

The soluble, non-viscous fermentable fiber NUTRIOSE[®] is slightly digested in the upper intestine and is highly used along the length of the entire gastrointestinal tract by the gut bacteria providing slow and sustained metabolic energy. NUTRIOSE[®] may be a consistent source of healthy energy to feed the body functions. Simply put, it helps energize the body from inside!

Energy? It is a simple term with complex meanings. Cells are constantly carrying out thousands of metabolic reactions needed to keep the cells and the body as a whole, alive or healthy. In our body, some of those metabolic reactions need energy and release energy. The food you eat is the source of the energy used by your cells.

THE ENERGY FROM DIFFERENT ORIGINS

The well-known source of energy is glucose. Digestible carbohydrates are digested in the small intestine leading to the release of glucose which is a major source of energy in the body.

However, many other metabolic processes occur and provide other sources of energy. A process called fermentation, where the microbiota is the main actor, uses the undigested fiber and produces short chain fatty acids like acetate, propionate, and butyrate. These substances act as fuel in the gut and beyond the gut. In other words, the colonic fermentation is also part of the energy supply for the body functions called the metabolic or physiologic energy.

UNDERSTANDING THE BENEFIT OF METABOLIC ENERGY

Carbohydrates, proteins and fats all help deliver energy to our bodies in different ways; however, carbohydrates including fibers are a key fuel source. Scientific studies provide insight into how certain foods and ingredients can help sustain longer-lasting energy that can help keep our move on. Metabolic energy utilizes the food that we eat and that our body metabolizes to fuel all body functions and all that humans do. In other words, just as living things must continually consume food to replenish their energy supplies, the body's metabolic activity must continually produce more energy to replenish that used by the many energy-requiring processes that constantly take place.

Metabolic or physiologic energy is an important part of the energy supply. It fuels every voluntary and involuntary process in our body. Consumers commonly believe that different foods can impact the supply of energy as well. Many consumers are seek foods that they believe will deliver a sustained energy level-one that helps to keep them going healthy.

NUTRIOSE® has been demonstrated to physiologically deliver sustained energy release, helping the human body to reach an energy balance.





A FIBER THAT PROVIDES A BONUS SUPPLY OF METABOLIC ENERGY

NUTRIOSE® is food ingredient formulated for use in many common consumer foods. NUTRIOSE® is slightly digested into glucose in the small intestine with a low impact on blood glucose, maintaining blood glucose levels in healthy adults. Then NUTRIOSE® is largely used in the colon by the bacteria. Unlike starches and sugars that are metabolized higher in the small intestine, NUTRIOSE® releases energy throughout the entire digestive tract, including the lower intestine or colon, where fermentation of the fiber takes place over a long period of time. This fermentation essentially creates a "bonus" supply of energy at the end of the metabolic process, establishing an extended energy release for use by the body.

THE METABOLIC ENERGY EXPLAINED WITH SCIENTIFIC PROOFS

Intestinal fermentation of NUTRIOSE[®] and subsequent energy release can be correlated with respiratory hydrogen (H₂) and carbon dioxide (CO₂) excretion. These are collected by measuring these gases in human breath. Expiration of H₂ is indicative of end metabolic products following colonic fermentation while expiration of CO₂ reflects NUTRIOSE[®] metabolites conversion and subsequent energy availability.

Two controlled, cross-over clinical trials have demonstrated NUTRIOSE®'s propensity to extend energy release throughout the digestive process ¹.

In one study of 10 healthy adults of over 7 days, breath H_2 excretion, as a marker of colonic fermentation, increased in the group fed 15g/day of NUTRIOSE® as opposed to the control group who consumed 15g/day of a common food starch, maltodextrin ².

A second study measured respiratory CO_2 excretion in 12 healthy adults fed a standardized breakfast containing either 50g of NUTRIOSE® or 50g of maltodextrin. Shortly after breakfast CO_2 measurements in the group fed maltodextrin increased dramatically indicating rapid energy release through glucose release. However the group fed NUTRIOSE® demonstrated only a slight increase in CO_2 due to its poor digestion in the small intestine into glucose. Interestingly, the NUTRIOSE®-fed group demonstrated a steady excretion of CO_2 over 10 hours paralleling the increase of H₂ excretion due to colonic fermentation ⁽³⁾.



A FIBER THAT CAN EASILY HELP FILL THE FIBER GAP

An additional advantage of NUTRIOSE[®] soluble fiber is a nutrient that most people worldwide do not consume in adequate amounts. NUTRIOSE[®] soluble fiber has the advantage to fill this gap in nutrition. National dietary survey data revealed average fiber intakes of around 20g/day for men and around 15g/day for women. These intakes are well below the general recommendations included in guidelines developed by countries on the optimal daily intakes of fiber which are around 25 g to 35 g per day ⁴.

Fiber is starting to be considered a "nutrient of public health concern" in many countries. NUTRIOSE® swapped into commonly consumed foods for other carbohydrate sources or added to a meal has the potential to help improve fiber intakes for a healthy lifestyle.

NUTRIOSE® SOLUBLE FIBER: THE DAILY ENERGY SUPPLY FOR WHOLE BODY FUNCTIONS

Thanks to its particular metabolism, NUTRIOSE® displays the advantage to produce slow and sustained energy release. NUTRIOSE® is a consistent source of healthy energy to feed the body functions. This versatile ingredient NUTRIOSE® helps to solve two gaps: the fiber gap across the worldwide population and, by providing a more sustained release of healthy and metabolic energy, it can also help to close the energy gap.

Scientific References

¹: Guérin-Deremaux et al., 2018, Dietary Fibre Conference

- ²: van den Heuvel *et al.*, 2004, Eur J Clin Nutr
- ³: Nazare *et al.*, 2011, J Am Coll Nutr
- ⁴: Stephen *et al.*, 2017, Nutr Res Rev

