic stability

Water-soluble rice fibre contains some carbohydrates such as dextrin while maintaining high levels beta glucan, pectin and gums. During the enzymatic treatment much of the starch is converted to dextrin. Stabilised rice solubles (RiSolubles) containing beta-glucan are effective in promoting healthy blood sugar and healthy blood pressure and in assisting control weight management. All these conditions are associated with type-2 diabetes.

The soluble fibre contained in soluble stabilised rice bran is a short chain fructo-oligosaccharide (scFOS) that will assist in rebalancing the intestinal microflora. These fibres help stimulate the growth of bifidobacteria in the colon. Prebiotic stimuli consist in bringing specific changes in the composition or activity of the digestive microflora.

Increasing bioavailability also enhances absorption of calcium, magnesium and isoflavones. All these compounds significantly

improve digestive comfort and well-being.

Soluble dietary rice fibre can be sub-divided into pectin, beta-glucans and galactomannan gums. Pectin makes up the predominant part of the soluble fibre, and is often isolated for functional use in many food, dairy and beverage products. Beta-glucans are indigestible beta linkages interspersed with glucose polymers providing water-soluble food gums with high viscosity solutions with little shear. In the large intestine, beta-glucans undergo extensive fermentation.

A better balance

Food and beverages that contain soluble stabilized rice bran meet consumers' expectations for better-balanced products including sugar reduction for calorie management while providing extended energy release at low glycaemic response. A lower glycaemic response decreases the demand for insulin that reduces the risk of type-2 diabetes.

The same can be said for lowering cholesterol. LDL cholesterol levels – a cardiovascular risk marker – usually decreases when soluble fibres are part of a (low) fat diet. This is also the case in the ration of total cholesterol to HDL as well HDL to LDL.

Soluble stabilised rice bran is also high in polyphenols and gamma oryzanol. Polyphenols are defined as a class of phytonutrients or non-vitamins, non-mineral compounds of foods and beverages that have significant health benefits.

Polyphenols are characterised by the presence of more than one phenol unit per molecule i.e. flavonoids and resveratrol anthocyanins.

The reach of polyphenols increases rapidly as more research identifies new plant phyto's and maps its bioavailability. For example, improving heart health, cognitive decline, cancer and diabetes.

Future for well-being

Affluent consumers are increasingly aware about the importance of daily diet and the fact that what they eat also affect how they look. Then again, the ancient Egyptians and most Asian cultures held a strong belief that beauty and food were closely interrelated. Consumers are looking for natural foods with simple-to-understand wholesome ingredients without chemical modification.

It is expected that the food and beverage markets will spur major business growth for easy-to-use multifunctional products that combine health, beauty and wellbeing.



Paul Evers (left), President/CEO of Alko international and Henk Hoogenkamp (right), former President of DMV Campina and Senior Director Strategic Technology of DuPont Protein Technologies.

Alcohol-free beer adapts to the times

One glass of cold Alko Malt tells you everything you need to know about malt beer. This alcohol-free beer has truly kept up with modern times and has transferred from a time-tested family recipe into a superb and refreshing taste and flavour that activates the senses.

Alko Malt is a heralded traditional all-natural and full-bodied premium non-alcoholic beverage that transcends age long brewing experience. The product only contains the finest natural ingredients, including carefully selected locally grown barley, golden harvest hops, brewer's yeast, and lightly carbonated filtered spring water. This micro-filtrated brew is fortified, biocultivated and enhanced with natural flavours. Its rich aromas safeguard a distinct unique sparkling and refreshing taste.

Alko Malt has evolved into a trailblazer for fun-drinks as well a highly nutritional beverage that contains an ideal balance of quality protein, vitamins, and minerals together with low-glycaemic carbohydrates. All these qualities make Alko Malt an ideal invigorating and refreshing drink without feeling guilty for bringing on calorie overload and sugar-surges that can have detrimental effect on general health and well-being. And to top it off, Alko Malt has no fat, no cholesterol, no lactose and zero alcohol.

Alko Malt is a premium alcohol-free beer suitable for every occasion when energy needs to be boosted simultaneously with a rush of righteous taste sensations like no other. The product is better for body and mind than syrupy high-fructose containing soda pops. Alko Malt is promoted as 100% natural with no calorie overhang and a perfect taste.



Alko International is the world's leading research & manufacturing company of premium value added cream cordials and specialty beverages. Alko's long-term goal is to create beverage concepts for everyday as well as life-enhancing wellness drinks.

Alko's in-house application specialists and engineering know-how create sustainable organoleptical advantages over and beyond what is usually presented by primary manufacturers of ingredients. This is especially demonstrated balancing and harmonising superb taste and flavour concepts together with intrinsic health-enhancing nutraceuticals. The company is leading in technologies of bioactive protein systems and a wide range of synergistically driven support ingredients.

Alko International brings together resources and synergies using the very latest technology coupled on unparalleled reduction of cycle time in concept development that translates into rapid project turnover and speed-to-market efficiency. In-depth experience of a professional and dedicated staff with practical 'can-do' & 'hands-on' experience makes sure their people speak and think the language the customer prefers.

Alko takes extraordinary care to be respectful of their customers' interests and understands the critical nature of compliance and proprietary information. Trust and mutual respect, coupled on leading edge technology will remain the basis as Alko International moves forward.



The company headquarters is nestled in a rural setting in the southern part of Holland, with a vision that spans the globe.



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