codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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Agenda Item 5 **CX/NFSDU 06/28/5**
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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON NUTRITION AND FOODS FOR SPECIAL DIETARY USES
28th Session

Chiang Mai, Thailand, 30 October - 3 November 2006

DRAFT REVISED STANDARD FOR GLUTEN-FREE FOODS

- Comments at Step 6 of the Procedure -

Comments from:

ARGENTINA
BRAZIL
CANADA
COSTA RICA
EUROPEAN COMMUNITY
MEXICO
PERU
PHILIPPINES
UNITED STATES OF AMERICA
AAF - European Starch Industry Association
AOECS - Association Of European Coeliac Societies
ISDI – International Special Dietary Foods Industries
IWGA - International Wheat Gluten Association
WGPAT - Report of the Working Group on Prolamin Analysis and Toxicity

ARGENTINA

2. DESCRIPTION

2.1 Definition

Argentina is of the opinion that paragraphs 2.1.b) and 2.1.c) should be deleted given that the proposed level of 200 ppm does not suitably protect the most sensitive celiac persons. Likewise two different "gluten-free foods" contents would give rise to error among consumers. Because of this Argentina proposes that a single content of 20 ppm should be maintained, pointing out that this value should be adjusted when scientific progress in the matter justifies it.

On the other hand Argentina considers it appropriate that the square brackets should be removed from the term "oats" given that there is so far no conclusive scientific evidence proving that this is not prejudicial to celiac persons.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Gluten-free

Argentina is of the opinion that paragraph 3.1 should be amended, deleting the phrase: *"that the total content of gluten from wheat, rye, barley, [oats] or crossbred varieties of these does not exceed [200] ppm in these foodstuffs or ingredients defined in 2.1 (b) and (c)",* so as to be consistent with the definition in section 2.1.

Likewise, Argentina feels that it is appropriate that the term "prolamine" should be replaced by "gluten" in order to be consistent with the definition of the start of the section and with current Argentinian Standards (Argentine Foodstuffs Code Articles 1383b and 1383). It is also suggested that the square brackets at [20 ppm] should be deleted.

Section 3.1 will remain as follows:

"For the purpose of this standard "gluten-free" means that the total gluten content in products defined in 2.1.a) shall not exceed 20 ppm on a dry matter basis. The gluten content of liquid food products is expressed as ppm of the original product".

6. GENERAL OUTLINE OF THE METHOD OF ANALYSIS AND SAMPLING

6.2 Determination of gluten in foodstuffs and ingredients

Argentina suggests that the wording of the first paragraph of section 6.2 should be amended, replacing the term "pautas" by "normas" as this would be the correct translation of the same into Spanish. (Applies to Spanish version only. Translator's note)

Likewise Argentina takes the view that it would be appropriate to replace the phrase *"extracto seco"* in the last paragraph of section 6.2 by *"materia seca"* so as to maintain consistency with what is defined in paragraph 3.1. (Applies to Spanish version only. Translator's note)

With regard to this item, in Argentina's opinion the analytical method should be adjusted when scientific progress in the field justifies it in order to optimise capacity for confirmation, detection and specificity, making it possible to check foodstuffs forming part of the diet of celiac persons in a more precise and reliable way.

BRAZIL

2.1 a) Brazil proposes the elimination of the brackets of "[oats]", and use "oats".

Justification:

Scientific evidences are not conclusive about the innocuousness of oat to people affected by celiac disease.

2.1. a) Brazil proposes the deletion of "with a gluten level not excededing [20 ppm]" and the replacement of the text by:

" consisting of or made only from ingredients which do not contain any prolamins from wheat or all Triticum species such as spelt (Triticum spelta L.) kamut (Triticum polonucum L.) or durum wheat, rye, barley, oats or their crossbed varieties."

Justification:
In this case, the 20 ppm limit refers to a possible contamination and must not take part in the product's description.

2.1 b) and c) Brazil proposes the deletion of these items.

Justification:
Products with gluten levels equal to or above 200 ppm cannot be called gluten-free foods, because this would represent a risk to the health of people affected by celiac disease and would be deceiving to costumers.

3.1 Brazil proposes the deletion of this item.

Justification:
Considering that we are proposing an amendment in item 2.1 a and the deletion of items 2.1b and 2.1c there is no need to maintain this item.

