Fédération Internationale des Industries des Aliments Diététiques

International Special Dietary Foods Industries

194, rue de Rivoli
F - 75001 PARIS
FRANCE

Tél. : 33/(0)1 53 45 87 87
Fax : 33/(0)1 53 45 87 80
andree.bronner@isdifederation.org

16 March 2007

ISDI Comments on Guidelines for the use of Nutrition Claims: Draft Table of Conditions for Nutrient Contents (Part B Containing Provisions for Dietary Fibre)

Alinorm 06/29/26 appendix III
At Step 6 of the Procedure

Answer to CL 2007/3-NFSDU

1. Table of Conditions for Dietary Fibre Contents

COMPONENT	CLAIM	CONDITIONS	JUSTIFICATION
B.		**NOT LESS THAN**	
Dietary Fibre	Source	3 g per 100 g or 1.5 g per 100 kcal **(solids)** or [10% of recommended intake] per serving* ~~[(liquid foods:~~ 1.5 g per 100 ml~~)~~ **(liquids)]**	Delete [ ] and ( ) and add "liquids" and "solids" Retain the conditions for liquid form. Rationale: the conditions for liquids are necessary and retaining them is consistent with the Table of GUIDELINES FOR USE OF NUTRITION AND HEALTH CLAIMS *CAC/GL 23-1997, Rev. 1-2004.* The proposed rewording is also consistent with the table of the guidelines mentioned above. For the detailed justification, see Annex I.
	High	6 g per 100 g or 3 g per 100 kcal **(solids)** or [20% of recommended intake] per serving* ~~[(liquid foods:~~ 3 g per 100 ml~~)~~ **(liquids)]**	

* Serving size [and recommended intake] to be determined at national level.

2. Definition and properties of dietary fibre

Summary

Degree of Polymerisation

At the 27th CCNFSDU meeting in Bonn/Germany in November 2005, a definition for dietary fibre was adopted at Step 6 in the framework of the Codex Guidelines for the Use of Nutrition Claims. The proposed definition covers polymers with a degree of polymerisation (DP) not lower than 3. This proposal excludes indigestible disaccharides (DP of 2), which can also be regarded as dietary fibres. ISDI is in favour of deleting the reference to the DP and the word "polymer", in order to have a definition that uses resistance to digestion and absorption in the human small intestine as the key element of dietary fibre.

FAO/WHO Proposal

At the 28th CCNFSDU meeting in Chiang Mai/Thailand in November 2006, a FAO/WHO proposal for a definition of dietary fibre was distributed with a conference room document CRD 19. The Committee agreed to return the Draft Table of Conditions for Nutrient Contents containing provisions on dietary fibre to step 6 and to issue a Circular Letter asking for comments and additional input on the definition and other provisions of dietary fibre.

ISDI supports the fact that intrinsic plant cell wall polysaccharides can be regarded as an important source of dietary fibre as stated by FAO/WHO. However, recent science demonstrates that other sources of dietary fibre have been widely recognized as dietary fibre as well (e.g., AACC, Health Council of the Netherlands, IOM). Therefore, ISDI would like to resubmit its earlier proposal for a definition of dietary fibre, which is based on the latest science and reads as follows:

'Dietary fibre means edible carbohydrates[1], which are neither digested nor absorbed in the human small intestine.

Dietary fibre consists of one or more of:

- *Edible carbohydrates naturally occurring in the food as consumed,*
- *carbohydrates, which have been obtained from food raw material by physical, enzymatic or chemical means,*
- *synthetic carbohydrates.'*

