codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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Agenda Item 3 **CX/NFSDU 08/30/3**

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON NUTRITION AND FOODS FOR SPECIAL DIETARY USES
30th Session

Cape Town, South Africa, 3 - 7 November 2008

GUIDELINES FOR THE USE OF NUTRITION CLAIMS: DRAFT TABLE OF CONDITIONS FOR NUTRIENT CONTENTS (PART B CONTAINING PROVISONS ON DIETARY FIBRE)

- *Comments at Step 6 of the Procedure* -

Comments from:

AUSTRALIA
COSTA RICA
GUATEMALA
NEW ZEALAND

AAF- European Starch Industry Association
AIDGUM - International Association for the Development of Natural Gums
IDF - International Dairy Federation
ILSI - International Life Sciences Institute
ISDI - International Special Dietary Foods Industries

AUSTRALIA

Australia notes that consideration of this matter has been deferred by CCNFSDU while awaiting further information on the FAO/WHO Scientific Update on Carbohydrates and Human Nutrition. Having now had the opportunity to review the information provided we look forward to a resumption of discussions on this agenda item at the next session of the Committee meeting in November 2008.

General Comments

Australia appreciates the efforts of the WHO/FAO in providing the Scientific Update on Carbohydrates and Human Nutrition[1] which includes discussion of the definition of dietary fibre. However Australia does not support this definition of dietary fibre whose meaning is given as:

intrinsic plant cell wall polysaccharides.

The proposed definition presented by FAO/WHO has selected one of several resistant carbohydrate components (albeit the major contributor) that are naturally found in plant foods. This proposal has major ramifications for many regulatory systems around the world which currently use a broader definition. Regulatory systems do not operate separately; they need to reflect current national decisions about the definition of fibre underpinning fibre content values that then are used to estimate fibre intakes and establish reference health values, which in turn can be incorporated into nutrition labelling.

Australia recognises that the current Codex definition and the definition proposed at Step 6 also have limitations. However, Australia considers the direction taken by CCNFSDU to be the more appropriate for food regulatory purposes, which particularly considers the links between public health nutrition tools and regulation, and the interface between industry and consumers. Australia therefore reiterates its preferred support for continued discussion of the definition proposed at Step 6 by the Committee.

Specific comments on the FAO/WHO definition of dietary fibre

Australia has concerns with specific elements of the FAO/WHO definition of dietary fibre proposed for CCNFSDU consideration. These concerns are outlined below.

1. Link to health benefits

Australia notes that the FAO/WHO Report - *Diet, Nutrition and the Prevention of Chronic Diseases* (TRS 916, 2003) reports the strength of evidence for protection of non-starch polysaccharides (NSP) against cardiovascular disease and diabetes as *probable* and protection of dietary fibre against dental caries as *possible*, and protection of fibre (not defined) against cancers as *possible/insufficient*.

While the TRS provides various strengths of evidence for NSP and its relationship to particular chronic disease outcomes, the Scientific Update has not specifically revised these conclusions in relation to the strengths of the evidence. However, the rationale for NSP as a preferred definition of dietary fibre refers to the overall health benefits **of NSP** from fruit, vegetables, wholegrain foods and other plant foods. In a discussion about an appropriate definition for dietary fibre, it would have been helpful to compare the strength of evidence of protective effects in epidemiological studies from NSP and from dietary fibre as measured by AOAC methods. This way, the protective impact of the two components could be compared to determine if one has stronger or the same health benefits than the other.

Australia is also interested to know the rationale for NSP being defined as dietary fibre, to the exclusion of other naturally occurring resistant carbohydrates in plant foods, given that whole foods are consumed. It is reasonable to conclude, without evidence to the contrary, that consumption of plant foods containing those components could also confer health protection and thus also qualify as a contributor to the meaning of dietary fibre. We also question the rationale for defining dietary fibre as NSP on the basis of being a marker for the intake of fruit, vegetables and wholegrain foods. If valid, NSP can be used for this purpose, without the need for it to be defined as dietary fibre.

2. Consumer information and claims

As risk managers, Codex needs to consider the consumer and economic impact of changing its definition of dietary fibre. There is the potential for considerable consumer confusion if Codex's currently accepted

[1] Joint FAO/WHO Scientific Update on Carbohydrates in Human Nutrition. (2007) Eur.J.Clin.Nutr 61 Supp 1

classification of dietary fibre were changed to a narrower view of the term. If this were to occur, consumers would need to become familiar with a number of classes of resistant carbohydrates in addition to a narrowed meaning of dietary fibre. Labelling of products would then need to allow for other components such as resistant oligosaccharides to be identified and declared separately rather than being incorporated into a broader single category. This change in presentation of information and identity will be difficult to convey especially when the physiological effects of the different classes are not discretely applicable to only one class of resistant carbohydrate.

Industry transition costs would rise to change label and advertising values of dietary fibre and other resistant carbohydrates along with the need to set up consumer information lines to explain why dietary fibre values had decreased. However, at the national level, there is an overriding imperative for a consistent application of a dietary fibre definition, with a change to the basis of food regulation flowing on to food content values, estimates of dietary intakes and reference health values.

3. Analytical concerns

Australia notes that all relevant analytical techniques cannot distinguish between 'intrinsic' and 'extrinsic' materials. The main method for analysing NPS[2] captures all non-α 1-4 glucosidic carbohydrates, regardless of their source.

Australia believes that all agreed methods of analysis of the same food for the same components, in this case total dietary fibre, should yield comparable results. A modified comparison of the main NPS method and the enzymatic gravimetric AOAC methods for dietary fibre analysis based on the original table in the Englyst paper[4] is attached to these comments (see Attachment 1).

Comments on the CCNFSDU definition as proposed at Step 6

Australia restates its comments on the definition of dietary fibre that were made for the 28th Session of the Committee. These comments are provided below.

Table of Conditions for Claims

Australia regards as essential the inclusion of a 'per serving' condition for 'source' and 'high' dietary fibre claims. In relation to the criteria /per serving, Australia considers that it is preferable to nominate gram amounts 'per serving' for the two claims, if consensus can be reached on this point, rather than relying on a percentage of an unquantified recommended intake.

Australia currently has draft criteria of 2 g/serve and 4 g/serve for 'source' and 'high' dietary fibre claims respectively.

Australia does not support separate criteria for liquid foods, thus the text relating to liquid foods in square brackets should be deleted.

Definition

Australia points out that the open square bracket symbol can be deleted.

Properties

Australia believes that the listed properties are not generally exhibited by all dietary fibre types and suggests that the introduction to this section be amended to Dietary fibre exhibits one or more of these properties:

Methods of Analysis

Australia generally supports the table containing the methods of analysis for dietary fibre proposed in CX/NFSDU 04/3 – Add 1, July 2004.

[2] Englyst K.N., Liu S., Englyst H.N. (2007). Nutritional characterization and measurements of dietary carbohydrates. *EJCN* 61(Supp 1): S19-S39.

Appendix 1

COMPARISON OF THE NSP AND THE GRAVIMETRIC AOAC METHODS WITH RESPECT TO PERFORMANCE AND SUITABILITY AS A MEASURE OF DIETARY FIBRE.

	NSP procedure[8]	**Gravimetric AOAC procedure[9]**
1. GENERAL PRINCIPLES[10]		
Stated Aim	To measure polysaccharides that do not contain the alpha 1-4 glucosidic linkages characteristic of starch (i.e. non starch polysaccharides).	To measure carbohydrates and associated substances in human foods and foodstuffs that are indigestible in the upper gastrointestinal tract.
Analytical Principle	Complete dispersion and enzymatic hydrolysis of starch. Precipitate residue in 80% ethanol and isolate by centrifugation. Hydrolyse and measure NSP as sum of constituent sugars by either colorimetry or gas liquid chromatography (GLC).	Enzymatic hydrolysis of available starch and protein. Precipitate residue in 80% ethanol and isolate by filtration. Record total residue weight and then determine and subtract ash and protein contents.
Information Provided	Values for total, soluble and insoluble NSP, with the option of detailed information on constituent sugars by the GLC version.	Weight of total, soluble and insoluble residue containing NSP, some forms of digestion resistant starch (RS) not affected by 100 °C gelatinisation or fine milling, lignin and higher DP oligosaccharides.
Effect of Food Processing	As a chemically distinct food component, NSP is minimally affected by normal food processing.	Measures additional starch rendered "resistant" by processing and some Maillard reaction products as consumed in processed foods.
Is Stated Aim Achieved	Yes. The procedure completely removes starch and sugars and gives a determination of NSP, provided allowance is made for solubility modification due to DMSO treatment and for approximations of sugars composition with full colorimetric determination.	Yes. Additional measurements may be required to measure total RS and total unavailable oligosaccharides.

