Key references related to the physiological benefits of Palatinose™ – A carbohydrate with unique physiological properties.

Palatinose™ (generic name: isomaltulose) is a disaccharide carbohydrate derived from sucrose by enzymatic rearrangement of the linkage. The different linkage turns Palatinose™ into a “slow release carbohydrate” with a unique combination of physiological properties: As result of its slow yet complete digestion and absorption, Palatinose™ has a low effect on blood glucose levels (GI: 32) and insulin release. It provides carbohydrate energy in a more balanced way over a longer period of time. And thus it contributes to modern energy management with characteristics like steadier energy supply and a higher contribution of fat oxidation. Apart from that, Palatinose™ is kind to teeth. The slow release properties, the higher fat oxidation and tooth-friendliness are all unique to Palatinose™ and make it different from sugars like fructose or sucrose and HFCS or from malto-oligosaccharides.

BENE0 has undertaken comprehensive research to study the unique nutritional and physiological properties of this functional carbohydrate. Some of these studies have not been published yet for reasons of the still unclear situation in the handling of proprietary data under the European Health Claim Regulation. An overview of the most relevant publications on the physiological properties of Palatinose™ is given in the following:

Table of Content:

1. Palatinose™ - a fully available carbohydrate for slow and sustained energy release ........................................2
   a) Palatinose™ is a fully available carbohydrate .................................................................................2
   b) Palatinose™ is a slow and sustained release carbohydrate .............................................................2
   c) Palatinose™ - the carbohydrate for sustained energy supply ............................................................3
2. Palatinose™ - a low glycemic carbohydrate ..........................................................................................4
3. Palatinose™ and long-term blood glucose control and insulin sensitivity ..............................................5
4. Palatinose™ and its role in weight management .....................................................................................7
   a) Palatinose™ and its influence on fat oxidation in energy metabolism ..............................................7
   b) Long-term benefits of Palatinose™ on body weight and body composition .....................................8
5. Palatinose™ in sports nutrition ..........................................................................................................9
6. Palatinose™ and its potential in cognitive performance and mood .......................................................10
7. Palatinose™ is kind to teeth ...............................................................................................................10
8. Palatinose™ in infant and small children nutrition ..............................................................................12
1. Palatinose™ - a fully available carbohydrate for slow and sustained energy release

   a) Palatinose™ is a fully available carbohydrate

   The essentially complete digestion and absorption of Palatinose™ within the small intestine has been confirmed in human and animal studies. Palatinose™ is a fully digestible carbohydrate and as such provides the full carbohydrate energy (4 kcal/g), respectively.

   Key references:


   b) Palatinose™ is a slow and sustained release carbohydrate

   The “slow release” aspect is based on enzyme kinetic studies which show that the enzymatic hydrolysis of Palatinose™ in the small intestine occurs much slower than that of e.g. sucrose (i.e. difference in $V_{\text{max}}$ by a factor of 4-5). Observations on incretin hormones illustrate that the digestion Palatinose™ and subsequent absorption is a slow process that is extended to more distal parts of the small intestine.

   References:

   Enzyme kinetics


   Heinz F (1987) The enzymatic splitting of sugar substitutes by isolated enzymes and enzyme complexes from the small intestinal mucosa. Hanover University Medical School, Biochemistry Centre, Research Project No. 6539.


**Incretin**


c) **Palatinose™ - the carbohydrate for sustained energy supply**

The sustained energy supply of Palatinose™ is a result of its slow yet complete digestion and absorption along the small intestine and is reflected in subsequent metabolic processes: In comparison with readily available carbohydrates, Palatinose™ shows a slower, overall lower and sustained rise in blood glucose levels. Since blood glucose means fuel for the body and its energy metabolism, the sustained glucose supply from Palatinose™ is associated with a more steady and sustained energy gain from carbohydrate oxidation: Palatinose™ provides sustained energy.