ISDI PROPOSAL	JUSTIFICATION
Definition: ~~Dietary fibre means carbohydrate polymers with a degree of polymerisation (DP) not lower than 3, which are neither digested nor absorbed in the small intestine. A degree of polymerisation not lower than 3 is intended to exclude mono- and disaccharides. It is not intended to reflect the average DP of a mixture~~. **Dietary fibre means edible carbohydrates[1], which are neither digested nor absorbed in the human small intestine** Dietary fibre consists of one or more	Delete the reference to a DP level, reword the sentence and delete the term "polymers" Rationale: The proposed Codex definition of dietary fibre includes carbohydrate polymers with a degree of polymerisation (DP) not lower than 3, which are neither digested nor absorbed in the small intestine. A DP not lower than 3 is intended to exclude mono- and disaccharides. The suggested ISDI definition will **exclude those mono- and disaccharides** that are readily digestible in the small intestine, but will **include the indigestible oligosaccharides and fibres**

of: • Edible carbohydrates ~~polymers~~ naturally occurring in the food as consumed, • carbohydrates ~~polymers~~, which have been obtained from food raw material by physical, enzymatic or chemical means, • synthetic carbohydrates ~~polymers~~. **Properties:** Dietary fibre generally has properties such as: • Decrease intestinal transit time and increase stools bulk • Fermentable by colonic microflora • Reduce blood total and/or LDL cholesterol levels • Reduce post-prandial blood glucose and /or insulin levels.	**from other origins than plant cell walls,** which are also considered to be dietary fibres. ISDI supports the physiological approach of the proposed Codex definition. We suggest therefore using resistance to digestion and absorption in the *human* small intestine as the key element of dietary fibre (instead of the combination of degree of polymerisation and resistance to digestion and absorption in the small intestine) for the following reasons: • The proposed Codex definition would exclude indigestible disaccharides (DP of 2), which can also be regarded as dietary fibres. Examples of these disaccharides are found in preparations of galacto-oligosaccharides (GOS). These disaccharides cannot be broken down by the enzymes of the human small intestine. This means that they are neither digested nor absorbed in the human small intestine. • Current scientific definitions of dietary fibre from authoritative bodies such as AACC, Health Council of the Netherlands and IOM, **do not make any reference to the degree of polymerisation.** • Current scientific definitions of dietary fibre from these authoritative bodies contain as **central important element of dietary fibre the indigestibility in the human small intestine.** • The digestible saccharides, such as the monosaccharides glucose and fructose (DP of 1), the disaccharides sucrose and lactose (DP of 2), and the oligo- and polysaccharides containing maltodextrins (DP > 3) are already excluded from the definition by the statement "which are neither digested nor absorbed in the human small intestine" (assuming that the definition relates to nutrition for healthy human beings). Therefore, in our opinion the use of the term degree of polymerisation is redundant. • The current Codex definition of dietary fibre includes other sources than plant material in the definition of dietary fibre. For the detailed justification, see Annex II.

[1)] When derived from a plant origin, dietary fibre may include fractions of lignin and/or other compounds when associated with polysaccharides in the plant cell walls and if these compounds are quantified by the AOAC gravimetric analytical method for dietary fibre analysis: Fractions of lignin and the other compounds (proteic fractions, phenolic compounds, waxes, saponins, phytates, cutin, phytosterols, etc.) intimately "associated" with plant polysaccharides are often extracted with the polysaccharides in the AOAC 991.43 method. These substances are included in the definition of fibre insofar as they are actually associated with the poly- or oligosaccharidic fraction of fibre. However, when extracted or even re-introduced into a food containing non digestible polysaccharides, they cannot be defined as dietary fibre. When combined with polysaccharides, these associated substances may provide additional beneficial effects.

Annex I

Detailed explanation and justification to support the preservation of the conditions for liquids forms in the table of Conditions for Dietary Fibre Contents

Globally fibre intake is clearly deficient with an average fibre intake by adults below the dietary recommendations; US RDA is set at 30 grammes, whereas the data show an average daily intake of 20 grammes in Europe and 10 to 15 grammes in the USA.

From a nutritional point of view, there is a valuable interest increasing the actual global fibre consumption among populations.

Rationale for retaining conditions for liquids

From the nutritional point of view it is important to promote internationally a higher fibre intake and, in this context, all foods, including liquid foods be involved.