	NSP procedure[8]	Gravimetric AOAC procedure[9]
2. Methodology[30, 11, 12]		
Specific Reagents And Equipment	Enzymes: Heat stable amylase, (EC 3.2.1.1), pullulanase (EC 3.2.1.41), pancreatin (these enzymes should be devoid of NSP hydrolytic activities), pectinase (EC 3.2.1.15). Chemicals DMSO, 12M sulfuric acid, glacial acetic acid, acetic anhydride, 1-methylimidazole, 3,5-dinitrosalicylic acid, sodium borohydride. Analysis vessels: screw cap test tubes. Equipment: Centrifuge, spectrophotometer and GLC system to achieve full analysis.	Enzymes: Heat stable amylase, (EC 3.2.1.1), protease, amyloglucosidase (EC 3.2.1.1). These enzymes should be devoid of NSP hydrolytic activities. Chemicals Conc. sulfuric acid and sodium hydroxide solution (if Kjeldahl protein method is used). Analysis vessels: 400 ml beakers and fritted glass crucibles. Equipment: Vacuum manifold, muffle furnace and Kjeldahl equipment.
Practical Issues	All the steps of this procedure are conducted in centrifuge tubes (50-60 mL), which makes it possible for analysis of large batch sizes, assuming sufficient equipment and expertise.	Macro conditions make for easy handling of 400ml beakers and associated equipment allowing large batch sizes without need for specialized equipment.
	It is important to ensure complete starch dispersion and hydrolysis, which is achieved by a combination of physical, chemical and enzymatic steps.	All starch remaining after enzymatic hydrolysis is measured as resistant (indigestible) starch (RS).
	The method is intricate and repetitive, eg. repeated vortex mixing of each tube (32 occasions); incubation in constant temperature baths (14 times, 7 different temperatures); centrifuging (3 times) to measure total NSP only. Considerable experience is required to achieve timely results.	The method is relatively simple: Three incubation steps with pH adjustment before step 2 and step 3; manual transfer and filtration of residues; weighing of the crucibles before and afterwards; subsidiary ash and Kjeldahl methods.
	While the chemical end-point determination techniques are the same as those used in the measurement of other carbohydrates (e.g. sugars, starch), they employ complex reactions and equipment.	Test sample weight can be reduced for materials that are difficult to filter eg. psyllium husks.
	The procedure takes 1 day with the colorimetric measure or 1.5 days for the GLC measure.	The procedure takes 1.5 days.

Environmental Impact	Use of several hazardous chemicals eg. DMSO, Sodium borohydride. Solvent waste per test amounts to 280 mL ethanol and 140 mL acetone (including duplicate).	Solvent waste amounts to 800 mL ethanol and 40 mL acetone per test (including duplicate).
Suitability for use Internationally	Reagents list: 34 items; Apparatus list: 9 items plus reaction tubes for colorimetry, eg. Centrifuge, vortex mixer, spectrophotometer, GLC.	Reagents list: 10 items; Apparatus list: 10 items, eg. Vacuum source, pH meter, oven, muffle furnace, Kjeldahl apparatus.
Traceability	NSP CRMs or pure cellulose, β-glucan etc. to assess the whole process. Primary standard monosaccharides assess final component sugars measurements only.	Total DF CRMs or pure cellulose, β-glucan etc. are available.
Method Specificity	Only NSP is measured under particular reaction conditions, however any alpha 1-4 linked glucosidic carbohydrates added to a food (i.e. extrinsic) will not be differentiated. Both methods depend on all NSP being precipitated by 80% ethanol. Empirical acid hydrolysis of polysaccharides to simple sugars requires factors to correct for losses.	Measures all carbohydrates not digested under enzymatic conditions, plus associated substances. Both methods depend on all NSP being precipitated by 80% ethanol.
Method Reproducibility	A range of certified reference materials are available (e.g. BCR). The method CV is less than 5%.	A range of certified reference materials are available (e.g. BCR). The method CV is less than 5%.

	NSP procedure[8]	Gravimetric AOAC procedure[9]
3. Determination of dietary Fibre[6, 7, 16, 26, 13]		
Associated Definition and Measurement Task	Intrinsic plant cell wall polysaccharides.	Indigestible carbohydrates and associated substances.
Definition Rationale	This definition is targeted specifically at the fruits, vegetables and whole grains (products) that are consistently linked with health benefits. It can be used as an index for plant cell walls. These foods have the characteristic feature of containing plant cell walls, which mainly consist of structural polysaccharides. The definition is focused on this carbohydrate component, which can be quantified in chemical terms, though not specifically or accurately in foods. Other polysaccharides, oligosaccharides and non-carbohydrate components are not included. With the focus on raw plant cell walls, any changes in digestibility due to manufacturing processes (eg. RS) are not taken into account. This focus on a "natural" fibre rich diet downplays the significance of synergistic elements including micronutrients, phytochemicals, low energy density and improvements to nutritional values through developments in food manufacture.	This definition is targeted at carbohydrates that escape digestion in the small intestine for which many studies have shown health benefits. It also recognizes the importance of associated indigestible substances. It can be used as an index for plant cell walls. The definition is not restricted to carbohydrates as it encompasses lignin and other substances associated with plant cell walls. In addition to the plant cell wall polysaccharides, the indigestibility criterion includes some forms of resistant starch (mainly RS3 and some RS2) and other extracted or synthesized carbohydrates, and non-digestible oligosaccharides, which can be measured separately and included provided there are demonstrated beneficial physiological effects.
Scientific Evidence For Rationale	This is a raw plant based rationale. A dietary fibre term identifying plant rich diets supports dietary guidelines, though the guidelines are not restrictive to a raw, plant based rationale.	This is a foods-as-consumed based rationale. From the existing epidemiological evidence collected and evaluated over the last few decades, this definition provides a reasonable indicator of plant rich diets which supports dietary guidelines.

	This definition still allows the properties of other non glycaemic carbohydrates to be researched and if appropriate promoted in their own right.	Any trend towards foods containing significant dietary amounts of added non glycaemic carbohydrate preparations has to survive in the face of dietary guidelines. Which guidelines can change in support of extracted or synthesized indigestible materials as research develops. This definition encourages research into properties of other non glycaemic carbohydrates and if appropriate promotion in their own right.
Potential discrepancies between definitions and determinations	For plant foods, the NSP content is claimed to be a measure of 'plant cell wall polysaccharides', however this methodology quantitates any non alpha 1-4 glucosidic carbohydrates, whether from plant, animal, fungal or synthetic sources.	As the AOAC gravimetric procedure measures a range of indigestible materials it includes other substances as well as plant cell wall polysaccharides.
	In a few plants NSP can occur as gums and alginates, but these are not typical foods and are more likely to occur as ingredient extracts. So they are down-played under this definition, in spite of their known health benefits.	It can include some non-carbohydrate food processing artefacts (e.g. Maillard reaction products) that form undigestible complexes with carbohydrates of the food.
	When extracted or synthesized NSP are present in products then these will need to be known and reported by the manufacturer so they can be deducted from the NSP measurement to obtain a value for the intrinsic plant cell wall polysaccharides. (The presence of specific extracts can often be identified by their NSP constituent sugar profile.) NSP measurement is therefore not sufficient to distinguish 'intrinsic' from 'extrinsic' materials.	The residual starch recovered does not include all physiologically resistant starch for some foods, so separate measurement may be required. When foods contain significant proportions of non digestible oligosaccharides or resistant maltodextrins, these substances will require separate analysis if they are to b included as dietary fibre.
	With the plant cell wall polysaccharide definition, non digestible oligosaccharides and RS are separate groupings and require separate, specific measurement.	