Numerous blood glucose response studies have been conducted on behalf of BENE0 and specifically analyzed to test whether the characteristics of sustained glucose supply from Palatinose™ can be shown in this methodology with its high variance. The sustained glucose supply of Palatinose™ has been concomitantly shown in all of these studies. Moreover, individual studies confirm the link between sustained glucose supply and sustained carbohydrate oxidation.
2. Palatinose™ - a low glycemic carbohydrate

As result of its slow (yet complete) intestinal release, Palatinose™ has a low effect on blood glucose levels and insulin release.

A Glycemic Index (GI) of 32 has been determined for Palatinose™ by Sydney University. The “low glycaemic” properties of Palatinose™ have been experimentally verified in extensive research initiated by BENE0 - including more than 30 human trials from the past 5 to 10 years conducted according to internationally recognized standard methodology in leading test centers worldwide (see Figure on the right) - and are well described in literature. A corresponding claim has been laid down in EU legislation following the publication of a positive EFSA opinion.

References of published blood glucose response studies:


3. Palatinose™ and long-term blood glucose control and insulin sensitivity

Longer-term studies investigated the effects of Palatinose™ on markers of blood glucose control and insulin sensitivity such as glycated haemoglobin HbA1c, fructosamine, effects on long-term postprandial glucose and insulin response curves, fasting glucose and insulin (HOMA).
These include following references:


4. **Palatinose™ and its role in weight management**

As result of its slow release properties and resulting lower and sustained blood glucose response, Palatinose™ triggers less insulin release and therefore enables higher fat oxidation in energy metabolism. Higher levels of fat burning with Palatinose™ in comparison with conventional carbohydrates such as e.g. sucrose or maltodextrin (but also in comparison with fructose) have been observed in human intervention studies with healthy and overweight individuals at mostly sedentary conditions (see below) as well as with physically active trained persons (see 4.).

Related long-term benefits of Palatinose™ refer to body weight and body composition: Longer-term feeding studies in animals reported beneficial effects of Palatinose™ on body fat accumulation and body weight. Some publications provide first human data on the effect of Palatinose™ on body composition, i.e. visceral fat accumulation.

New research on the effects of Palatinose™ on body weight and body composition has not been published yet.
a) **Palatinose™ and its influence on fat oxidation in energy metabolism**


b) **Long-term benefits of Palatinose™ on body weight and body composition**

References of animal studies:


References of human studies:


5. Palatinose™ in sports nutrition

Palatinose™ provides the desired carbohydrate energy for physical activity in a more steady way and at the same time promotes a higher contribution of fat oxidation in energy metabolism than commonly used readily available carbohydrates. A higher level of fat burning is of particular interest in endurance activity where it may spare carbohydrate sources (glycogen) for enhanced endurance. The effect of Palatinose™ on substrate utilization and fat oxidation has been shown in a series of intervention studies which have not been published yet.

Following references are published:


Research at Swansea University investigated the benefits of Palatinose™ on fat oxidation, metabolic control and incidences of hypoglycemia during physical activity in men with type 1 diabetes mellitus, as described in the following publications:


6. **Palatinose™ and its potential in cognitive performance and mood**

Carbohydrates and their supply of glucose to the brain play a central role in cognitive performance and mood. Palatinose™ with its steady and sustained glucose supply is of particular interest with respect to beneficial effects in the later phase after a meal. The potential of Palatinose™ in cognitive performance and mood has been addressed in the following studies:


7. **Palatinose™ is kind to teeth**

Palatinose™ is no substrate for oral bacteria and therefore the first sugar that is kind to teeth. Its toothfriendliness has been confirmed in pH telemetry studies. A corresponding claim has been accepted a) in the USA by FDA and implemented in the Code of Federal Regulations as well as b) in the EU following the publication of a positive EFSA opinion.

References:


8. Palatinose™ in infant and small children nutrition

Palatinose™ is suitable for infants from the age of 6 months, when complementary feeding starts. It provides benefits to milk formula applications when used in place of maltodextrin, glucose or other high glycemic carbohydrates as it is slowly and fully available and therefore provides a low blood glucose profile. Hence, Palatinose™ brings the metabolic profile closer to that of mother milk. The suitability and good tolerance of Palatinose™ have both been confirmed in a study with infants.

Reference:

Want to know more?
If you have any questions, please contact us at contact@beneo.com. We will be happy to assist you.

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