CANADA

General comments
A strict gluten-free diet is necessary to maintain health in individuals with celiac disease or dermatitis herpetiformis. The scientific literature indicates that a strict gluten-free diet has the following positive effects: reduces the risk of lymphoma; increases bone-mineral density; and reduces antibodies associated with a variety of autoimmune diseases associated with celiac disease.

In Canada "gluten-free" foods are foods for special dietary use (i.e. foods that have "been specially processed or formulated to meet the particular requirements of a person in whom a physical or physiological condition exists as a result of a disease, disorder or injury...") and are defined in the *Food and Drug Regulations* as follows: "No person shall label, package, sell or advertise a food in a manner likely to create an impression that it is gluten-free unless the food does not contain wheat, including spelt and kamut, or oats, barley, rye, or triticale or any part thereof."

Specific comments
2. DESCRIPTION
2.1 Definition

Canada does not support two different levels of gluten in "gluten-free" foods.

Based on currently available data and analytical methodology, we would support the maximum gluten level not exceeding 20 ppm for parts (a), (b) and (c) of the definition. Maintaining the maximum at this level will protect those with celiac disease. The maximum level could be reconsidered in the future should new data from clinical studies become available regarding the tolerance for gluten by individuals with celiac disease. Such data

would need to demonstrate that those individuals with celiac disease that are perceived to be "less sensitive" to dietary gluten do not in fact suffer from mucosal damage or have an increased risk of malignancy on long term use.

OATS: The square brackets around "oats" in sections 2.1(a) as well as in 2.2.1 and 3.1 should be removed.
Although there is clinical evidence that confirms that consumption of **pure, uncontaminated** oats (i.e. oats not contaminated by wheat or other Triticum species, rye or barley) is safe in the amount of 50 to 70 grams per day (½ – 3/4 cup dry rolled oats) by adults and 20 to 25 grams per day (1/4 cup dry rolled oats) by children with celiac disease, the clinical studies have involved a small number of subjects, the oats used were pure and free of gluten contamination (i.e. from wheat or other Triticum species, rye or barley) and the amount allowed per day was also limited. Moreover, a small number of individuals with celiac disease may not tolerate even pure, uncontaminated oats. Furthermore, the availability of pure and uncontaminated oats is limited and there is no international standard for this product.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1. Gluten-free

As discussed above, Canada supports a maximum gluten content in "gluten-free" foods not exceeding 20 ppm and does not support 2 levels.

Also as discussed above, Canada supports the removal of the square brackets around oats.

6. GENERAL OUTLINE OF THE METHOD OF ANALYSIS AND SAMPLING

Canada notes that the 27th Session of the Codex Committee on Methods of Analysis and Sampling (CCMAS) agreed to advance the Enzyme-Linked Immunoassay R5 Mendez (ELISA) to the Commission for adoption as a Type I Method. While Canada will not object to its adoption, it is our view that this decision will need to be reviewed again when better science and methodology are available.

There would appear to be an inconsistency between sections 6.1 and 6.2 in that 6.1 includes only the Enzyme-Linked Immunoassay R5 Mendez (ELISA) method, whereas 6.2 refers to methods generically. Canada notes that the ELISA method using the R5 antibody is a useful method but it does have its limitations and we would be concerned if its inclusion in the Standard would be interpreted as the sole, acceptable method. We would note that other ELISAs would also have their place, such as the ELISA method that uses the Skerrit or other antibodies. Although most tests using the Skerrit antibody had higher detection limits than 10ppm, it is possible to modify these tests to meet the 10 ppm detection limit. Also, other ELISAs may be developed in the future that are even better than the R5 based ELISAs.

In this regard we would generally prefer the text in 6.2. However the first bullett which states that "Methods used for determination should be traceable and calibrated against an internationally accepted standard, if available." is potentially problematic as at the moment there is no internationally accepted standard for gluten.

Specifically with regard to the ELISA R5 method, the R5 antibody was designed to recognize a specific 5 peptide sequence that is found in the prolamins of wheat, rye and

barley. The antibody does not recognize the high molecular weight glutenin subunits which have also been implicated as toxic for people with celiac disease. For products which contain both gliadin and glutenins the R5 test would be able to detect the presence of the gliadin. If there was a product which did not contain gliadin, but did contain the high molecular weight glutenins then the R5 test would not give a positive response. For a product like wheat starch, which can be prepared by the extensive washing of wheat flour with water, it is possible to have a product where most of the gliadin has been washed out but glutenin still remains. This would mean that the product could be more toxic than the quantitative result from the ELISA test would otherwise suggest.

