

# Different biotics and their value in combinations

## Definitions, differences and health benefits



### Prebiotics

#### What are prebiotics<sup>1</sup>?

Prebiotics are **substrates** (non-digestible dietary fibers) that are selectively utilized by host microorganisms to induce a health benefit.

#### Some health benefits of prebiotics<sup>1</sup>:

- Altering the composition or function of gut microbiota to provide health benefits
- Improving digestive function
- Improving the body's natural defenses
- Improving mineral absorption
- Regulating appetite, energy balance and metabolism



### Probiotics

#### What are probiotics<sup>1</sup>?

Probiotics are **live microorganisms** that, when administered in adequate amounts, can induce health benefits to the host.

#### Some health benefits of probiotics<sup>1</sup>:

- Helping the immune system to function normally
- Aiding in digestion and gastrointestinal homeostasis
- Keeping harmful microorganisms under control
- Improving mineral absorption
- Producing vitamins and helping in nutrient absorption



### Postbiotics

#### What are postbiotics<sup>2</sup>?

Postbiotics are a preparation of **inanimate microorganisms and/or their components** that induce a health benefit to the host.

#### Some health benefits of postbiotics<sup>2</sup>:

- Improving gastrointestinal discomfort (e.g. in chronic diarrhea)
- Reduction of IBS symptoms
- Reduction in severity of COPD and asthma
- Improving mineral absorption
- Reduction in the number of acute respiratory infections



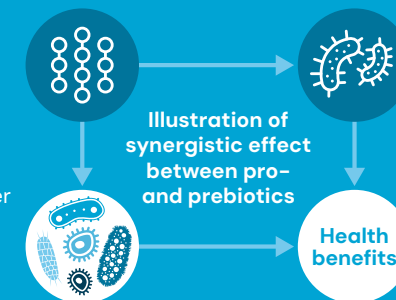
### What's the value in combining different biotics?

#### Synbiotics: More than simple probiotic-prebiotic mixture

Synbiotics are a mixture of **live microorganisms** and **substrate(s)** that confer health benefits to the host either by complementary or synergistic effects<sup>3</sup>.

#### What is the added value of combining microbes and (prebiotic) substrates?

Pro- and prebiotics in a mixture can each work **independently** to achieve certain health benefit(s)<sup>3</sup> within one formulation. However, depending on their type and nature, the live microbes and selectively-utilized substrate can also **synergistically** work together in a mixture to bring a health benefit that cannot be met with microbes or their substrates when used alone<sup>3</sup>.



#### Other future (prospective) biotics or their combinations:

With increasing knowledge in the field of **postbiotics**, the definition of synbiotics may evolve in future to include postbiotics as substrates that might synergistically work with live microbes.

In addition, recent scientific evidence shows that Microbiome Targeted Technology (MTT™) used to deliver vitamins into the lower intestines and colon can be an efficient tool to modulate composition and metabolic activity of the human gut microbiome. Thus, it can be speculated that the combination of colon-targeted vitamins with other biotics might also bring further synergistic effect to enhance/promote microbiome homeostasis.

dsm-firmenich biotic offerings and their contribution to a healthy gut ecosystem	Next-generation prebiotics			Compounds with biotic-like characters		
	Probiotics	Human milk oligosaccharides (HMOs)	Natural plant extracts (e.g., Fruitflow®)	Postbiotics	Vitamins with MTT™	Digestive enzymes
Maintain a healthy gut environment*			✓		✓	
Selectively support keystone species		✓			✓	
Gut barrier integrity	✓	✓	✓	✓	✓	
Microbiome independent mechanisms	✓	✓	✓	✓	✓	✓

\*Direct effects on the gut redox and bacteria metabolism

**References:** 1. International Scientific Association for Probiotics and Prebiotics 2019, 2. Salminen et al, 2021; Nat Rev Gastroenterol Hepatol, 3. Swanson et al, 2020; Nat Rev Gastroenterol Hepatol, 4. Liu et al, 2023; Antioxid Redox Signal, 5. Pham et al, 2021; Gut microbiome

**Abbreviations:** COPD: chronic obstructive pulmonary disease; IBS: irritable bowel syndrome; MTT™: Microbiome Targeted Technology™

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dsm-firmenich offers a variety of options for biotics and biotic combinations.

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