

PREBIOTICS

SUMMARY REPORT: CONSIDERATION FOR CLASSIFICATION OF A SUPPLEMENT INGREDIENT

The ABCD Classification system ranks sports foods and supplement ingredients into four groups according to scientific evidence and other practical considerations that determine whether a product is safe, permitted, and effective in improving sports performance. The classification of supplements and sports foods is made via the consideration of the AIS Sports Supplement Framework Committee and evolves according to new knowledge plus the informed direction of our key stakeholders. This report summarises decisions made regarding the addition or reclassification of a substance within the System, based on evidence provided by the applicant and assessed (and potentially augmented) by the Framework Committee.

| SUMMARY REPORT FOLLOWING CONSIDERATION OF ADDITION/ALTERATION OF SUPPLEMENT INGREDIENT | |
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| Name/ Formulation & description | <p>Prebiotics: A prebiotic is defined as 'a substrate that is selectively utilized by host microorganisms conferring a health benefit.'¹</p> <p>Sources include 'prebiotic-like' foods and products that contain (one or more) concentrated extracts. Fructo-oligosaccharides (FOS), galacto-oligosaccharides (GOS), soybean-oligosaccharides, mannan oligosaccharides, xylo-oligosaccharides, inulin, partially hydrolysed guar gum, lactulose, and resistant starches (types 1, 2, 3, and 4).</p> <p>The doses used in studies demonstrating a significant alteration in microbial composition and metabolism, vary greatly and are individual-microbiome dependent.</p> |
| Current AIS Supplement Framework Classification | NA |
| Agreed AIS Supplement Framework Classification | Group C |
| Proposed benefit[s] | <p>Prebiotics are substrates selectively utilised by the host microbiome conferring a health benefits to the host. They may:</p> <ol style="list-style-type: none"> 1. Enhance gastrointestinal immune function and competitive inhibition of pathogens (help an athlete be more resistant to infections i.e., traveller's diarrhoea² and UTIs) 2. Improve bowel function³ 3. Have some anti-colon cancer properties³ 4. Have some lipid lowering effects⁴ 5. Improve glucose tolerance⁴ |
| Proposed mechanism of action[s] | <p>Consumption of prebiotic like foods and/or prebiotic supplements balance and restore a dysbiotic gastrointestinal environment caused by negative factors including diet, certain medication use, physical and psychological stressors.</p> <p>While complex, it is thought they do this by increasing microbial diversity and key bacterial species that produce a variety of end products including short chain fatty acids.</p> <p>Prebiotic mechanisms:</p> <ol style="list-style-type: none"> 1. increase Bifidobacterium spp. 2. increase lactobacillus spp. 3. increase faecalibacterium prausnitzii, 4. increase in Roseburia spp. 5. increase in Eubacterium spp. 6. decrease beta-glucuronidase activity 7. decrease faecal concentrations of protein putrefactive by products and pathogenic bacteria |

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| Summary of supporting evidence | <p>Most human studies evaluating the effects of prebiotics have explored effects on the composition of the gastrointestinal microbiota. These studies report significant increases in <i>Bifidobacterium</i> and to a lesser-degree <i>Lactobacillus</i> bacterium and <i>Faecalibacterium prausnitzii</i>, <i>Roseburia</i> and <i>Eubacterium spp.</i> and their by-products.</p> <p>The main prebiotics researched are fructo-oligosaccharides (FOS), galacto-oligosaccharides (GOS), lactulose and partially- hydrolysed guar gum.</p> <p>Taking Lactulose, GOS and FOS have all been found to be effective in the management of constipation. GOS have been found to reduce the incidence of 'traveller's diarrhoea and FOS to reduce the severity of diarrhoea.</p> <p>Administration of lactulose or oligofructose-enriched inulin has been found to reduce beta-glucuronidase activity [protective against colon cancer].</p> <p>Lactulose has been shown to reduce incidence of urinary tract infections.</p> <p>Inulin plus oligofructose has been shown to significantly improve calcium absorption in women. and promote satiety</p> |
| Limitations to current science | <ul style="list-style-type: none"> > Prebiotic foods and ingredients used in products are considered safe. > The 'capacity' of a prebiotic ingredient to exert an effect on the microbial ecosystem is dependent on the microbes present in the gut to ferment them > The main adverse effects are gastrointestinal symptoms of bloating, distension, and increased flatulence. > Effect on sport performance is varied, because of a high degree of inter-individual variation in response. > There remain some conflicting results regarding therapeutic outcomes e.g., FOS has not shown benefits in reducing symptoms of irritable bowel syndrome but GOS has > Allergies to prebiotics ingredients are rare but have been reported |
| Final consensus | Group C |

REFERENCES

1. Gibson, G. R. et al. (2017). Expert consensus document: The International Scientific Association for Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of prebiotics. *Nature reviews Gastroenterology & Hepatology*, 14, 491.
2. De Preter, V. et al. (2008). Effect of dietary intervention with different pre- and probiotics on intestinal bacterial enzyme activities. *European Journal of Clinical Nutrition*, 62, 225-231.
3. Vulevic, J., Juric, A., Tzortzis, G. & Gibson, G. R. (2013). A mixture of trans-galactooligosaccharides reduces markers of metabolic syndrome and modulates the fecal microbiota and immune function of overweight adults. *The Journal of Nutrition*, 143, 324-331.
4. Cummings, J., Christie, S. & Cole, T. (2001). A study of fructooligosaccharides in the prevention of travellers' diarrhoea. *Alimentary Pharmacology & Therapeutics*, 15, 1139-1145.

The Australian Institute of Sport (AIS) Supplement Framework is an initiative of the Australian High Performance Sport System. The AIS acknowledges the support of members of the National Institute Network (NIN) and National Sporting Organisations (NSO) and their staff in delivering content expertise. This information is intended to help athletes, coaches and scientists make evidence-based decisions about the use of supplements and sports foods. Before engaging in supplement use, we recommend that each individual refer to the specific supplement policies of their sporting organisation, sports institute or parent body, and seek appropriate professional advice from an accredited sports dietitian www.sportsdietitians.com.au.

Athletes should be aware that the use of supplements may have doping implications. Athletes are reminded that they are responsible for all substances that enter their body under the 'strict liability' rules of the World Anti-Doping Code. Some supplements are riskier than others. The Sport Integrity Australia (SIA) app is a useful resource to help mitigate the risk of inadvertent doping by helping to identify supplements that have been batch-tested. The SIA App provides a list of more than 11,000 batch-tested products. We recommend that all athletes consult the educational resources of SIA regarding the risks associated with supplements and sports foods. While batch-tested products have the lowest risk of a product containing prohibited substances, they cannot offer you a guarantee that they are not contaminated www.sportintegrity.gov.au/what-we-do/supplements-sport.

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Last updated March 2021