Within the daily consumption pattern liquid foods,, in particular beverages, constitute an important part.

Liquid foods can be a source of fibre either through its endogenous fibre content or through fibre supplementation.

As a consequence, it is important to maintain the conditions laid down for liquid foods in these Guidelines for the use of Nutrition Claims.

Annex II

Detailed explanation and justification to support the changes in the definition of dietary fibre and analysis of the FAO/WHO proposal

1. *DETAILED EXPLANATION AND JUSTIFICATION TO SUPPORT THE CHANGES IN THE DEFINITION OF DIETARY FIBRE*

Carbohydrates and dietary fibres

Carbohydrates & Polymerisation

Carbohydrates consist of monosaccharides (or monomers) such as glucose, galactose and fructose. The type of monosaccharide and the number of monosaccharides differ for different carbohydrates as can be seen from Figure 1. A monosaccharide has just one ring, a disaccharide has two and a polysaccharide has many. The degree of polymerisation (DP) refers to the number of monosaccharides in a carbohydrate. For example, in figure 1 the disaccharide (sucrose) has a DP of 2 (one fructose unit linked to one glucose unit). If another fructose unit would be added, the DP would be 3.

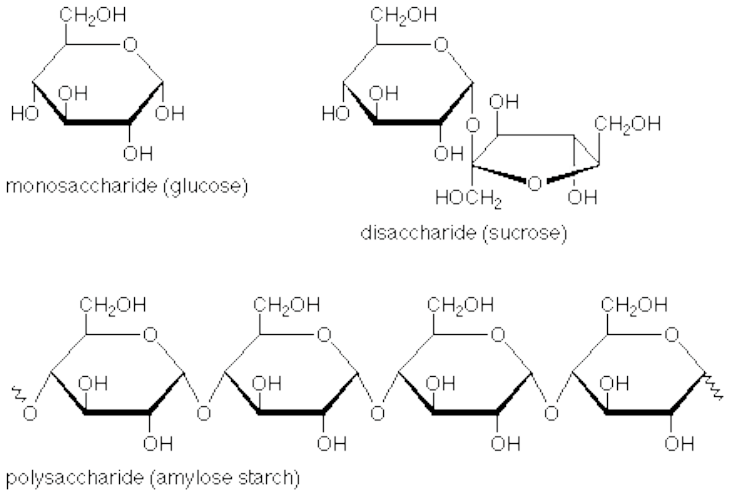

Figure 1. Examples of carbohydrates.

What makes a carbohydrate a dietary fibre?

Carbohydrates can be digestible as well as indigestible. Digestible carbohydrates will be broken down and absorbed in the first part of the human gastrointestinal tract. Digestion occurs mainly in the human small intestine through the action of a number of carbohydrate splitting enzymes (e.g. α-amylase and glucosidases). Examples of digestible carbohydrates are for instance sucrose and lactose with a DP of 2 and maltodextrins with a DP > 3.

Indigestible carbohydrates will not be broken down in the first part of the gastrointestinal tract, as the links between the monosaccharide molecules of indigestible carbohydrates are resistant to the carbohydrate splitting enzymes. Therefore they reach the large intestine (colon) intact. Examples of these indigestible carbohydrates are galacto-oligosaccharides with a DP of 2 to 8, and inulin with a DP of 3 to 60.

The indigestible carbohydrates can be regarded as dietary fibre. Small intestinal digestibility is the main feature in the distinction between carbohydrates and dietary fibre. Indigestibility can be measured by means of *in-vitro* as well as *in-vivo* methods.

Current definitions on dietary fibre

Various publications of respectable organisations have defined dietary fibre in a more broad perspective than the current Codex proposal for dietary fibre definition (AACC, 2001; Gray, 2006, Health Council of the Netherlands, 2006; IOM, 2002; Jones *et al*. 2004; Asp, 2004; Tungland and Meyer, 2002; De Vries, 2004) (see frame). The important **central element in all these definitions is the indigestibility** of dietary fibre in the human small intestine.

