Fibresol®-2 Low viscosity Fibre offers flexibility to formulations

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Fibresol®-2 is a unique soluble fibre developed and patented by Matsutani Japan. It offers food manufacturers the opportunity to add soluble fibre to food products without compromising flavour, mouthfeel or ease of digestion.

Fibresol®-2 meets all the requirements for maltodextrin as set out in both the Food Chemicals Codex V and 21 CFR184.1444. It also meets the requirements for US GRAS status and is widely used in FOSHU (Foods for Specific Health Use) products in Japan.

However the unique manufacturing method for Fibresol®-2 means that it is classified as a resistant maltodextrin with, depending on the method of analysis, a fibre content of approximately 90%.

Prior to 1995, both Australia and New Zealand only recognized dietary fibre as determined by the Prosky method (AOAC 985.29). This method does not calculate the fibre contribution from ingredients such as resistant maltodextrins.

Following an application to FSANZ (Application A491), the fibre determination method was amended to include AOAC Official Method 2001.03 which allowed the fibre contribution from resistant maltodextrins such as Fibresol®-2 to be included in nutritional calculations.

Fibre Contribution

Fibresol®-2 is produced from non GM cornstarch using similar technology as that used to manufacture conventional maltodextrin. However, the patented process for Fibresol®-2 specifically converts a proportion of the normal α-1,4 glucose linkages to random 1,2-, 1,3-, and 1,4- α or β linkages. As the human digestive system digests only α-1,4- linkages, only around 60% Fibresol®-2 is absorbed, mostly as a result of microbial fermentation and metabolism in the colon.

As a result Fibresol®-2 has minimum measurable fibre content of 90% on a dry weight basis and a calorific value of 1.9kcal/g (Standard 1.2.8, Food Standards Australia New Zealand 2000)

Handling properties

Fibresol®-2 has extremely low viscosity in solution and is easy to handle.

- Fibresol®-2 does not readily absorb moisture from the environment, and can be used in most manufacturing environments
- Fibresol®-2 readily disperses in cold water and does not need to be pre-blended with other ingredients.
- In a 30% w/w solution, the viscosity of Fibresol®-2 is equivalent to that of sucrose and maltodextrin and therefore has minimal effect on the viscosity or mouthfeel of products.

- Fibresol®-2 is completely soluble up to 70% (w/w) in water at 20°C. At normal usage levels it will produce clear transparent solutions with no effect on product colour.

Stability

Fibresol®-2 is a stable ingredient and can be used in various applications.

- Fibresol®-2 is extremely stable in repeated freeze-thaw cycles and under retort conditions.
- In low pH environments such as fruit products Fibresol®-2 does not degrade under acidic and heating conditions, and retains its fibre status.
- Compared to standard maltodextrins of a similar DE, Fibresol®-2 does not actively participate in Maillard-type browning reactions, and shows minimal tendency to brown.
- Fibresol®-2 is non hydroscopic and can protect final dry blend formulations containing other hydroscopic ingredients.

Flavour profile and sweetness

Fibresol®-2 has little sweetness and is considered to be very bland.

- The sweetness of Fibresol®-2 is less than 10% of that of sucrose, making it suitable for use in savoury, acidic, bland/low flavour, and sweet applications.
- Fibresol®-2 has been found to improve the flavour perception of high intensity sweeteners by modification of the sweetness perception and reducing the lingering aftertaste often associated with artificial sweeteners.

Digestibility

Around 10% Fibresol®-2 is absorbed in the upper gastrointestinal tract (GIT) with approximately 50% metabolised by microbial fermentation in the colon. The remaining undigested material is excreted.

Inulin and fructo-oligosaccharides are widely used as dietary fibre in a wide array of food products and have similar fibre content. Whilst their health benefits are well documented and recognised, adverse side effects, such as flatulence and bloating, are less well publicised. However there is growing acknowledgement of these issues (Scholtens *et al.*, 2006; Ten Bruggencate *et al.*, 2006)

In contrast, Fibresol®-2 is not associated with these adverse effects and is well tolerated by young children and adults alike. Research has shown that there are differences in the digestive processes between different fibre sources, with Fibresol®-2 producing significantly less reduction in gut pH and less short-chain fatty acids production during the microbial fermentation phase in the colon of dogs (Flickinger *et al.*, 2000). The production of less gas and acid, resulting from slower and less extensive fermentation, may accounts for the increasing consumer preference in Japan of Fibresol®-2.

Health benefits of Fibresol®-2

Under the Japanese FOSHU, Matsutani have been able to make a number of validated health claims for Fibresol®-2.

Fibresol®-2 claim	**Reference**
Intestinal regularity	FOSHU 1992
Moderating postprandial blood glucose levels	FOSHU 1994
Lowering serum cholesterol levels	FOSHU 1998
Lowering serum triglyceride levels	FOSHU 1998
Moderating postprandial serum triglyceride elevation	(Kishimoto *et al.*, 2007)

The suitability and acceptability of Fibresol®-2 as a functional ingredient for health benefits is apparent in Japan, where products formulated with Fibresol®-2 accounted for over 24% of all FOSHU foods as at the end of January 2007.

Conclusion

Fibresol®-2 is a unique ingredient with several distinct advantages over alternative forms of fibre. Its compatibility and stability in many different food systems, combined with its potential health benefits, should make it a preferred fibre for food technologists, marketers and manufacturers.

Fibresol®-2 is distributed in New Zealand by Hawkins Watts Ltd (Phone +64 9 622 2720, contact Paul Harrison) and in Australia by ADM (Phone +61 2 9387 2255, contact Geoff Meek)

Bibliography

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