Suitability as a measure of dietary fibre	The intrinsic plant cell wall polysaccharide definition provides a link to the plant rich diet shown to be beneficial to health. The NSP procedure provides measurements that are suitable for this definition, provided additional information is available to deduct 'extrinsic' NSP and other sources of dietary fibre are discounted.	Indigestible carbohydrates provide an indicator of a plant fibre rich diet. The AOAC gravimetric procedure provides a suitable response to the definition and can be supplemented by separate measurement of total resistant starch and indigestible oligosaccharides, where appropriate.
4. Impact on Public Health[6, 7, 16, 26, 33]		
Nutrition Labelling	A dietary fibre value describing intrinsic plant cell wall polysaccharides is an indicator for consumers of plant rich foods, provided these are not confused with 'extrinsic' NSP.	AOAC gravimetric values are good indicators to consumers of indigestible carbohydrates in plant rich foods as they are consumed.
	If other sources of non glycaemic carbohydrates are present, then there is the possibility for these to be measured and labelled specifically.	If approved individual fibre supplements are added, their content in a food product can be included in the total quantity of dietary fibre or indicated separately if desired.
	Enforcement of labelling would be difficult since the NSP method cannot distinguish between intrinsic and extrinsic carbohydrates.	
Health Claims	The health claims for dietary fibre are largely based on the epidemiological evidence, which relates to fibre from plant rich diets including some forms of resistant starch. NSP measurement excludes all forms of resistant starch.	The health claims for dietary fibre are largely based on the epidemiological evidence, which relates to fibre from plant rich diets including some forms of resistant starch. AOAC gravimetric values are the basis for this epidemiological evidence and continu to be the best measure of this fibre.
	When appropriate, specific health claims should be established for individual non glycaemic carbohydrate supplements, thereby acknowledging their specific functional properties and taking account of variations in their effective and safe dosages.	When appropriate, specific health claims should be established for individual non glycaemic carbohydrate supplements, thereby acknowledging their specific functional properties and taking account of variations

		in their effective and safe dosages.
Population Reference Intakes	The population reference intake values for dietary fibre are largely based on the epidemiological evidence that minimally refined plant rich diets are associated with a lower incidence of several diseases. The intrinsic plant cell wall polysaccharide definition ensures that dietary fibre intakes contributing towards the reference value would consistently reflect both the epidemiological evidence and the intended message of the dietary guidelines, apart from the exclusion of other indigestible carbohydrates and associated substances. However intrinsic plant cell wall polysaccharides content cannot be quantitated using the NSP methodology alone.	The population reference intake values for dietary fibre are largely based on the epidemiological evidence that minimally refined plant rich diets are associated with a lower incidence of several diseases with intakes generally derived from AOAC dietary fibre quantities for those foods. The indigestible carbohydrates definition ensures that dietary fibre intakes contributing towards the reference value would consistently reflect both the epidemiological evidence and the intended message of the dietary guidelines. Non-plant cell wall fibre ingredients will contribute to food fibre intakes if they have been approved and have demonstrated similar benefits to plant cell wall polysaccharides.
5. Impact on food industry		
	Although NSP values are generally lower than those for the gravimetric procedure, this should not make a difference to the marketing of the majority of products, as population reference intakes and health claims would be established on the same basis. Unless the lowering of daily recommended intakes gives consumers the impression that dietary fibre is less important. The emphasis would remain on manufacturers to incorporate minimally refined plant ingredients into products to achieve health claims for dietary fibre. Difficulty in finding laboratories familiar with the measurement of NSP.	With this definition, food manufacturers have more choice in product formulation to produce foods that are acceptable to consumers and have equivalent or superior health benefits. Dietary guidelines nevertheless will guide customers to foods higher in whole cereals, fruits and vegetables. So the emphasis would remain on manufacturers to incorporate minimally refined plant ingredients into products to achieve health claims for dietary fibre.

	Additional measurements will be required on foods, to account for the missing indigestible carbohydrates and associated substances that have similar health benefits, but these would need to be placed in the "undefined other carbohydrates" category.	A significant number of laboratories are familiar with this methodology. As gravimetric values are influenced by food processing, label values derived by calculation from component ingredients must allow for processing effects.
6. Impact on Nutrition Research		
	Food composition data has a crucial role in nutrition research, as only with precise and informative descriptions is it possible to address the mechanisms responsible for the relation between diet and health.	Food composition data has a crucial role in nutrition research, as only with precise and informative descriptions is it possible to address the mechanisms responsible for the relation between diet and health.
	The intrinsic plant cell wall polysaccharide definition provides a firm link with the minimally refined plant rich diet consistently associated with health benefits. This food component can be described in chemical terms. An advantage of NSP measurement by GLC is an indication of the types of polysaccharides present from their constituent sugar composition, providing a means with which to explore functional properties.	The indigestible carbohydrates definition provides a firm link with plant rich diets as they are consumed and with their associated health benefits.
	However, the measurement of NSP gives no information regarding the proportions of "intrinsic" to "extrinsic" NSP, nor does it relate only to plant cell wall polysaccharides, nor provide any information on processing effects, nor any suggestion of the nutritional value of other indigestible carbohydrates.	As a simpler index of plant rich foods, individual polysaccharides are not initially measured. Additional measurements can be made as further details are sought. These measurements can employ hydrolysis to constituent sugars or more specific methods for particular polysaccharides and other non-glycaemic carbohydrates.

COSTA RICA

As for the conditions for the declarations of dietary fibre content, a correction is requested in the version in Spanish for the translation of the terms listed under the column "declared property", so that instead of "basic content" the word "origin" is used. This will facilitate its interpretation. Additionally, a request is made to add the phrase "good source" next to the term "high content".

Justification: The terms and values requested are adjusted to current practice for declaring properties with respect to the dietary fibre content. It is believed that applying percentages for the reference values will help in applying the conditions and that the absolute values are in alignment with the nutricional goal established for Costa Rica, which is 30 g daily.

COMPONENT	**PROPERTY DECLARED**	**CONDITIONS**
B.		**NO LESS THAN**
Dietary fibre	**Source**	3 g per 100 g or 1.5 g per 100 kcal or ~~[~~10% of the recommended intake~~]~~ per food portion* ~~[~~(Liquid foods: 1.5 g per 100 ml)~~]~~
	High content **or good source**	6 g per 100 g or 3 g per 100 kcal or ~~[~~20% of the recommended intake~~]~~ per food portion* ~~[~~(Liquid foods: 3 g per 100 ml)~~]~~

* The size of the food portion ~~[~~and the recommended intake~~]~~ must be determined at a national level

GUATEMALA

Comments from Guatemala			**Justification**
Page	**Original text**	**Modifications**	
50	**Conditions:** no less than 3 g per 100 g or 1.5 g per 100 kcal or [10% of recommended intake] per portion of food* [(Liquid foods: 1.5 g per 100 ml)] 6 g per 100 g or 3 g per 100 kcal or [20% of the recommended intake] per portion of food* [(Liquid foods: 3 g per 100 ml)] The size of the portion [and the recommended intake] must be determined at the national level	Delete brackets and approve the text that appears between them.	These values are found within the range of the daily fibre requirement, for Guatemala.

51	**Properties:** Dietary fibre generally has one of the following properties:	**Properties:** Dietary fibre generally has **properties like the following:**	For a more concrete translation of the English version.

NEW ZEALAND

New Zealand supports continued work on the proposed definition for dietary fibre currently being considered by the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) (CL 2007/03-NFSDU) for use in nutrition claims. The definition being proposed is relatively consistent with the definition for dietary fibre currently in the Australia New Zealand Food Standards Code however we do believe that the proposed Codex definition could benefit from simplification as it has become unnecessarily lengthy.

New Zealand does agree with the WHO/FAO Scientific Update that there is inadequate evidence to support a link between dietary fibre that is not plant-based and the reduction of chronic disease and would not support the CL 2007/03-NFSDU definition as the basis for any proposed dietary fibre health claim for the prevention of chronic disease. New Zealand believes this type of claim should be reserved for eating patterns compromised mostly of whole foods that have a predominance of minimally processed vegetables, fruits, legumes and/or breads and cereals. This should not restrict the CL 2007/03-NFSDU definition of dietary fibre and would best be addressed in the substantiation of health claims currently being considered by CCNFSDU. Other benefits of dietary fibre could be linked to the broader CL 2007/03-NFSDU definition for dietary fibre. For example, there would be scope to use the proposed definition with nutrient claims e.g. *"high in dietary fibre"* or *"good source of dietary fibre"* and possibly more general claims that do not link to a chronic disease e.g. *"high in dietary fibre to assist with a healthy gut"*.

New Zealand is mindful of the dilemma around the methods of analysis and has continued to raise within the CCNFSDU that the Englyst method of analysis of dietary fibre should be added to the list of permitted methods of analysis for components of dietary fibre. As it is becoming increasingly difficult to limit the extent of what is dietary fibre, New Zealand would continue to support that it is appropriate to list methods of analysis for the various components of dietary fibre – including non-starch polysaccharides as measured by Englyst. Of the 10 methods given in the table "Methods of analysis for dietary fibre" only the first three methods given (991.43, 985.29, 994.13) are for measurement of total dietary fibre and none of them measure non-starch polysaccharide. A non-starch polysaccharide component gives a specific, intrinsically non-digestible carbohydrate baseline for a food. Other components - (resistant starch and oligosaccharides) that may contribute to dietary fibre may be measured and added to the total if required in a dietary fibre value. This gives flexibility and some understanding of what lies behind a given fibre value.