Current definitions of dietary fibre:

American Associations of Cereal Chemists (AACC, 2001):

"Dietary fibre is the edible parts of plants or analogous carbohydrates that are resistant to digestion and absorption in the human small intestine with complete or partial fermentation in the large intestine. Dietary fibre includes polysaccharides, oligosaccharides, lignin, and associated substances. Dietary fibres promote beneficial physiological effects including laxative effects and/or blood cholesterol attenuation, and/or blood glucose attenuation."

This definition of the AACC recently has been confirmed by the AOAC (De Vries, 2004)

Institute of Medicine of the National Academies (IOM, 2002):

"Dietary fibre consists of non digestible carbohydrates and lignin that are intrinsic and intact in plants. Functional fibre consists of isolated, non digestible carbohydrates and lignin that have beneficial physiological effects in humans. Total fibre is the sum of dietary fibre and functional fibre".

Health Council of the Netherlands (2006):

"Dietary fibre is the collective term for a group of substances that are not digested or absorbed in the human small intestines and which have the chemical character of carbohydrates, compounds analogous to carbohydrates, lignin, or substances related to lignin."

Superior Health Council Belgium(2006)

*Dietary fibres are described as a group of very heterogenous nutrients as regards chemical structure, but which are characterised by their resistance to digestive enzymes secreted by or occurring in the human or animal gastrointestinal tract. Described examples of dietary fibres are e.g. pectins, oligosaccharides, resistant starch, cellulose and lignin.*Current Codex Alimentarius definition (CAC/GL 2-1985, Rev. 1 – 1993)

"Dietary fibre means edible plant and animal material not hydrolysed by the endogenous enzymes of the human digestive tract as determined by the agreed upon method."

All these definitions are concordant in the following ways:

1. They **do not contain a reference to the degree of polymerisation (DP)** such as in the current Codex proposal (DP≥3) for a definition of dietary fibre. Therefore, all these definitions include resistant oligosaccharides and also resistant starch and lignin. The current Codex proposal would exclude the indigestible disaccharides (DP = 2), which can also be regarded as dietary fibres.

2. In all these definitions the important, **central element is the indigestibility** of dietary fibre in the human small intestine. The indigestibility is the key feature in the distinction between carbohydrates and dietary fibre.

Furthermore, a number of these definitions require that components included are not only indigestible in the human small intestine, but also have beneficial physiological effects typical for dietary fibre .

Based on the above definitions, we suggest the removal of the terms "degree of polymerisation" and "polymers" from the current proposed Codex definition and instead use **"resistance to digestion"** and "**absorption in the human small intestine"** as the key feature of dietary fibre (see our proposal in paragraph 2)

2. FAO/WHO PROPOSAL

The FAO/WHO proposed in CRD 19 at the CCNFSDU meeting 2006 the following definition for dietary fibre:

"Dietary fibre consists of intrinsic plant cell wall polysaccharides".

Other fibres

The ISDI definitely agrees that the intrinsic plant cell wall polysaccharides in vegetables, fruit and cereals are an important source for dietary fibre consumption. However, recent science shows that other sources have also been widely recognized as dietary fibres, which have not been included in the proposed FAO/WHO definition. Examples of these other types of fibres are: galacto-oligosaccharides (GOS), resistant starch, fructo-oligosaccharides (FOS; oligofructose), polyfructose, gluco-oligosaccharides, xylo-oligosaccharides (XOS), beta-cyclodextrins, resistant maltodextrins and other maltodextrins, polydextrose and modified celluloses, such as methyl- and hydroxypropylmethyl celluloses (Gray, 2006).

These substances have been regarded as dietary fibres by several respectable organisations (e.g., AACC, Health Council of the Netherlands and IOM). These substances exhibit similar physiological effects (Sungsoo and Dreher, 2001), and contribute to adequate fibre consumption. To use the term "dietary fibre" exclusively as marker of fruit, vegetables and grains intake would undervalue the intake of dietary fibre in the modern diet.

