



Clasado Limited

United Kingdom

Web: www.clasado.com

Draft Carbohydrates and Health report scientific consultation: 26 June to 1 September 2014

We wish to make a representation concerning:

1. Chapter 9 Non-digestible oligosaccharides and resistant starch
2. Chapter 11 Dietary Reference Values
3. Chapter 12 Dietary carbohydrate recommendations

1. Chapter 9 Non-digestible oligosaccharides and resistant starch

Clasado has a specific interest in galactooligosaccharides (GOS) having supplied a proprietary GOS (Bimuno®) to the market as a food supplement since 2007. As part of our extensive scientific research programme we have built up a substantial body of peer reviewed published and unpublished scientific research that unequivocally demonstrates a range of health benefits for the product.

We recognise that owing to the relative paucity of data concerning non-digestible oligosaccharides compared with other dietary fibres, SACN have taken the option of grouping non-digestible oligosaccharides together when considering individual health benefits. However, we consider that such a grouping fails to recognise that non-digestible oligosaccharides can differ markedly in the functional properties and health benefits they exhibit. Indeed, each of the different GOS types mentioned in the draft Report is made using different enzymes.

Differences in the way individual oligosaccharides are produced e.g. the use of different enzymes in the production of GOS will result in products with a different biochemical structure and molecular weight distribution. These structural differences lead to clear measurable differences in functionality. This point is recognised in the report 'Summary and Conclusions' [for Chapter 9 Non-digestible oligosaccharides and resistant starch], section 9.60.

Please note that the effect of Bimuno® GOS on the colonic microbiota is supported by two further publications; Silk et al 2009 and Vulevic et al 2013. These were not picked up by the Report literature search. We request that these be included in the final version of the Report. [Note Silk et al 2009 is wrongly assigned as a single blinded study when in fact it was double-blinded; Vulevic et al., 2013 missed the second literature search carried out in 2012]

The bifidogenic response to GOS (sections 9.28 & 9.29)

The individual types of GOS listed in the draft Report (Bimuno®, Vivinal, Oligomate and a research GOS) exhibit significant bifidogenic differences. The composition of Bimuno® is given in Table and the reported bifidogenic effect is listed in Table 2. Our own as yet unpublished research using Bimuno® GOS has demonstrated a significant bifidogenic effect even at doses of 1.375g/day

Table 1 Level of GOS in Bimuno®

Composition of Bimuno® Prebiotic	Depeint (2008), Silk (2009) g/7g of Bimuno®	Vulevic (2008, 2013) g/5.5g of Bimuno®
Moisture	0.62	0.19
GOS	2.65	2.67
Lactose	1.21	1.44
Monosaccharides	1.66	0.68
Drying aid	0.52	0.24
Ash	0.3	0.23
Protein	0.05	0.05

For each of the Papers included in the draft Report we have noted the dose required to cause a bifidogenic response. We have included the results from the Vulevic et al., 2013 study.

Table 2 Not all GOS elicit a bifidogenic response

Reference	Type of GOS	Amount of GOS g/day	Bifidogenic effect
Alles et al., 1999	Vivinal	7.5 & 15	No
Ben et al., 2008	Vivinal	Unclear	Unclear
Bouhnik et al., 2004	Oligomate	2.5-10	Only at 10g/day
Depeint et al., 2008	Bimuno®	2.65	Yes
Goplal et al., 2003	Experimental GOS	2.4	Yes
Ito et al., 1990	Oligomate	2.5, 5 & 10	Only at 10g/day
Tannock et al., 2004	Oligomate	2.5	No
Silk et al., 2009	Bimuno®	2.65	Yes
Van Dokkum et al., 1999	Vivinal	15	(Increased SCFA)
Walton 2012 et al., 2012	Vivinal	4	No
Vulevic et al., 2008	Bimuno®	2.67	Yes
Vulevic et al., 2013	Bimuno®	2.67	Yes

Given these clear differences, GOS made from different enzymes should be considered as individual products

Untoward effects of GOS

The draft Report comments that there may be adverse or untoward effects from doses of non-digestible oligosaccharides, viz:

9.63 The supplement doses of resistant starch, non-digestible oligosaccharide or inulin at which the effects described above become apparent is above levels currently consumed in typical diets in the UK, but recent and future developments of novel food ingredients may substantially increase the intake of these carbohydrates. The actual intake and extent of use of these novel foods is, as yet, unknown. The doses required for these effects may cause adverse gastrointestinal symptoms such as bloating, borborygmi and flatulence in the majority of the population

We wish to point out that while it is indeed the case that some forms of fibre and fast fermented oligosaccharides can cause adverse gastrointestinal symptoms, particularly at higher doses, no such effects have been reported in Bimuno® GOS research (Depeint et al., 2008; Vulevic et al., 2008; 2013). Bimuno® has actually been shown to relieve such effects. Silk et al., (2009) showed that individuals who suffered with IBS and therefore had a heightened sensitivity to these untoward effects obtained relief from bloating, flatulence and abdominal pain when given Bimuno® at 2.65g/day. This further supports our assertion that the grouping GOS fails to reflect their clear differences in terms of form, functionality and health effects.

2. Chapter 11 Dietary Reference Values: Fibre

Section 11.15 includes the following phrase:

‘Therefore it is recommended that dietary fibre should be defined as all carbohydrates that are naturally integrated components of foods and that are neither digested nor absorbed in the small intestine and has a degree of polymerisation of three or more monomeric units, plus lignin’

The use of the expression ‘naturally integrated components of food’ needs clarification. What does ‘naturally integrated’ mean? Does this exclude or include Food Supplements or foods enriched with fibre? Does this mean that the ‘isolated dietary fibres’ mentioned in the last bullet point in section 12.27 are included or excluded from potential health benefits?

3. Chapter 12 Dietary carbohydrate recommendations

It seems that from the following recommendation, non-digestible oligosaccharides would be excluded from health benefits related to fibre intake (where we understand that ‘isolated dietary fibres’ includes ‘non-digestible oligosaccharides’):

- *Dietary fibre intake should be largely achieved from a variety of foods, such as whole grains, pulses (e.g. kidney beans, haricot beans, lentils), potatoes, vegetables and fruits, where it is a naturally integrated component. At this time, it is not known whether extracted or isolated dietary fibres would convey the range of health benefits associated with the consumption of dietary fibre rich foods.*

The draft Report cites many instances where non-digestible oligosaccharides have effects that are potentially health related, but carry the caveat *‘whether this effect is beneficial or of biological relevance is currently unclear’*:

- Non-digestible oligosaccharide or inulin and fractional calcium absorption (9.49-9.50)
- Infant faecal bacteria (9.51-9.53)
- Infant faecal pH and short chain fatty acid content (9.56-9.57)
- Fructo-oligosaccharides and faecal bacteria (9.26-9.27)
- Galacto-oligosaccharides and faecal bacteria (9.28-9.29)

Two exceptions were:

The effects of non-digestible oligosaccharides on fasting blood lipid concentrations (9.6-9.8) and on faecal weight (9.18-9.23) were both denoted as ‘biologically significant’.

We feel that the phrase *'it is not known whether extracted or isolated dietary fibres would convey the range of health benefits associated with the consumption of dietary fibre rich foods'* does not reflect the real situation and should be modified to associate 'isolated dietary fibres' with health benefits, with an additional comment that further research will clarify the health associations.

The draft Report mentions that *'recent and future developments of novel food ingredients may substantially increase the intake of these oligosaccharides'*. Modification of the recommendation as we suggest will provide an impetus for future research and development of these dietary fibres.

Bibliography

Silk DBA, Davis A, Vulevic J, Tzortzis G, Gibson GR

Clinical trial: the effect of a trans-galactooligosaccharide prebiotic on faecal microbiota and symptoms in irritable bowel syndrome
Aliment Pharmacol Ther 2009; 29:508-518

Vulevic J, Juric A, Tzortzis G, Gibson GR.

A mixture of trans-galactooligosaccharides reduces markers of metabolic syndrome and modulates the fecal microbiota and immune function of overweight adults
J Nutr. 2013 Mar;143(3):324-31