We would request clarification of and the need for the statement "The qualitative analysis as indicating presence of protein shall be based on DNA-methods or other relevant methods."

COSTA RICA

Costa Rica supports deletion of the square brackets around the word "oats" in sections 2.1.a and 3.1, because section 2.1.a refers to those foodstuffs which naturally do not contain prolamines, as a result of which we feel that oats should be included among the exceptions to those foodstuffs, given its avenine content. Although some studies supporting the inclusion of oats in the diet of patients with celiac disease have been revised, other scientific publications indicate that caution is necessary given that this could be contaminated with other prolamines during harvesting and milling.

With regard to the square brackets around the value of 20 ppm in sections 2.1.a and 3.1, as this corresponds to the detection limit in the R5 Mendez method for gluten, and bearing in mind that there is the possibility of cross-contamination with foodstuffs containing prolamines, removal of the square brackets around the said value is supported.

In sections 2.1.b and 3.1 it is requested that the square brackets should be maintained around the value of 200 ppm, given that it would appear that more scientific backing is necessary for determining the maximum safe value of gluten for celiac patients. Although 200 ppm would not appear to be a significant quantity, the literature consulted mentions the possibility that some patients might have complications even with small quantities of gluten.

As a general recommendation and consistently with use of the international system of units in other Codex standards, it is suggested that ppm should be replaced by mg/kg wherever it appears.

Furthermore, in section 4 on Labelling it is suggested that for greater clarity and consistency with other Codex standards the following phrase should be added: "In addition to the provisions included in the General Codex Standard for the Labelling of Prepackaged Foods, the Guidelines on Nutritional Labelling and the Guidelines for Use of Nutrition and Health Claims will apply to the following specific provision:"

Finally, in section 6.2 it is recommended that in the phrase relating to the detection limit of the R5 Mendez method, it should be clarified that the 10 ppm value corresponds to the gliadins content in accordance with the Report of the 26th Session of the CCNFSDU in 2004 (Alinorm 05/28/26).

EUROPEAN COMMUNITY

The European Community and its Member States (ECMS) believe that it is important to progress the draft revised standard for gluten-free foods. The ECMS are still reflecting on certain issues relating to the revision of the standard but consider that it is useful to provide some initial comments at this stage.

1. General Comments

Definition of gluten and prolamins

The ECMS suggest that the definitions and terms of gluten and prolamins that are used in the standard should be checked by cereal protein experts as since the adoption of the Codex Gluten-free standard in the early 1980s the definition of prolamins has been extended. The term gluten is used in a broad meaning in the draft for 'historical' reasons, however, the ECMS believe that the term causes confusion when used together with prolamin as it is now used in the draft standard.

In the current draft standard prolamins are defined as proteins extractable in aqueous ethanol. However, its is known that also the low molecular weight glutenins are soluble in aqueous ethanol after reduction, and they are included in prolamins since they are evolutionarily closely related to the rest of the wheat prolamins (Shewry and Tatham, 1999[1]). Using this extended definition of prolamins covers essentially almost all gluten proteins, whereas according to the current draft standard they only cover 50% of the gluten proteins.

Inclusion of oats

Oats is mentioned in draft standard (Alinorm 04/26, Appendix III), sections 2.1 (a) and (b), 2.2.1, 2.2.2 and 3.1. However, research in certain EC Member States has found that oats are suitable for most of the adult and child patients with coeliac disease as well as for patients with *Dermatitis herpetiformis*. For example, in Finland oats have been a part of the diet of coeliac disease patients for almost 10 years with 73% of Finnish persons with coeliac disease using oats regularly and in excellent treatment balance (Annex I gives details of research). Oats bring variety and palatability to the diet and especially valuable dietary fibre. The oats and oat products marketed for coeliac patients need to be pure from prolamin containing cereals. Therefore it is important to have HACCP based in-house control during the production, processing, transportation, storage, marketing and serving of oats and oat products and as well as for other gluten-free products.