AAF - European Starch Industry Association

The European Starch Industry Association (AAF) would like to comment on the joint FAO/WHO Scientific Update on Carbohydrates in Human Nutrition in the context of the discussion on a definition of dietary fibre within the CCNFSDU.

As mentioned in the review on the terminology and classification (Joint FAO/WHO) Scientific Update on Carbohydrate in Human Nutrition vol. 61 Supplement 1-December 2007) dietary carbohydrates are a group of chemically defined substances with a range of physical and physiological properties and health benefits. It is recognised that 'dietary fibre' is essentially a physiological concept with as a common property the non-digestibility in the small intestine. Based on epidemiological support from diets that contain fruits, vegetables and whole grains, the

FAO/WHO expert group agreed on a definition stating that 'dietary fibre consists of intrinsic plant cell wall polysaccharides'.

The AAF recognises that whole grain products, fruits and vegetables are important as part of a healthy diet. However, availability of dietary fibre from these sources alone can be limited for different reasons such as income, geography, food storage, transportation and seasonality. In recent years substantial scientific progress was made in understanding the physiological effects of dietary fibre. A range of food substances have been developed that have physiological properties of fibre and that are widely available for use in a variety of foods.

There is a wealth of scientific literature and reviews[1)] that demonstrate that physiological functionality is a key characterising feature of dietary fibre. Consumers expect dietary fibre to offer physiological benefits. In its recent evaluation[2)] the European Food Safety Authority (EFSA) concluded that the intake of dietary fibre has a number of physiological effects in humans including decreased intestinal transit time, increased stool bulk, reduction of blood total and/or LDL cholesterol levels, and reduction of postprandial blood glucose and/or insulin levels. Hence, the AAF strongly believes that a definition of dietary fibre based on physiological properties is required in order to focus on the health benefits of the dietary fibre themselves. A definition limiting dietary fibre to intrinsic plant cell wall polysaccharides would ignore the recent developments in understanding the physiological role of dietary fibre. Intrinsic plant cell wall polysaccharides as a source of fibre is limited due to their physicochemical properties.

Therefore a range of fibre substances with different physicochemical and physiological properties is needed that can be used in different type of foods.

Analytical methods for the determination of fibre are of utmost importance to ensure correct information on the level of dietary fibre in foods. A range of AOAC approved methods is available that allows determining the different types of fibre in food, and the AAF is in favour of one single method that covers all different fibres. Analytical methods that respond to this requirement are currently being validated (*to be eventually further specified*) and this will be an important step forward in the context of nutrition labelling and nutrient content claims with relation to dietary fibre. However, the absence of an agreement on methodology at this stage should not detract from the need for a agreement on a definition of "dietary fibre".

In conclusion, the AAF therefore supports the definition of dietary fibre as proposed at the 2005 CCNFSDU meeting in Bonn, based on non-digestion and non-absorption in the small intestine and with one or more of the physiological properties as defined. The AAF believes that the scientific substantiation of these physiological properties is sufficiently guaranteed by this definition and by available generally accepted scientific evidence.

AIDGUM - International Association for the Development of Natural Gums

AIDGUM submitted a comment for the November 2007 meeting of the CCNFSDU on the draft Codex definition for dietary fiber. It is attached to this comment and remains valid and applicable to the current request for comment.

With regard to the draft Codex definition for dietary fiber, AIDGUM strongly supports the draft definition that is currently held at Step 6. The CL circulated with the November 2007 CCNFSDU report requests additional comment on the Codex draft definition and the proposed FAO/WHO definition that was briefly introduced at the last minute at the 2006 CCNFDU meeting and again introduced at the 2007 CCNFSDU session by representatives of WHO. WHO, despite promises to publish in early 2007 the results of a July 2006 WHO meeting on carbohydrates, held in violation of FAO and WHO rules for such meetings, did not release the promised results until two days

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1) Lunn J. and Buttriss J.L. "Carbohydrates and dietary fibre", British Nutrition Bulletin 32, 21-64-2007; ILSI Europe Concie Monograph, Dietary Fibre, 2006.

2) The European Food Safety Authority: Statement of the Scientific Panel on Dietetic Products, Nutrition and Allergies on a request from the Commission related to dietary fibre (Request N° EFSA-Q-2007-121) expressed on 6 July 2007.

before the November 2007 CCNFSDU session. This late release of the WHO meeting results caused a delay in Codex consideration of the Codex draft definition, which has been under discussion by all Codex member countries for more than 10 years.

With regard to the draft Codex definition, AIDGUM strongly supports the draft Codex definition for a number or reasons. Codex standards, guidelines, recommendations and definitions must be based on sound science. They should reflect the totality of current acceptable practices and scientific consensus. Codex definitions must be accurate, and not worded to be biased or to promote confusion or to emphasize certain unscientific concepts.

The current draft Codex definition for dietary fiber accurately reflects the scientific consensus on fiber, and emphasizes the important physiological aspects of fiber as not being digested in the stomach or small intestine, but being fermented in the large intestine. Most countries have recommended increased dietary fiber intake, based on surveys that show that most diets do not contain enough fiber, and a number of sources of dietary fiber that meet the physiological aspect of the Codex definition have been identified and included in processed foods. In addition to processed foods, dietary fiber is found in cereals, fruits, vegetables, and in some animal products. The Codex definition must be comprehensive and encompass all sources of dietary fiber.

Acacia gum is a natural and organic dietary fiber that is harvested from the cambium layer of two species of African acacia trees, Acacia senegal, and Acacia seyal. This gum has been consumed as a food in Africa for centuries, and is not digested in the stomach or small intestine, but is fully fermented by beneficial bacteria in the large intestine.

The gum has many uses in foods as an emulsifier, coating agent, thickening agent, and stabilizer. Its use in food increases the dietary fiber content of the foods that contain the gum, is recognized in the United States as a generally recognized as safe food ingredient, and has been reviewed by the FAO/WHO Joint Expert Committee on Food Additives and has the status of "ADI not specified", meaning it is a safe food additive and ingredient, and can be used at good manufacturing practice levels in various foods. Clinically controlled trials of acacia gum have shown it be a useful product in assuring good bowel function.

The gum is harvested from acacia trees as dried plant cell wall polysaccharides coming from the cambium layer of acacia trees. Acacia gum is a recognized source of dietary fiber, and meets the draft Codex definition of dietary fiber, and is recognized as a dietary fiber in Codex member countries.

AIDGUM does not support the draft WHO definition since it is not accurate or inclusive, is not based on sound science, does not reflect current scientific consensus, and does not reflect current rules and regulations in many Codex member countries with regard to dietary fiber. The sole purpose of the WHO draft definition appears to be to promote increased consumption of fruits, certain (but not all) vegetables, and whole grain products. With regard to these groups, the WHO papers released at the time of the November 2007 CCNFSDU meeting are woefully biased towards fruits, some vegetables and whole grain products, but do not properly take into account comprehensive or applicable sound scientific information and data on food composition, food science, botany, chemistry or human physiology. The WHO papers are anachronistic, and written as if scientific inquiry about fiber ended 50 years ago, ignoring all more recent developments in food science, food composition, controlled clinical trials on fiber .

AIDGUM strongly recommends that the November 2008 CCNFSDU session adopt the draft Codex definition for dietary fiber, and firmly rejects the WHO draft definition.

Comment on proposed FAO/WHO definition of dietary fibre.

The Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) has been elaborating a definition of dietary fibre, with discussions of this topic at several recent sessions.

In its discussions on dietary fibre, the CCNFSDU has taken into account the need for basing Codex work on standards, guidelines, recommendations and definitions on sound scientific analysis and evidence as elaborated in the Codex Procedural Manual (page 159 English versions,

15th edition). The CCNFSDU has also been aware that Codex work must be applicable in all 172 member countries, and one member organization (the European Community). Discussions must take into account differing dietary patterns and food habits, different foods and food ingredients, and the need for diets that meet all basic nutritional needs in all countries.

Assembling appropriate and consensus-based scientific evidence require the participation of a wide range of scientific disciplines. With regard to dietary fibre, a basic knowledge of botany, chemistry, food science, food technology, agriculture, and toxicology is needed to properly collect, analyze and evaluate scientific data related to foods and food ingredients that contain insoluble and/or soluble fibre. In considering the effect of fibre in human food consumption, the above disciplines must be included, along with physiology, medicine and nutrition. In carrying out this process at the international Codex level, transparent operations are needed to assure the best possible access to and consideration of all appropriate scientific evidence, and the full participation of all concerned.