Furthermore, the **current Codex definition of dietary fibre in the Codex Guidelines on Nutrition Labelling (CAC/GL 2-1985, paragraph 2.7) also includes other sources than plant material in the definition of dietary fibre. They have defined dietary fibre as "*Edible plant and animal material not hydrolysed by the endogenous enzymes of the human digestive tract as determined by the agreed upon method."***

Physiologically based and indigestibility

According to Gray (2006), there is a consensus that a physiologically based definition is necessary. The proposed definition by WHO/FAO is, however, not physiologically based. The physiological property "indigestibility" was already a key element in the definition of dietary fibre in the first definitions ever occurring, *e.g.*, the definition of Hipsley in 1953 and Torwell and others in the early seventies (see Tungland & Meyer, 2002). Recently published scientific literature on the definition of dietary fibre shows that various respectable organisations use **small intestinal digestibility as the main feature** in the distinction between digestible carbohydrates and dietary fibre (see the definitions in the frame in section 1).

Analysis

We support the opinion that it is inappropriate to relate the definition to a particular analytical method. In order to validate labelling declarations and claims, different methods exist for measurement of the dietary fibre content in different foods.

The proposed Codex Alimentarius Commission definition of dietary fibre includes a specified list of AOAC analytical methods on the basis that this methodology is used worldwide for routine analysis. In addition to methods AOAC 985.29 and 991.43 for total dietary fibre in most foods, methods AOAC 995.16, 2002.02, 999.03, 997.08, 2001.02, 2001.03 and 2000.11 can be used for complementary measurement of dietary fibre currently in use (Gray, 2006).

References

AACC (2001). The definition of dietary fibre. Report of the dietary fibre definition committee on the board of directors of the American Association of Cereal Chemists, vol 46; No.3: 112-126.

Asp NG (2004). Definition and analysis of dietary fibre in the context of food carbohydrates. In: Dietary fibre. Bio-active carbohydrates for food and feed. (Eds: Van der Kamp JW, Asp NG, Miller Jones J, Schaafsma G); pp 21 – 26. Wageningen Academic Publishers, The Netherlands.

Codex Guidelines on Nutrition Labelling (CAC/GL 2-1985, Rev. 1 - 1993).

De Vries JW (2004). Dietary fibre: the influence of definition on analysis and regulation. JAOAC, 87, 681-791.

Gray J (2006). Dietary fibre. Definition, analysis, physiology & health. In: ILSI Europe Concise Monograph Series, ILSI Europe.

Health Council of the Netherlands (2006). Guideline for dietary fibre intake. The Hague: Health Council of the Netherlands; publication no. 2006/03.

Institute of Medicine of the National Academies (2002). Dietary reference intakes for energy, carbohydrates, fibre, fat, protein and amino acids. Part 1. Chapter 7. Dietary, functional, and total fibre. The National Academy Press, Washington, DC, USA.

Jones JR, Lineback DM, Levine MJ (2006). Dietary reference intakes: Implications for fibre labelling and consumption: a summary of the International Life Sciences Institute North America fibre workshop, June 1-2, 2004, Washington, EDC. Nutr Rev 64, 31-8.

Sungsoo S, Dreher ML (eds) (2001). Handbook of Dietary Fiber. Marcel Dekker Inc, New York, USA.

Superior Health Council Belgium (2006), Voedingsaanbevelingen voor België, herziening November 2006 (Nutrition Recommendations for Belgium, revision November 2006), Brussels, Superior Health Council; HGR dossiernumber: 7145-2.

Tungland BC, Meyer BC (2002). Nondigestible oligo- and polysaccharides (dietary fibre): their physiology and role in human health and food. Comprehensive reviews in Food Science and Food Safety. Vol. 1: 73-92.