The EC is further considering the scientific evidence related to oats intolerance and would be glad to consider the experiences of other countries on this issue.

Levels of gluten

There is ongoing research in certain EC Member States in relation to the most appropriate level of gluten in products rendered gluten free to be included in the standard. However, the results of the research will not be known until later in the year. The ECMS hope that the relevant information will be available to inform its position before the CCNFSDU meeting in the Autumn.

Labelling

The current draft of the revised standard proposes that there should be two levels of gluten - one for products that are naturally gluten free and another for those products that include ingredients that have been rendered gluten free. The committee may wish to review whether there should also be a distinction in the labelling of the two categories of products.

Determination of gluten

Recent research[2] from the University Of Helsinki, Department of Food Technology, shows that the R5 ELISA method overestimates barley prolamin contamination. However, since barley and rye are potential relevant contaminants in foods used by the coeliac patients, these cereals should also be detected reliably. Therefore the ECMS consider that the R5 ELISA method should not be given a general or unconditional acceptance for testing the purity of the samples in cases where there is a possibility that the product may contain barley.

Research results from some research groups do not support the suitability of the R5 ELISA method for detecting the purity of oats.

2. Specific comments

The ECMS propose that the reference to the levels of gluten should be in terms of "mg/kg" rather than "ppm". This would apply to the following sections: 2.1 a), b) and c); 3.1; and 6.2.

Section 2 Description

In 2.1 a) – it is proposed that the wording 'all *Triticum* species' should be changed to 'any *Triticum* species'

In 2.1 a) the EC supports the level of gluten of 20 mg/kg for naturally gluten-free foodstuffs. As noted in the general comments the EC is awaiting the outcome of additional research on the appropriate level of gluten in products that have been processed to reduce the level of gluten.

Section 6. General outline of method of analysis and sampling

It is proposed that the ordering of the two sections 6.1 and 6.2 should be changed so that the existing section 6.2 'Determination of gluten in foodstuffs and ingredients' should become 6.1 and visa versa.

The final sentence of the existing 6.2 should refer to '10 mg/kg gluten in the product on a dry matter basis'.

It is proposed that the heading 6.2 (existing 6.1) should be changed from 'Determination of gluten' to 'Methods of analysis'.

References:

1 Shewry PR, Tatham AS. 1999. The characteristics, structures and evolutionary relationships of prolamins. In: *Seed Proteins*, pp. 11–33. Eds. Shewry, P.R. and Casey, R. Kluwer Academic Publishers, Dorfrecht, the Netherlands.

2 Kanerva P.M, Sontag-Strohm T.S, Ryöppy P.H, Alho-Lehto P, Salovaara H.O. Analysing the purity of oats using R5 and omega-gliadin antibodies: a problem with barley contamination. *(Submitted in 2006 for publication in the Journal of Cereal Science)*