During the 28th session of the CCNFSDU in Chiang Mai, Thailand, further consideration was scheduled of the dietary fibre definition considered and amended by previous CCNFSDU sessions. At the time of the session, and with no prior communication with Codex members, WHO introduced a Conference Room Document (Number 19) concerning a non-transparent WHO and FAO scientific review on carbohydrates in human nutrition. The WHO Conference Room Document submitted a new draft definition for dietary fibre that excluded many foods and food ingredients that are recognized as dietary fibre. Codex has now requested comments on the current draft Codex definition of dietary fibre discussed as several recent Codex CCNFSDU meetings, along with the proposed WHO/FAO definition, and these comments will be discussed at the November 2007 CCNFSDU meeting in Germany.

It appears that the proposed WHO/FAO definition resulted from a so-called scientific review of carbohydrates commissioned in secret by the WHO and FAO Secretariats in 2005/6. This "review" commissioned authors to prepare papers on various aspects on carbohydrates in human nutrition, but the names of the authors, the subject of the commissioned papers and any related information has not been released to Codex or the WHO and FAO Member Countries. This process is in complete conflict to the FAO and WHO rules for transparency in it work, and may lead to problems for both organizations.

With regard to Dietary fibre, the CCNFSDU WHO/FAO Conference Room Document 19 cited an FAO/WHO Expert Consultation report on Diet, Nutrition and Chronic Diseases that has been heavily criticized, and has not accepted by FAO Member Countries. The FAO Member Countries in their deliberations in FAO Governing Bodies stated that the report was not based on sound science, did not take into account differing dietary patterns and cultural difference in various parts of the world, and contained non-science based recommendations that could cause serious disruption to current good agricultural practices and food production, and needlessly harm small farmers and national economies.

Despite the FAO non-acceptance of the FAO/WHO report on Diet, Nutrition and Chronic Diseases, FAO and WHO apparently utilized its recommendations to link its proposed definition to fruits, vegetables and wholegrain cereals, and to promote increased consumption of these foods.

While there is general agreement that fruits, vegetables and whole grain cereals are desirable foods and that their consumption should be increased, if possible and affordable, it is also clear that the proposed WHO/FAO definition excludes many other sources of dietary fibre that are currently present in many foods. Linking the WHO/FAO definition to a goal of increasing consumption of fruits, vegetables and whole grain cereals also ignores a wide range of other foods and processed food ingredients that contain soluble and insoluble fibre such as roots and tubers, nuts, gums, F.O.S. and polysaccharides.

AIDGUM is an association of national acacia gum producer organizations in Africa. Acacia gum is produced from acacia trees across the entire arid Sahel region south of the Sahara Desert.

Acacia gum is an essential part of the livelihood of millions of people in Africa, and the national economies of the producing countries, which are among the poorest countries in the world.

Acacia gum is a native and organic product that is harvested from acacia trees as an exudate from the tree branches, it also consists of intrinsic plant cell wall polysaccharide. It is a highly soluble fibre, and has many uses in food products, as an emulsifier, thickening agent, encapsulating agent. Acacia gum is not digested in the stomach or small intestine, and therefore - is an unavailable carbohydrate - but is fermented by bifido bacteria and lactic acid forming bacteria (referred to as friendly bacteria) in the large intestine, and helps to improve bowel function. It has a very high degree of polymerization, and has been found to be a safe food ingredient by JECFA and Codex.

Current recommendations for fibre intake range from about 25 to 40 grams per day. It is highly unlikely that individuals can meet this level of fibre intake with diets that are high in fruits, vegetables and whole grain cereals. In addition, the WHO/FAO proposed definition does not take into account actual dietary consumption patterns, cultural factors, or applicable scientific information.

Therefore, the WHO/FAO proposed definition must be rejected as non-science based, and in conflict with Codex rules. In addition, the WHO/FAO definition is harmful to the entire system of agriculture and food production that provides nutritious foods to over 6 billion people on a daily basis. The CCNFSDU should make every effort to complete its work on the proposed Codex definition that was before the 27th CCNFSDU session, so that it can be adopted by the Codex Alimentarius Commission.

IDF - International Dairy Federation

SUMMARY

In defining dietary fibre at "Codex" the International Dairy Federation (IDF) considers it important not to lose sight of the USE of this definition, which is to confirm that food manufactures comply with the statements written on packages and used in their advertisements. Defining food components by their chemistry is therefore essential.

The IDF supports the fact that intrinsic plant cell wall polysaccharides are regarded as an important source of dietary fibre as stated by FAO/WHO. However, more recent scientific knowledge demonstrates that other sources of carbohydrates are widely recognized as dietary fibre.

The IDF therefore is in favour of the basis of the proposed "Codex" definition (see Annex I) which focuses on the chemistry of dietary fibres and their functionality. This proposed definition covers polymers with a degree of polymerisation (DP) not lower than 3. The IDF is in favour of this proposal, except for the fact that it excludes indigestible disaccharides (DP of 2), which can also be regarded as dietary fibres and therefore the proposed definition does not cover all carbohydrates with dietary fibre properties.

In it's 2007 comments to CL 2007/3-NFSDU, the IDF was in favour of removing the degree of polymerisation from the definition. To avoid that lactose and lactulose will fall in the scope of the definition, the IDF would like to submit an update of its earlier position for a definition of dietary fibre. The updated position is again based on the latest science and covers all the carbohydrates having this property and reads as follows:

Dietary fibre means carbohydrate polymers[1] with a degree of polymerisation (DP) not lower than 3, which are neither digested nor absorbed in the small intestine[1)]. A degree of polymerisation not

[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

lower than 3 is intended to exclude mono- and disaccharides. It is not intended to reflect the average DP of a mixture. Dietary fibre consists of one or more of:

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

Dietary fibre generally has properties such as:

- Decrease intestinal transit time and increase stools bulk
- Fermentable by colonic micro flora
- Reduce blood total and/or LDL cholesterol levels
- Reduce post-prandial blood glucose and /or insulin levels.

This document consists of the following sections:

1. FAO/WHO proposal
2. IDF proposal for modifications and explanation
3. Conclusion
4. References

Annexes
I Currently proposed "Codex" definition of dietary fibre
II Current definitions of dietary fibre

1. 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".

In reaction to the proposed definition for dietary fibre a request was done, at the FAO/WHO 29th meeting at the CCNFSDU in November 2007, for comments as to how the FAO/WHO scientific update applied to the definition proposed for dietary fibre[2].
The FAO/WHO expert group concluded (Mann et al, 2007) that dietary fibres should be defined as: "Intrinsic plant cell wall polysaccharides". IDFs comments to the proposed FAO/WHO defi nition are described below.

Definition based on chemistry
The FAO/WHO expert group agreed that for all food components they should be defined firstly by their chemistry. This was felt to be essential for good methods of measurement, labelling, health claims and enforcement. However the definition "intrinsic plant cell wall polysaccharides" is hardly a chemical definition, but rather a botanical one which is extremely difficult to enforce. The statement "carbohydrate polymers with a degree of polymerisation not lower than 3" is much more precise and provides a fairly well defined group of chemical targets.

Other fibres
The IDF 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 are not included in the proposed FAO/WHO definition. Examples of these types of fibres are: galacto-oligosaccharides (GOS), resistant starch, fructo-oligosaccharides (FOS; oligofructose), polyfructose, inulin, gluco-

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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.

2) Non-Digestible carbohydrates like Galacto-oligosaccharides (GOS) although partly consisting of disaccharides, (allo-lactose and galactobiose) fulfil the properties of dietary fibre and therefore fall within the scope of this definition.

2 The European Journal of Clinical Nutrition (2007); 61 (supplement 1)

oligosaccharides, xylo-oligosaccharides (XOS), beta-cyclodextrins, resistant 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) and exhibit similar physiological effects as fibre (Sungsoo and Dreher, 2001), and thus contribute to adequate fibre consumption.

ALINORM 08/31/26 paragraph 31 states "These carbohydrates [resistant starch and prebiotic oligosaccharides], while having important properties in their own right, cannot be said to confer the benefits of fibre as originally proposed. If the original proposition of dietary fibre is considered to be that of Hipsley (1953), the only benefit of fibre to be considered is the prevention of pregnancy toxaemia. IDF proposes that the definition should consider all the relevant scientific findings to date as to the potential benefits. Indeed Cummings & Stephen (2007) present a table with all the possible properties of carbohydrates in the diet. From this one might consider that fibre may increase satiety, be a source of SCFA (Short Chain Fatty Acids), have a prebiotic effect and increase stool output.
To use the term "dietary fibre" exclusively as a marker of fruit, vegetables and grains intake would undervalue the intake of dietary fibre and thus its health benefits 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 sources other 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 and the one from the FAO/WHO expert group 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 Trowell 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 Annex II).

