

Decoding dietary fibers

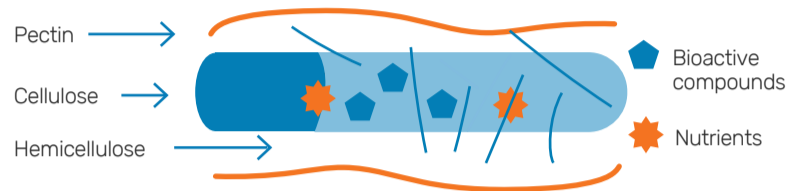
From structure to health impact

Dietary fibre is primarily derived from plant-based foods. Despite this, intakes remain **below recommended levels** in many populations and continue to represent a public health concern. This infographic provides an overview of current scientific evidence on dietary fibers for healthcare professionals.

What is dietary fiber?

It is a **diverse group of carbohydrate polymers** of plant a powerful argument for origin that cannot be digested or absorbed in the human plant-forward eating patterns, upper gastrointestinal tract. As a result, they reach the yet it remains one of the most colon essentially intact, where they **become available under-consumed nutrients as substrates for the resident gut microbiota**¹.

In whole plant foods, fibers form part of the cell wall health concern. This factsheet architecture, where they coexist with other nutrients and provides an overview of current bioactive compounds (e.g., polyphenols, phytosterols)².



Different types of dietary fibers have distinct roles in health



Fibers differ widely in their chemical composition and physical behavior, which is why they cannot be considered interchangeable. Two complementary classification (structural and physicochemical) help characterize this diversity³.

Structural diversity

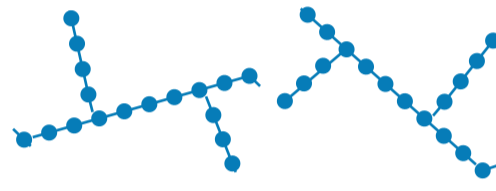
1

The degree of polymerization (the number of repeating sugar units, or "monomers", in the chain)



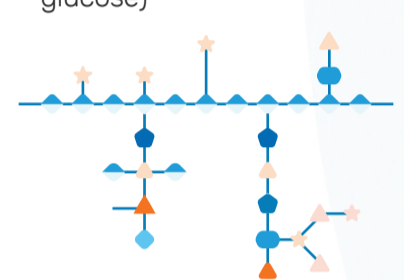
2

The backbone geometry (linear or branched)

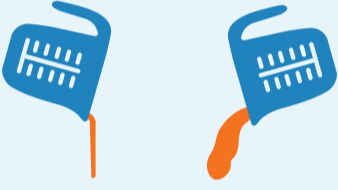


3

The nature of the monomers themselves and their linkages (e.g., fructose, galactose, glucose)



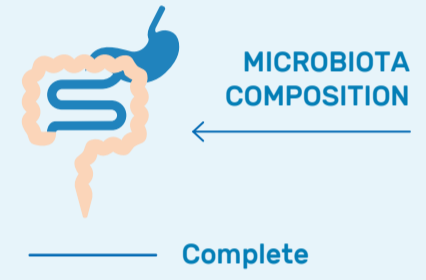
Physicochemical properties



Viscosity: the capacity to form gel-like solutions when mixed with fluids, increasing the thickness of the intestinal contents⁴.



Solubility: the ability to dissolve in water (water-soluble or -insoluble fibers). Influencing gut transit and fermentation.



Fermentability: the extent to which a fiber can be fermented by the gut microbiota in the large intestine. Fermentability can be influenced by fiber structure (e.g., the chain length of the fiber can impact the speed and the site of fermentation along the colon).

Mechanisms of action in the body

Dietary fibers exert their effects at successive stages of the gastrointestinal tract, through both mechanical and metabolic pathways.



In the stomach and small intestine. Certain fibers swell and increase the viscosity of the intestinal contents. This modulates gastric emptying and transit time, promotes satiety, influences nutrient absorption – notably glucose –, and affects bile acid reuptake, with downstream consequences on cholesterol metabolism⁵.

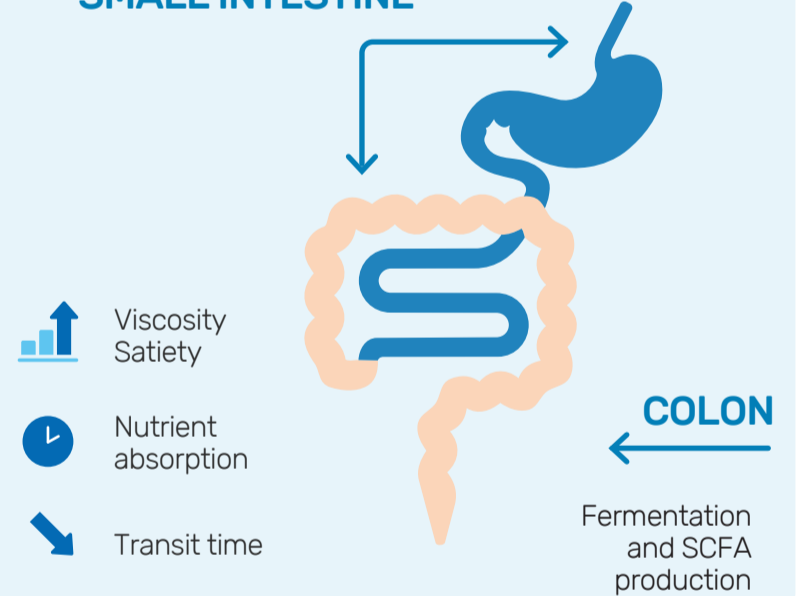


In the colon: fermentation and SCFA production. Fibers reaching the colon **may be fermented** by the resident bacteria, generating **short-chain fatty acids** (SCFAs) with distinct roles⁵.

Butyrate: serves as an **energy source** for colon epithelial cells and **modulates cell signaling and immune regulation**.

Acetate and propionate: are absorbed into the bloodstream, contributing to energy metabolism and potentially influencing satiety via the brain's satiety center.

STOMACH AND SMALL INTESTINE



COLON
Fermentation and SCFA production

A fiber-rich diet shapes the gut microbiota. By promoting the growth, composition and diversity of gut microbiota, fibers play a key role in the inflammation regulation⁶.

Demonstrated health benefits

Systematic reviews and meta-analyses report 15 to 30% risk reduction in chronic diseases and all-cause mortality^{5,7}.



Body weight and obesity. Evidence from a meta-analysis of 15 RCTs demonstrates **significant reductions in body weight, body fat, and BMI** with viscous fiber supplementation in calorie-restricted individuals⁸.



Type 2 Diabetes (T2D). A large-scale study (n = 26,088) demonstrated a **reduction in T2D risk** with total, vegetable, and cereal fiber consumption, after adjustment for dietary and lifestyle factors⁹.



Cardiovascular disease (CVD). A systematic review and meta-analysis of 22 cohort studies reported an inverse association between fiber intake and CVD risk, with particularly strong evidence for **coronary artery disease**¹⁰.

Bridging to practice: Why fiber diversity matters

Scientific evidence highlights that the health benefits of dietary fiber are maximized when **multiple regions of the gastrointestinal tract are engaged and diversity is key**. While whole plant foods remain the foundation of fiber intake, globally, fiber intake remains far below recommendations, with **significant implications for public health**. Familiar, ready-to-consume food formats can contribute to bridge this gap particularly in habitual eating occasions.

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