Annex 1
LIST OF SCIENTIFIC RESEARCHES WITH OATS AND COEALIAC DISEASE

Author, year	Country	Patients	Oat content of diet, length of trial	Oat product	Examinations	Results
Janatuinen et al. 1995 [1]	Finland	92 CD-adults	50-70g oats daily for 6 and 12 months	Flour, muesli & breakfast cereal	Small bowel biopsy	Moderate amounts of oats did not cause adverse effects for CD-adults
Srinivasan et al. 1996 [2]	Ireland	10 CD-adults	50g oats / day for 12 weeks	Porridge (GF oats)	Serological tests, duodenal biopsy	No signs of the toxicity of oats
Hardman et al. 1997 [3]	United Kingdom	10 DH-adults	50-70g oats /day for 12 weeks	Porridge (GF oats)	Serological tests, skin and duodenal biopsies	No adverse effects from oats
Reunala et al. 1998 [4]	Finland	11 DH-adults 11 DH-controls	50g oats / day for 6 months	Porridge and bread (GF oats)	Clinical tests, serological tests, intestinal biopsies	Oats did not harm mucosa nor cause rash
Holm et el. 1998 [5]	Finland	22 CD-children 10 ctrl CD-children	50g oats / day for 6 months		Clinical and serological tests, intestinal biopsies	Oats suitable for CD-children even in large amounts
Hardman et al. 1999 [6]	United Kingdom	2 DH-patients	Avenin 2,5g/d for 5d, and 2,5g/d for 9d (= 300 g of oats/d)	Avenin extracted from pure oats	Skin and small bowel biopsies, serological tests	Avenin did not have toxic effects on DH-patients. Oats tolerated even in large quantities
Janatuinen et al. 2000 [7]	Finland	92 CD-adults	About 50g oats / day for 6-12 months	Flour, muesli & breakfast cereal (GF oats)	Duodenal biopsy, serological tests	No adverse immunological effects from moderate amounts of oats
Hoffenberg et al. 2000 [8]	USA	10 CD-children	24g oats / day for 6 months	Commercial instant oat meal product	Small bowel biopsy, serological tests	Commercial oat product safe for newly-diagnosed CD-children
Picarelli et al. 2001 [9]	Italy	13 CD-adults	Peptic tryptic digests (PT) of avenin (2g/l)	*In vitro*	Small bowel biopsy, EMA detection from biopsy specimens	Oats did not induce EMA-production. Oats safe for CD-patients
Janatuinen et al. 2002 [10]	Finland	23 on oats diet for a 5-year period	After 1y patients were allowed do eat oats freely	Commercial rolled oats	Duodenal biopsy, serological tests	First long-term evidence of the safety of oats for CD-patients
Lundin et al. 2003 [11]	Norway	19 CD-adults	50g of oats / day for 12 weeks	Uncontaminated oats	Serological tests, C-D-xylose breath test,	Oats were tolerated by most, several had gi-

Author, year	Country	Patients	Oat content of diet, length of trial	Oat product	Examinations	Results
					duodenal biopsies	symptoms, 1 had villous atrophy
Störsrud et al. 2003 [12]	Sweden	20 CD-adults	Median 93g oats / day for 2 years (N=15 completed the study)	Uncontaminated rolled oats	Small bowel biopsies, serological tests	CD-adults in remission tolerate oats even in large amounts for extended periods of time
Kilmartin et al. 2003 [13]	Ireland	8 CD-patients 8 non-CD patients	Duodenal biopsies cultured with PT-avenin (5g/l)	*In vitro*	Duodenal biopsies, INF- γ and IL-2 cytokine markers	Immunogenic sequences in gliadin are not present in avenin. Oats are safe for CD-patients
Högberg et al. 2004 [14]	Sweden	116 CD-children	Average of 15 g oats / day for 12 months' trial period	"pure oats" mixed in porridges, bread and cookies	Small bowel biopsy, serological tests	1st randomized double blind study shows that moderate amounts of oats are tolerated by most CD-children
Peräaho et al. 2004 [15]	Finland	39 CD-patients	23 subjects oats 50g/day, 16 ctrl group no oats for 1 year	Normal, commercially available oat products	Small bowel biopsy, serological tests	Oats were not harmful on the mucosa although use can cause GI-pain/problems
Peräaho et al. 2004 [16]	Finland	710 CD- and HD-patients	Evaluation the use of oats - questionnaire	Normal, commercially available oat products	Questionnaire	Majority of CD- (73%) and DH-patients (55%) prefer to consume oats; well tolerated and diversifies the diet
Holm et al 2006 [17]	Finland	32 children with CD	50g oats/day, 2 yr controlled trial + 7 yr follow-up	Rolled oats (porridge, home-baked bread)	Small bowel biopsy, serological tests	Long-term oat consumption is well tolerated in children with CD. It doesn't result in small bowel mucosal deterioration or immune activation

CD = coeliac disease
DH = dermatitis herpetiformis
GF oats= gluten-free oats (not contaminated with other cereals, such as wheat, rye or barley)

EMA = antiendomysial antibodies
IFN-γ = interferon- γ
IL-2 = interleukin-2

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MEXICO

- In the Spanish text, when reference is made to the content this is expressed in parts per million, i.e. ppm, which in Spanish is connected with the concentration. For that reason it should be indicated in this form.
- We suggest deleting the square brackets from 2.1 a, b and c.
- We suggest deleting the square brackets from 2.2.1.
- It is recommended to keep the square brackets around 20 ppm in the second line of 3.1 and to delete the square brackets around "oats" in the third line of this section
- We suggest replacing "vitaminas y minerales / vitamins and minerals" under 3.2 in the Spanish text by "micronutrimentos / micronutrients".
- Regarding Section 6, during the Annual Session held in Bonn, Germany, last November, an English analytical method had been discussed as an alternative to the R5 method; this method is not mentioned in the document.