ALINORM 08/31/26 paragraph 29 states "Inclusion of "non-digestibility", poses many problems as there is no agreement on the definition of digestibility and no method to measure or validate it." However the concept of non-digestibility has been a fundamental part of the definition since it was first discussed. The Institute of Medicine (USA) report lists 18 different definitions of dietary fibre proposed between 1976–2000 and one definition of a new fibre source. Of these:

- 12 include statements to the effect of "non-digestible", "resistant to digestion" or "resistant to hydrolysis by human enzymes".
- Seven define fibre as that obtained using one or more of the AOAC methods 985.29, 991.43 and 997.08.
- Only ONE definition (that of the UK Commitee on Medical Aspects of Foods, in 1998) defined fibre as the NSP (Non Starch Polysaccharides) recovered by the Englyst method.

Furthermore to measure or validate digestibility there are various assays mimicking the human digestion. Muir and O'Dea (1993 and 1995) for example describe an *in vitro* assay mimicking the gastric and pancreatic digestion of starches. A different model is described by Venema *et al* (2000) which mimics the digestive tract from stomach to colon. These suggestions are not completely similar to the digestion in the human body, but they do give good indication of the digestibility of carbohydrates.

Analysis

In defining dietary fibre at "Codex", IDF considers it important not to lose sight of the USE of this definition, which is to confirm that food manufactures comply with the statements written on packages and used in their advertisements. It is thus necessary to be able to check manufacturers' claims analytically. In processed food it is currently impossible to differentiate between INTRINSIC plant cell wall polysaccharides and those which have been added. Neither the commonly used Prosky method nor the NSP (Englyst) methods are able to differentiate INTRINSIC from EXTRINSIC polysaccharides. Indeed Cummings & Stephen (2007) already indicate that dividing sugars into categories "intrinsic" and "extrinsic" is not a good idea. They say "Dividing sugars into intrinsic and extrinsic creates problems for the analyst and, therefore, for food labelling. While ingredient lists can be used to identify the source of sugars in foods, analytically it is not readily possible to distinguish their origin in a processed food." This statement is completely accurate and is applicable not only to simple sugars but also to oligo- and polysaccharides, and thus to dietary fibre.

The final definition MUST BE MEASURABLE. The proposed "Codex" Commission definition of dietary fibre includes a specified list of AOAC analytical methods. 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). Englyst and Cummings make the case for the NSP method because it is easier and faster to perform. However the AOAC methods have been implemented in many laboratories world-wide and are being performed on a routine basis daily without difficulty. Furthermore non-digestible carbohydrates that escape the NSP-detection method would have to be labelled as "carbohydrates". This is misleading as they are non-digestible whereas carbohydrates on a nutritional label are all digestible. This will not contribute to one of the aims of regulation of labelling as to provide maximum consumer protection by giving more accurate information on the food label.

The EFSA noted that a main problem in making a differentiation between sorts of carbohydrates in practice is that no analytical method differentiates between different fibre sources once they occur mixed in a food product. The EFSA advised that for practical purposes, analytical methods should fit in a single assay that could be used to quantify all components of dietary fibre. The IDF supports that it would be more convenient to have one method, but as been mentioned in chapter 2 the AOAC methods have been implemented in many laboratories world-wide and are being performed on a routine basis daily without difficulty.

2. IDF PROPOSAL FOR MODIFICATIONS AND EXPLANATION

The IDF supports the physiological approach of the proposed "Codex" definition in which resistance to digestion and the absorption in the human small intestine is the key element of dietary fibre (Annex I).
However, to have the definition in line with the most recent scientific knowledge, carbohydrate polymers like GOS, although containing some fractions of disaccharides should fall within the scope of the definition. The IDF would like to propose the following modification to the current proposed "Codex" definition which will exclude the mono- and disaccharides, but will include all indigestible oligosaccharides and fibres from other origins than plant cell walls, which are also considered to be dietary fibres:

Dietary fibre means carbohydrate polymers[1] with a degree of polymerisation (DP) not lower than 3, which are neither digested nor absorbed in the small intestine[2]. 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 consists of one or more of:

- Edible carbohydrate polymers naturally occurring in the food as consumed,
- carbohydrate polymers, which have been obtained from food raw

material by physical, enzymatic or chemical means,
- synthetic carbohydrate polymers.

Dietary fibre generally has properties such as:
- Decrease intestinal transit time and increase stools bulk
- Fermentable by colonic micro flora
- Reduce blood total and/or LDL cholesterol levels
- Reduce post-prandial blood glucose and /or insulin levels.

[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.

[2)] Non-Digestible carbohydrates like Galacto-oligosaccharides (GOS) although partly consisting of disaccharides (allo-lactose and galactobiose) fulfil the properties of dietary fibre and therefore fall within the scope of this definition.

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) used in the fibre definition 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.

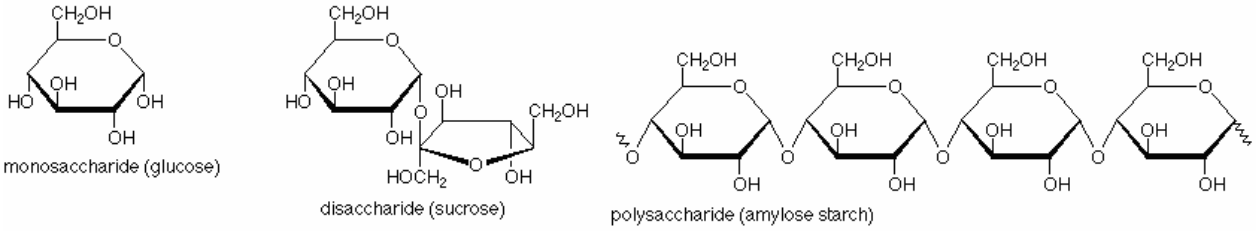

Figure 1. Examples of carbohydrates.

Physical-chemical characteristics and physiological effects of dietary fibre The EFSA (2007) stated that the interest of defining and quantifying dietary fibre in foods lies in the physiological effects that are associated with the consumption of that dietary component, which include decreased intestinal transit time and increased stools bulk, reducing blood total and/or LDL cholesterol levels, and reducing post-prandial blood glucose and/or insulin levels, among others. These physiological effects of dietary fibre are distinct from those of digestible carbohydrates.

Carbohydrates and digestibility

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.

Current definitions on dietary fibre

Various publications of respectable organisations have defined dietary fibre in a more broad perspective than the current FAO/WHO 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, EFSA 2007) (see annex II). The important **central element in all these definitions is the indigestibility** of dietary fibre in the human small intestine.

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. 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.

IDF rationale for proposal for modification of the definition

The IDF supports the way of defining and quantifying dietary fibre based on the distinction between physiological effects of dietary fibre and those of digestible carbohydrates because it highlights the central role of dietary fibre; **its contribution to general health** (CL 2007/43-NFSDU November 2007 paragraph 28). The contribution of dietary fibres to human health is mainly because of its non-digestibility.

Based on the above mentioned definitions, the IDF submitted an earlier proposal to remove the terms “degree of polymerisation” and “polymers” from the current proposed “Codex” definition. The IDF understands that with this definition lactose will also fall in the scope of the definition. This carbohydrate can cause severe problems in people suffering from lactose intolerance. Thus, removing the degree of polymerization from the proposed “Codex” definition will be in contradiction with the statement that dietary fibres are beneficial for health. The IDF therefore suggests that a footnote should be added to the proposed “Codex” definition, which allows GOS (and other carbohydrate polymers with similar properties) to fall within the scope of the dietary fibre definition.

On average two third of GOS consists of fractions with a DP of 3 or higher and will already fall within the proposed fibre definition. The carbohydrates present in GOS with a DP of 2 are shown in figure 2 and are disaccharides which cannot be or are hardly broken down by the enzymes of the human small intestine, meaning that they are neither digested nor absorbed in the human small intestine. Different scientific papers, describe GOS as indigestible and as beneficial for human health. *Asp* (1996) classifies oligosaccharides containing of galactose, glucose and fructose as indigestible, GOS is one of these oligosaccharides. *Macfarlane (2008)* describes in a review different health related effects of GOS, particularly in relation to their influence on mineral absorption, lipid metabolism, and anti-inflammatory and other immune effects such as atopic disease. This links GOS to one of the most important properties of dietary fibre, namely being beneficial to human health.

