

Probiotics, Prebiotics, Synbiotics, Postbiotics and Fermented Foods

DEFINED

Many terms in the 'biotic' space have emerged. Although probiotics, prebiotics, and synbiotics have more than a 25 year history, other biotic terms are relatively new. These terms are widely used in both scientific literature and popular media, and while they are intended to be descriptive, they often are confused and misused.

ISAPP has enlisted the help of multiple global experts across disciplines to provide perspectives in formulating consensus definitions that reflect current science for many of these terms. The goal of the consensus panels has been to describe clearly what these terms are in order to support their proper use by stakeholders.


In addition to the criteria stipulated below, all substances must be safe for their intended use. For substances required to have a demonstrated health benefit in the target host, all product formulations must deliver an efficacious level of substance and must be clearly identified.

Probiotic

Simple way to conceptualize

Live microbes present?

Demonstrated health benefit required?



Consensus definition

Live microorganisms that, when administered in adequate amounts, confer a health benefit on the host (Hill et al., 2014)

Simple way to conceptualize

Live microbes that are good for your health

Live microbes present?

Yes

Demonstrated health benefit required?

Yes

Examples

Bifidobacterium animalis subsp. *lactis* XYZ

Genus: *Bifidobacterium*

Species: *animalis*

Subspecies: *lactis*

Strain: XYZ

Keep in mind

Identity must be confirmed through genome sequencing. Sufficient viability to deliver the health benefit must be preserved through to the end of shelf life.

Probiotics

What are probiotics?

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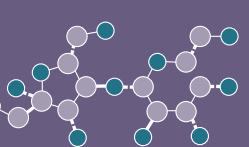
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Prebiotic

Simple way to conceptualize

Live microbes present?

Demonstrated health benefit required?



Consensus definition

A substrate that is selectively utilized by host microorganisms conferring a health benefit on the host (Gibson et al., 2017)

Simple way to conceptualize

Food for beneficial microbes residing on or within the host

Live microbes present?

No

Demonstrated health benefit required?

Yes

Examples

Prebiotics include galactooligosaccharides, fructooligosaccharides, inulin, lactulose, certain types of resistant starch and human milk oligosaccharides

Keep in mind

Look for appropriate characterisation and research to confirm the prebiotic status of an ingredient

Prebiotics

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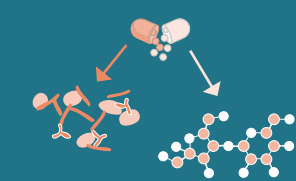
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Synbiotic

Simple way to conceptualize

Live microbes present?

Demonstrated health benefit required?



Consensus definition

A mixture comprising live microorganisms and substrate(s) selectively utilized by host microorganisms that confers a health benefit on the host (Swanson et al., 2020)

Simple way to conceptualize

Complementary synbiotic is a mixture of probiotic + prebiotic

Synergistic synbiotic contains a live microbe and a substrate that it can use for growth

Live microbes present?

Yes

Demonstrated health benefit required?

Yes

Example

Complementary synbiotic: inulin + *Bifidobacterium animalis* subsp. *lactis* XYZ

Keep in mind

A health benefit must be shown for a synbiotic as combined, not just the probiotic alone and the prebiotic alone.

Synbiotics

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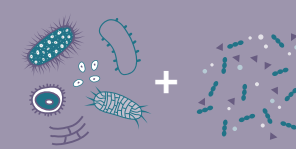
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Postbiotic

Simple way to conceptualize

Live microbes present?

Demonstrated health benefit required?



Consensus definition

Preparation of inanimate microorganisms and/or their components that confers a health benefit on the host (Salminen et al., 2021)

Simple way to conceptualize

Non-viable microbes and/or cell components with or without metabolites

Live microbes present?

No. Live microbes are the starting point to make a postbiotic, but they are intentionally inactivated

Demonstrated health benefit required?

Yes

Examples

Some infant formulas, therapeutic bacterial lysates and yeast fermentates used in animal feeds

Keep in mind

Purified metabolites (e.g., butyric acid) do not qualify as postbiotics

Postbiotics

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Fermented Foods

Simple way to conceptualize

Live microbes present?

Demonstrated health benefit required?



Consensus definition

Foods made through desired microbial growth and enzymatic conversions of food components (Marco et al., 2020)

Simple way to conceptualize

Foods that are made through the growth of live microbes

Live microbes present?

Sometimes yes, sometimes no. Live microbes not required in final product.

Demonstrated health benefit required?

No

Examples

Yogurt, kefir, sauerkraut, sourdough bread

Keep in mind

Microbes present not required to be defined and may be live or dead

How are probiotic foods and fermented foods different?

PROBIOTICS

Microorganisms that confer a health benefit on the host when administered in adequate amounts.

PROBIOTIC FOODS

Foods that contain live microorganisms that confer a health benefit on the host when administered in adequate amounts.

FERMENTED FOODS

Foods made through desired microbial growth and enzymatic conversions of food components.

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