PERU

1. SCOPE
Peru is in agreement with the text.

2. DESCRIPTION
Peru is in agreement with the text.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS
Peru makes the following comment: with reference to section 3.1: The term gluten-free creates confusion among consumers. Consideration should be given to the term low gluten content or reduced gluten content.

4. LABELLING
Peru submits the following comment: with reference to section 4: the quantity of gluten in ppm included in the foodstuff must be regarded as nutritional information in the label.

5. CLAIMS
Peru is in agreement with the text.

6. GENERAL OUTLINE OF THE METHOD OF ANALYSIS AND SAMPLING
Peru is in agreement with the text.

PHILIPPINES

The Philippines recommends the following points in the revision of the draft revised standard for gluten-free foods.

1. Scope
Comments: Add the phrase *processed foods* and change the word 'purpose' to 'uses' in 1.2 under Scope, thus, the statement would appear:
1.2 The standard refers only to processed foods for special dietary purpose uses for which these foodstuffs and ingredients are intended.

Rationale: to support 1.1 of Scope, emphasize that the subject of the standard are the foodstuffs and ingredients which have been specially processed, and maintain the title wherein this draft standard belongs.

2. Description

Comments: Remove the square brackets on 'oats' and on '20ppm' in sub-section 2.1 a) under definition, thus, the statement would appear as:

a) consisting of or made only from ingredients which do not contain any prolamins from wheat or all *Triticum* species such as spelt (*Triticum spelia* L.), kamut (*Triticum polinicum* L.) or durum wheat, rye, barley [oats] or their crossbred varieties with a gluten level not exceeding [20ppm]

Rationale: Oats also contain prolamin (about 16% avenin) and are sometimes grown directly adjacent to, and/or milled on the same equipment as other grains that do not contain gluten and so are commonly contaminated.

3. Essential Composition and Quality Factors – We support the information contained in the draft

4. Labeling
Comments: Change the word 'given' to 'printed' and add the phrase 'located on the principal display panel of the product label', thus, the sentence would appear as:

The term 'gluten-free' shall be given printed in the immediate proximity of the name of the product *located on the principal display panel of the label.*

Rationale: The word printed is more appropriate word to be used because the subject is about written information. The phrase 'located on the principal display panel of the label' need to be specified inasmuch as the product name is also written in the information panel and other sides in the label, further, the principal display panel is the place wherein vital information is immediately seen.

5. Claims
Comments: Modify the sentence adding the phrase 'as defined in Section 2.1b and c' and a sentence regarding 'naturally gluten-free' thus, would appear as follows:

A foodstuff or ingredient that meets the requirements set out in Section 3.1 *as defined in Section 2.1b and c* may be labeled as 'gluten-free'. *A foodstuff or ingredient that meets the requirement set out in Section 3.1 as defined in Section 2.1a may be labeled 'naturally gluten-free'.*

Rationale: The purpose is to differentiate a claim between a 'gluten-free' products (which have been rendered gluten-free by processing) and products which are inherently or 'naturally gluten-free"

UNITED STATES OF AMERICA

I. GENERAL COMMENTS

The United States offers the following comments on the Draft Revised Standard for Gluten-Free Foods at Step 6. At the time these comments were submitted, the United States was in the process of rulemaking on gluten-free labeling. Consequently, our comments mainly focus on identifying questions and issues for the Committee's further consideration (including scope, definition of gluten-free, labeling, and certain inconsistencies). At a later date, we anticipate offering additional comments.

II. SPECIFIC COMMENTS

Scope of this standard
The United States proposes that the Committee clarify the scope of this standard, and ensure that appropriate Codex texts provide for truthful and non-misleading "gluten-free" claims about the absence of gluten in foods that are and are not by nature free of gluten.

