\ RESEARCH BRIEF

New Synbiotic Potential Score (SPS) for rationale Synbiotic Selection

The Purpose:

To develop a rapid and quantitative screening platform to identify strain-specific prebiotic–probiotic combinations with the highest synbiotic potential.

ISAPP definition of SYNBIOTICS

A mixture, comprising live microorganisms and substrate(s) selectively utilized by host microorganisms, that confers a health benefit on the host[1].

Synbiotics are increasingly explored as **targeted nutritional tools to modulate the gut microbiota and support host health.**

Synergistic synbiotics in particular, are designed to **combine specific probiotic strains with prebiotic substrates** that are selectively utilised by those strains, thereby **enhancing functional efficacy.**

However, **not all probiotic strains utilise prebiotic fibres equally**, and commonly used in vitro screening methods often fail to capture strain-specific growth behaviours.

Synbiotic Potential Score (SPS)

$$SPS = \frac{(\text{growth on fibre}) - (\text{background growth})}{(\text{growth on glucose}) - (\text{background growth})}$$

Quantitative strain-fibre screening › Reduction of background-driven effects › Objective ranking of strain–fibre combinations

Revealing true fibre-driven microbial growth:

The SPS enables a clearer assessment of true synbiotic activity.

By integrating nutrient-limited conditions with full growth-curve analysis, SPS captures fibre-specific microbial responses over time, avoiding bias from single time-point measurements and enables a more nuanced evaluation of both rapidly fermented and complex fibres.

PROMITOR® Soluble Fibre	Displays selective prebiotic activity under nutrient-limited conditions, revealing fibre-driven microbial growth that may be masked in rich media.
EUOLIGO® FOS	Consistently supports strong bifidogenic growth across strains, even under minimal nutrient conditions, reflecting its rapid and readily fermentable nature.
Combinations of the two fibres	Combining EUOLIGO® FOS and PROMITOR® Soluble Fibre revealed complementary, strain-specific growth patterns, highlighting how fibre blends can support differentiated synbiotic strategies.

Conclusions:

- The Synbiotic Potential Score (SPS) is a simple way to compare how well different fibres support the growth of beneficial bacteria, *in vitro*.
- SPS allows many **fibre–strain combinations to be tested and ranked quickly.**
- With this methodological framework, **SPS helps reveal the real effect of each ingredient: EUOLIGO® FOS shows broader and faster support of bacterial growth**, while **PROMITOR® Soluble Fibre shows more selective**, condition-dependent utilisation, highlighting different synbiotic roles rather than a one-size-fits-all approach.
- **Combining fibres reveals complementary utilisation by bacteria**, highlighting **opportunities to better match fibres with specific strains** in synbiotic development.

References

1. Swanson, K.S., Gibson, G.R., Hutkins, R., Reimer, R.A., Reid, G., Verbeke, K., Scott, K.P., Holscher, H.D., Azad, M.B., Delzenne, N.M.: The International Scientific Association for Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of synbiotics. Nat. Rev. Gastroenterol. Hepatol. 17, 687–701 (2020).