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New study defines the physiological benefits of BENEO's Palatinose™ slow release carbohydrate

According to new research which recently appeared in the British Journal of Nutrition's online version,¹ BENEO's Palatinose™ (isomaltulose) disaccharide carbohydrate has been shown to offer distinct physiological benefits, as tested in a detailed series of human studies.

Holub *et al's* research was centered around discovering what physiological properties the slow, intestinal release of Palatinose™ (observed in enzyme kinetic studies) would manifest in the human body. With this in mind, three separate studies investigated the following:

- Whether Palatinose™ would be fully digestible and available from foods and beverages in humans
- Whether the slow release of Palatinose™ led to complete digestion and absorption and how this would be reflected in its blood glucose response
- What the acceptance and tolerance of Palatinose™ consumption would be over a longer period of time, compared to sucrose, in the human metabolism.

Resounding success

The series of studies by Holub *et al* have clearly presented the metabolic benefits of Palatinose™. Following Holub *et al's* work, Palatinose™ has been shown to be a completely available carbohydrate irrespective of its consumption with food or beverages. The slow yet complete intestinal release of Palatinose™ leads to a prolonged delivery of blood glucose. Regular Palatinose™ consumption is well tolerated, even in subpopulations with increased risk of cardiovascular disease. The results of Holub *et al* suggest that Palatinose™ may even have beneficial effects on long-term carbohydrate metabolism.

Palatinose™ – a completely available carbohydrate

Studies into the digestibility of Palatinose™, carried out at the University of Würzburg, Germany, confirmed that Palatinose™ is indeed essentially fully digested and absorbed from the small intestine, irrespective of its consumption with food or beverages. The digestibility

¹ Reference: Holub I, Gostner A, Theis S, Nosek L, Kudlich T, Melcher R, Scheppach W: Novel findings on the metabolic effects of the low glycaemic carbohydrate isomaltulose (Palatinose™). British Journal of Nutrition 2010. First view articles, published online by Cambridge University Press 09 March 2010.

and absorption of 50g of Palatinose™ in two different food applications was essentially complete. This is the first study on the digestion and absorption of Palatinose™ in humans and confirms data from earlier *in vitro* and animal studies that Palatinose™ is a completely available carbohydrate.

Palatinose™ - the first disaccharide carbohydrate to have low glycemic characteristics AND to deliver blood glucose over a longer period of time

To find out whether the slow yet complete digestion and absorption of Palatinose™ would be reflected in its blood glucose response, a second study was carried out. For this purpose, a 3-hour blood glucose response test was done in healthy adults at the PROFIL Institute in Neuss, Germany. This showed a significantly lower blood glucose and insulin response for Palatinose™ in comparison to sucrose and demonstrated that -- unlike sucrose -- Palatinose™ is a low glycemic carbohydrate. Moreover, the blood glucose response data, together with the findings from the University of Würzburg study, demonstrate that Palatinose™ is very slowly, yet completely digested and absorbed in the small intestine. This leads to a prolonged delivery of blood glucose to the body. Therefore, it can be said that Palatinose™ is the first disaccharide carbohydrate which has low glycemic characteristics and delivers blood glucose over a longer period of time.

Palatinose™ - longer term benefits on carbohydrate metabolism

A third study was undertaken to investigate the physiological effects of daily Palatinose™ consumption on the human metabolism (in comparison with sucrose) over a longer period of time. An intervention trial was conducted in a double-blind, controlled design at the University of Würzburg, in which adults with raised blood lipids consumed 50 g of Palatinose™ or sucrose every day. The trial included various foods as part of a controlled typical Western diet over a four-week period. The study demonstrated that regular Palatinose™ consumption (50 g per day) was well tolerated and had no detrimental effects on blood lipids (including cholesterol and LDL cholesterol) or cardiovascular risk markers. Moreover, carbohydrate-metabolism parameters, i.e. fasting blood glucose levels and insulin resistance, were significantly reduced after four weeks of Palatinose™ consumption, compared to no such significant differences with sucrose. These findings suggest that Palatinose™, taken regularly over longer periods of time, has beneficial effects on carbohydrate metabolism.

Anke Sentko, Vice President, Regulatory Affairs and Nutrition Communication for BENEÓ, comments: "Holub *et al's* findings only support still further the reason why a wide range of food and beverage producers are already using Palatinose™ in their products. From sport and wellness drinks, sports nutrition products, instant beverages and functional dairy drinks,

to teas, cereal and energy bars and baked goods, when you look closely at issues related to nutrition, the functional carbohydrate Palatinose™ can have a significant impact.”

BENEО’s Palatinose™

BENEО’s Palatinose™ is a disaccharide carbohydrate derived from sugar (sucrose). It differs from sugar in its linkage between the glucose and the fructose units (α -1,6 instead of α -1,2 glucosidic in sucrose). Earlier enzyme kinetic studies have shown that the linkage in Palatinose™ is much more slowly digested by the enzymes of the small intestine than the linkage in readily available sugars like sucrose or maltose. Palatinose™ is a tooth-friendly carbohydrate and, as a result of its complete yet slow intestinal release, it provides the full carbohydrate energy (4 kcal/g) in a more balanced way over a longer period of time.

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The **BENEО** product portfolio consists of functional ingredients with nutritional and technical advantages, derived from chicory roots, beet sugar and rice. BENEО is the ideal partner to help improve the health (weight management, energy for mental and physical performance, digestive, bone and dental health), taste, texture and nutritional value (fat and sugar replacement/fiber enrichment) of a product. Through a unique chain of expertise, including the BENEО-Institute, BENEО actively supports (industry partners in) the development of more balanced and healthy food products.

BENEО is a division of the Südzucker Group and has a turnover of €350 million, employs almost 900 people and has production units in Belgium, Germany, Chile and Italy.

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