We would like to draw the Committee's attention to an apparent inconsistency between Section 1.1 and Section 2.1 with regard to this standard's scope. Section 1.1 states that this "standard applies to those foodstuffs and ingredients which have been especially processed or prepared to meet the dietary needs of persons intolerant to gluten." While Section 2.1b) appears to be consistent with this, referring to specific grain ingredients…which have been *rendered* "gluten-free", Section 2.1a) may be interpreted to refer to foods that are by nature free of gluten. In support of this interpretation, we note para 37 in ALINORM 97/26 which states:
"After an extensive discussion, the Committee agreed to define three groups according to their gluten content in the end product, with all figures in square brackets for further comments:
- naturally gluten free foods (20 ppm)
-products which had been rendered 'gluten free' (200 ppm)
-any mixture of the two ingredients (200 ppm)."

The United States requests that the Committee clarify the scope of the standard and correct any related inconsistencies. We would support a scope that encompasses both foods rendered gluten-free and foods naturally gluten-free. This would require revisions to text in Sections 1.1 and 1.2 (Scope).

Definition of "Gluten-Free" (Sec. 2 and 3.1)
As noted above, the Committee proposed a decade ago to identify maximum gluten levels for three categories of foods, which represented: 1) "naturally gluten free foods;" "products which had been rendered 'gluten-free';" and 3) "any mixture of the two…." However, in subsequent Committee meetings, there was continued discussion about whether there should be one or two levels (e.g., ALINORM 99/26, para 36; ALINORM 01/26, para 30-32.).

Once the Committee has clarified this standard's scope, we recommend further discussion of the text in Sections 2 and 3.1 considering, among other things:
- Appropriate criteria for defining gluten-free;
- Whether one or two levels are justified;
- Whether to list oats with the other grains identified in Section 2 and 3.1; and
- Additional areas where there may be a need to correct inconsistencies or update provisions.

Below are examples of issues for further discussion.

Criteria for defining gluten-free. The United States supports a definition of gluten-free that is scientifically sound, and facilitates the two Codex goals of protecting consumers' health and facilitating fair international food trade. Specifically, the establishment of a maximum gluten level(s) in the definition of gluten-free should afford protection to persons who have celiac disease and are intolerant to gluten, and consider the sensitivity of the analytical method that would be used to verify compliance.

With regard to identifying a threshold that should protect persons who are intolerant to gluten, we emphasize the need for the Committee to consider the scientific literature to date, which raises concerns about the justification for the 200 ppm threshold proposed over a decade ago (refer to bracketed text in Sections 2.1b) and 3.1). For example, in a 2004 advisory opinion of the European Food Safety Authority[1], a scientific panel stated that "at present, clinical data are not sufficient to back up the [200] mg/kg threshold suggested" and that "the current figure of [200] mg gluten/kg food is arbitrary and does not include any safety factor." The panel concluded that the proposed limit of 200 mg gluten/kg food therefore requires reconsideration. Recent studies that examined potential gluten exposure in individuals with celiac disease also bring into question whether the 200 ppm level would be protective, and accommodate individual variability in gluten sensitivity among those who have celiac disease (Collin, *et al*, 2004; Catassi, *et al*, 2005; Fasano, 2005).

With regard to the analytical methods that would be used to verify compliance of foods labeled gluten-free, we also emphasize the need for the Committee to consider the implications of the CCMAS temporary

[1] European Food Safety Authority (EFSA). Opinion of the Scientific Panel on Dietetic Products, Nutrition and Allergies on a request from the Commission relating to the evaluation of allergenic foods for labelling purposes. (Request No EFSA-Q-2003-016). (Adopted 19 February 2004). pp. 40 and 44.

endorsement of the Enzyme-Linked Immunoassay (ELISA) R5 Mendez Method in establishing a maximum level for gluten in the definition of "gluten-free." In particular, we note that the methods developed over the past decade since the 200 ppm was proposed are more sensitive (e.g., part of the rationale of one delegation's support for the 200 ppm level in 1995 was that "no validated methods existed with a limit of determination below 160 ppm" (ALINORM 95/26, para 51).

Additional implications of updated methods of analysis. The United States notes that other provisions in the draft revised standard will likely need to be updated to reflect the updated text in Section 6 on methods of analysis. For example, we request that the Committee consider whether the references to "prolamins" in 2.1a), 2.2.2, and 3.1 should be deleted, and the need for other modifications to the text based on the method for gluten determination that CCMAS temporarily endorsed.