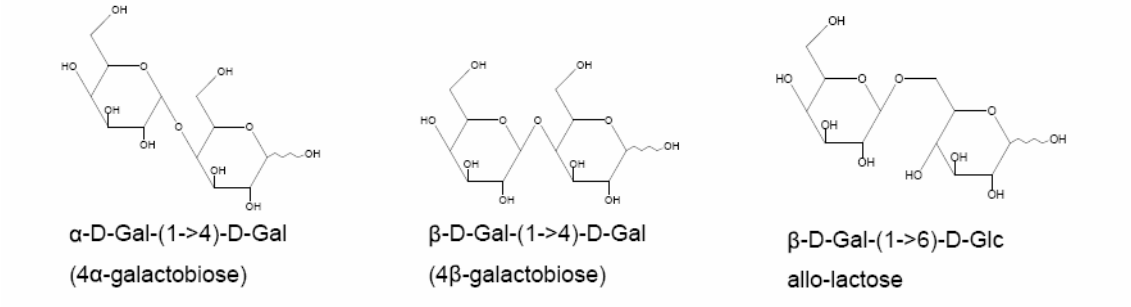

Figure 2: DP2 carbohydrates present in GOS

3. CONCLUSION

The IDF would like to propose the following modification to the current proposed "Codex" definition, in order to **exclude the mono- and disaccharides**, but to **include all indigestible oligosaccharides and fibres from other origins than plant cell walls,** which are also considered to be dietary fibres based on their non-digestibility:

Dietary fibre means carbohydrate[1)] polymers with a degree of polymerisation (DP) not lower than 3, which are neither digested nor absorbed in the small intestine[2)]. 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 consists of one or more of:

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

Dietary fibre generally has properties such as:

- **Decrease intestinal transit time and increase stools bulk**
- **Fermentable by colonic micro flora**
- **Reduce blood total and/or LDL cholesterol levels**
- **Reduce post-prandial blood glucose and /or insulin levels.**

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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.

2) Non-Digestible carbohydrates like Galacto-oligosaccharides (GOS), although partly consisting of disaccharides, (allo-lactose and galactobiose) fulfil the properties of dietary fibre and therefore fall within the scope of this definition.

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ANNEXES

I CURRENTLY PROPOSED CODEX DEFINITION OF DIETARY FIBRE

II CURRENT DEFINITIONS OF DIETARY FIBRE

ANNEX I
CURRENTLY PROPOSED CODEX DEFINITION OF DIETARY FIBRE

The currently proposed "Codex" definition of dietary fibre is as follows:

Definition[1)]

Dietary fibre means carbohydrate polymers[2)] 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 consists of one or more of:

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

Dietary fibre generally has properties such as:

- Decrease intestinal transit time and increase stools bulk
- Fermentable by colonic micro flora
- Reduce blood total and/or LDL cholesterol levels
- Reduce post-prandial blood glucose and /or insulin levels.

ANNEX II
CURRENT DEFINITIONS OF DIETARY FIBRE

Current "Codex" definition (CAC/GL 2-1985, Rev. 1 – 1993)
"*Dietary fibre means edible plant and animal material not hydrolyzed by the endogenous enzymes of the human digestive tract as determined by the agreed upon method* "

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):

1) From: Report of the 27th session of the „Codex" Committee on Nutrition and Foods for Special Dietary Uses, Bonn, Germany, 21-25 November 2005 (page 62) and Appendix III of Alinorm 06/29/26.

2) 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

"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.

Proposed EFSA definition (2007)[6)]
"Dietary fibre means all carbohydrates component occurring in foods that are non-digestible in the human small intestine"
This includes
* *Non-starch polysaccharides*
* *Resistant starch*
**Resistant oligosaccharides with three or more monomeric units.*
**Other non-digestible, but quantitatively minor components when naturally associated with dietary fibre, especially lignin.*

ILSI - International Life Sciences Institute

These are the same comments that ILSI submitted for consideration by the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU), in response to the request for comments (CL 2007/3-NFSDU) on Guidelines for the Use of Nutrition Claims: Draft Table of Conditions for Nutrient Content Claims (Part B Provisions for Dietary Fibre) at Step 6 with a few modifications.

ILSI is a nonprofit, worldwide foundation established in 1978 to advance the understanding of scientific issues relating to nutrition, food safety, toxicology, risk assessment and the environment by bringing together scientists from academia, government, industry, and the public sector to solve problems with broad implications for the well-being of the general public. ILSI receives financial support from industry, government and foundations.

ILSI is affiliated with the World Health Organization as a nongovernmental organization and has specialized consultative status with the Food and Agriculture Organization of the United Nations. Thus, it is as a nongovernmental organization that we respectively submit the comments below.

KEY POINTS

The main point ILSI wishes to communicate in response to latest request for comments on this topic is that the CCNFSDU definition of fibre given in Appendix III of Alinorm 06/29/26 and Appendix II of Alinorm 08/31/26 best expresses current scientific understanding. Other key points are summarized below with supporting information provided in the subsequent sections.

1. The finalization of a globally accepted definition of dietary fibre is an important objective which will have positive implications for scientists working in the field, for consumers, and for food manufacturers responding to consumer demand.
2. The definition should be based on the best available scientific evidence.
3. The definition should enable consumers to benefit optimally from the available scientific data.
4. The draft definition of dietary fibre circulated at the 27th Session of the CCNFSDU in 2005[7] was derived following extensive consultation and deliberation among a wide range of experts in the

[6)] Statement of the Scientific Panel on Dietetic Products, Nutrition and Allergies on a request from the Commision related to dietary fibre (Request N°EFSA-Q-2007-121) expressed on 6th July 2007

field. This definition, given in Appendix III of Alinorm 06/29/26 and Appendix II of Alinorm 08/31/26, is a clear, unambiguous physiological definition that can be supported by chemical analyses.

5. The draft definition is in accord with the physiological properties of fibre, again, as listed in Appendix III of Alinorm 06/29/26 and in Appendix II of Alinorm 08/31/26.
6. The physiological properties of fibre in turn relate to its health benefits, both putative and those widely accepted within the scientific community.
7. The necessary AOAC International Official Methods of Analysis exist for the measurement of dietary fibre components in foods as per the CCNFSDU 2005 (Appendix III of Alinorm 06/29/26 and Appendix II of Alinorm 08/31/26) proposed definition (ref – DeVries JW, Rader JI . J AOACI 88:1349-1366, 2005).
8. Thus, the 2005 proposed definition fulfills the criteria listed under points 2 and 3 above.
9. Encouraging increased consumption of fruits, vegetables and whole grains is also a laudable objective - one which has received almost global coverage. However, to use fibre determination as a marker to promote fruit and vegetable intake is not a fibre labelling concept, but relates to food-based dietary guidelines.
10. The following reference is recommended as further background: Gray J (2006) Dietary Fibre: Definition, Analysis, Physiology & Health. ILSI Europe Concise Monograph ISBN 90-78637-03-X. This Monograph has been developed by ILSI Europe in collaboration with experts in the field of dietary fibre. For convenience, it can be downloaded from the following web link: http://europe.ilsi.org/publications/Monographs/DietaryFibreCM.htm.
11. This definition agrees in terms of principle and methods with the AACC International definition for Dietary Fiber adopted by the AACCI Board of Directors in June, 2000. The ILSI North America Carbohydrates Technical Committee participated in the development of the AACC International definition by assembling a workshop of key government, academic and industrial scientists.

THE ISSUE

The Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) has been developing a definition of dietary fibre since 1998. At the CCNFSDU meeting in November 2006 the Committee considered a definition to forward to the Codex Alimentarius for adoption at Step 8 at the 2007 CAC meeting. During discussion the representative of the World Health Organization introduced an alternative concept (CRD19), a concept limiting dietary fibre to "intrinsic plant cell wall polysaccharides". In response the Committee chair delayed action on the definition and requested comments on both the original CCNFSDU definition and the one proposed by WHO. During the November 2007 CCNFSDU meeting, WHO introduced a publication, "Joint FAO/WHO Scientific Update on Carbohydrates in Human Nutrition" which was published in the December 2007 issue of the European Journal of Clinical Nutrition (volume 61, supplement 1), and supports the alternate concept offered by WHO in 2006. The CCNFSDU agreed to return the Draft Table (Provisions on Dietary Fibre) to Step 6 for further comment and consideration at the next session.

ILSI COMMENTS

The issue of a definition for dietary fibre has been thoroughly discussed and debated in the scientific community for many years. A consensus has developed, based on clear scientific evidence, that the definition of dietary fibre should be based on the physiological properties of food constituents, not merely on their physicochemical characteristics. This consensus is reflected in the original definition developed in CCNFSDU and numerous other definitions, including those of the US National Academy

[7] 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 consists of one or more of:

- Edible carbohydrate polymers naturally occurring in the food as consumed
- Carbohydrate polymers, which have been obtained from food raw material by physical, enzymatic or chemical means,
- Synthetic carbohydrate polymers.

of Sciences Institute of Medicine, the Agence Française de Sécurité Sanitaire des Aliments, the American Association of Cereal Chemists, the Health Council of the Netherlands, and the European Food Safety Authority among others. Each of these definitions is based on the physiological property of non-digestion and non-absorption in the small intestine, coupled with one or more desirable health effects.

The 'Intrinsic Cell Wall' (ICW) definition in the FAO/WHO Scientific Update has been proposed for over a quarter of a century. However, the ICW definition has not gained a common consensus in the scientific community, because it excludes non-digestible storage carbohydrates. The ICW definition has not been accepted for dietary fibre labelling purposes in the majority of the world's countries. In the UK, where the ICW approach was traditionally used, the Food Standards Agency in 2000 determined "The recommended reference procedure for analysis of dietary fibre is an AOAC International method, e.g. 991.43, 997.08," i.e. the methods applicable to the proposed CCFNSDU definition.

While there may be hypothetical grounds for believing that "intrinsic" fibre consisting of plant cell wall material may impart different effects compared to "extrinsic/added" fibre, there currently is no sound scientific basis demonstrating that "intrinsic" dietary fibre provide greater, or for that matter, different effects from "added" dietary fibre in foods. Studies using added fibre must also be considered in evaluating this question.

Support for the concept of "intrinsic" dietary fibre appears to be based on associations found in epidemiological studies rather than experimental evidence. The fact that the reported intake of foods naturally high in fibre is associated with a lower risk of several non-communicable diseases is not scientifically adequate to demonstrate that the beneficial effect of "intrinsic" dietary fibre outweighs those of added (extrinsic) fibre. In fact, the argument fails to recognize a large and growing body of scientific evidence on "added fibers' and/or "isolated non-digestible carbohydrates" derived from raw food materials by physical, chemical and enzymatic means or synthetic carbohydrate polymers that demonstrate similar physiological benefits to fibres from fruits, vegetables and grains. For example, isolated fibers such as β-glucans, guar and psyllium show the same physiological and health benefits as their intact fibre counterparts[8]. Using the term "intrinsic" dietary fibre to try to encapsulate the concept of plant cell wall material influencing the bioaccessibility of carbohydrates fails to take into account how the food may be used and what happens to it on cooking or processing. How such effects differ from those generated by added fibre is far from clear.

ICW as dietary fiber is claimed to provide an indicator of the quantity of fruits, vegetables, and whole grains in the diet. The purpose of nutrition labelling on foods is to represent the content of nutrients in foods, dietary fiber being one. The Englyst method proposed is non specific and does not necessarily quantitate the level of cell wall components present, but rather any carbohydrate

polymer that is not digestible by amylase[9]. Further, there is no relationship between ICW and the quantity of fruits, vegetables, and whole grains in a food or diet since the quantity of cell wall material varies from one fruit, vegetable or whole grain to the next. The content of phytonutrients and micronutrients in foods and/or diets should be determined by specific and valid methods specific to the nutrient in question. Nutrition labelling is not intended to indicate the source of nutrients, but rather the content of the nutrient in a food.

RECOMMENDED INTAKE VERSUS ACTUAL FIBRE CONSUMPTION

Recommended adult daily intakes for total fibre consumption in countries which have developed guidelines range from 21 – 40 g/day, and WHO has recommended that total fibre intake be 25 g/day.

[8] Institute of Medicine (IOM). Dietary, Functional and Total Fiber, Chapter 7, and Macronutrients and Healthful Diets, Chapter 11. In Dietary Reference Intakes for Energy, Carbohydrates, Fiber, Fat, Protein and Amino Acids. The National Academy of Sciences, Washington, D.C., USA, 2002/2005.

[9] Cho, S, DeVries, J.W., and Prosky, L. Dietary Fiber Analysis and Applications, AOAC International, 1997, Gaithersburg, MD, USA.

However, estimates of actual total dietary fibre consumption range from a low of 14 g/day to a high of 29, with only a few countries reporting fibre consumption at or above the WHO recommendation, and with most reported values below either national or WHO recommendations[10]. Even for countries that have subdivided their intake recommendations into categories of non-starch polysaccharides and total dietary fibre, consumption still falls short of recommended levels.

Traditional sources of dietary fibre have been polysaccharides found in fruits, vegetables and grains. However, availability of dietary fibre from these sources can be limited by factors such as income, geography, food storage and transportation, and seasonality. In recent years, food scientists and manufacturers have developed new food constituents which have the physiological properties of plant-wall polysaccharides, but which can be produced from widely and readily available materials. They are well-suited to inclusion in the diet in a variety of forms. They are also stable and storable and not subject to seasonal availability. Examples of these products include inulin-type fructans (fructo-oligosaccharides, oligofructose, inulins), galacto-oligosaccharides, gluco-oligosaccharides, xylo-oligosaccharides, polydextrose, resistant maltodextrins, β-cyclodextrins resistant starches, gums, pectins and modified cellulose products.

Given the difference between actual and recommended fibre consumption, consumption of products that exhibit the essential physiological properties, irrespective of the origin, of the fibre would be expected to provide public health benefit. Limiting the definition of fiber to "intrinsic plant cell wall polysaccharides" not only discourages future scientific creativity and innovation, but may, as a result, limit public access to a greater variety of fiber-rich healthy foods.

HEALTH BENEFITS OF DIETARY FIBRE

The range of products that meet the 2005 CCNFSDU dietary fibre definition (Appendix III of Alinorm 06/29/26 and Appendix II of Alinorm 08/31/26) share the core characteristics of being fully or partially fermented by microflora in the large intestine. As a result, each such ingredient may provide health benefits at different levels, partly depending on the degree and type of fermentation by microflora in the large intestine. Short-chain fatty acids produced during this fermentation, mediate a number of such beneficial effects, some directly and some indirectly. These effects include, among others, improved composition of intestinal flora, improvement of large bowel function, lowering of blood cholesterol levels, lowering of post-prandial blood glucose and insulin levels.

Other beneficial effects are the reduced absorption or inactivation of procarcinogens, inhibition of the growth of harmful yeast and bacteria, increasing mineral absorption, reducing food intolerance and allergy, modulation of the production of gastrointestinal peptides, reduction of undesirable compounds and production of digestive enzymes and B group vitamins[11]. In turn, these effects have been linked with improved bowel function, improved bone health, reduction in coronary heart disease and improved diabetes management.

While most observational studies demonstrating these benefits have been based on association with consumption of whole grain products, human clinical studies have demonstrated similar beneficial effects for different carbohydrate polymers obtained by physical, enzymatic, chemical or synthetic means, food constituents which would be excluded in the proposed ICW definition. Moreover, the levels of important short chain fatty acids produced by their fermentation are similar to those obtained from products such as oat and wheat bran[12].

CONCLUSION

[10] Dietary Fibre : Definition, Analysis, Physiology & Health. ILSI Europe, Brussels, 2006. Tables 8 and 9.
[11] Dietary Fibre: Definition, Analysis, Physiology & Health. ILSI Europe, Brussels, 2006. Box 4.
[12] Dietary Fibre: Definition, Analysis, Physiology & Health. ILSI Europe, Brussels, 2006. Table 10.

The dietary fiber definition that has been under development since 1998 by the CCCNFSDU, having reached step 7, accurately reflects the current state of scientific knowledge. Scientific evidence does not support limiting health benefits to "intrinsic cell walls" as dietary fiber. Moreover, "intrinsic" and "non-intrinsic" dietary fiber cannot be distinguished analytically.

ISDI - International Special Dietary Foods Industries

1. Table of Conditions for Dietary Fibre Contents

COMPONENT	CLAIM	CONDITIONS	ISDI 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 the Annex.
	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

ISDI, as representative of the international manufacturers of foods for special dietary uses fully supports the comments made by IDF on the proposal for a definition of dietary fibres.

ISDI therefore supports the following definition:

> Dietary fibre means carbohydrate polymers[1] with a degree of polymerisation (DP) not lower than 3, which are neither digested nor absorbed in the small intestine[2]. 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 consists of one or more of:
>
> - Edible carbohydrate polymers naturally occurring in the food as consumed, carbohydrate polymers, which have been obtained from food raw material by physical, enzymatic or chemical means, synthetic carbohydrate polymers.
> - Dietary fibre generally has properties such as:
> - Decrease intestinal transit time and increase stools bulk
> - Fermentable by colonic micro flora
> - Reduce blood total and/or LDL cholesterol levels

- Reduce post-prandial blood glucose and /or insulin levels.

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.

2) Non-Digestible carbohydrates like Galacto-oligosaccharides (GOS) although partly consisting of disaccharides, (allo-lactose and galactobiose) fulfil the properties of dietary fibre and therefore fall within the scope of this definition.

Annex

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.