Oats. The United States wishes to bring to the Committee's attention that the word "oats" is stated in brackets (i.e., [oats]) in Section 2.1a) whereas the brackets around the word "oats" are missing in Section 2.1b) as presented in CL 2006/5-NFSDU. We believe that absence of brackets around the word "oats" in Section 2.1b) may have been an inadvertent omission.

Regarding the inclusion of oats in Section 2.1a), the United States notes that although a few recent reports in the scientific literature indicate that some individuals with celiac disease may be sensitive to the naturally occurring proteins in oats (Arentz-Hansen, *et al*., 2004; Lundin, *et al*., 2003), the findings of numerous published studies, including one that lasted 5 years, indicate that most individuals with celiac disease prefer and can tolerate a limited daily intake (e.g., 50 gm or less) of oats that do not contain gluten from wheat, rye and barley (Janatuinen *et al*., 1995; Srinivasan, *et al*., 1996; Hardman, *et. al*., 1997; Reunala, et al., 1998; Janatuinen *et al*., 2000; Janatuinen *et al*., 2002; Storsrud, *et al.,* 2003). Therefore, the United States encourages the Committee to consider this information.

Description of other grains in 2.1. We further note that there appear to be certain inconsistencies in how the grains in 2.1 are described. For example, in 2.1a) there are references to all *Triticum* species, but this is absent from 2.1b).

Labelling (Section 4)

The current text of the draft revised standard reads as follows:

4. Labelling
The term "gluten-free" shall be given in the immediate proximity of the name of the product.

If the Committee decides that this standard's scope should include foods that are naturally free of gluten, then it might consider referencing the General Guidelines on Claims and adding a similar provision to Section 5.2 in the Codex Guidelines for Use of Nutrition and Health Claims to identify non-misleading language for such claims.

Specifically, section 5.1(v) of the General Guidelines on Claims (*CAC/GL 1-1979, Rev. 1-1991*), states:
5.1 The following claims should be permitted subject to the particular condition attached to each:
...(v) Claims that a food has special characteristics when all such foods have the same characteristics, if this fact is apparent in the claim.

We further note a similar provision specific to nutrients in the Codex Guidelines for Use of Nutrition and Health Claims (*CAC/GL 23-1997, Rev.1-2004*) which identifies how such a nutrient content claim should be expressed, i.e.:
5.2 Where a food is by its nature low in or free of the nutrient that is the subject of the claim, the term describing the level of the nutrient should not immediately precede the name of the food but should be in the form "a low (naming the nutrient) food" or "a (naming the nutrient)-free food."

Consequently, if the Committee decides to include foods that are naturally free of gluten in this standard, it could consider revising Section 4 to encompass the following new text identified in bold:

4.1 Foodstuffs Rendered Gluten-Free
The term "gluten-free" shall be given in the immediate proximity of the name of the product.

4.2 Foodstuffs Naturally Gluten-Free
In addition to the requirements of the Codex General Guidelines on Claims *(CAC/GL 1-1979, Rev. 1-1991)*, where a food is by its nature free of gluten, the term describing the level of gluten should not precede the name of the food but should be in the form, "(naming the food), a gluten-free food".

References cited:

Arentz-Hansen, H., *et al.* (2004). The molecular basis for oat intolerance in patients with celiac disease. *Plos Med,* 1:84-92.
Catassi, C., *et al.* (2005). Toxicity of gluten traces in patients on treatment for celiac disease. Results of a prospective, placebo-controlled, double-blind, randomized study. Abstract. *Digestive Disease Week,* May 14-19, 2005 McCormick Place, Chicago, IL.
Collin, P.,*et al.* (2004). The safe threshold for gluten contamination in gluten-free products. Can trace amounts be accepted in the treatment of coeliac disease? *Aliment Pharmacol Ther,* 19:1277-1283.
Fasano, A. (2005). Presentation on *Prospective Studies*. Transcript of the Food Advisory Committee Meeting on *Advice on CFSAN's Draft Report: Approaches to Establish Thresholds for Major Food Allergens and for Gluten in Food* held by the Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, on July 14, 2005 in Greenbelt, Maryland, p. 141-145. Accessible at http://www.fda.gov/ohrms/dockets/ac/cfsan05.html on May 25, 2006.
Hardman, C.M., *et al.* (1997). Absence of toxicity of oats in patients with Dermatitis herpetiformis. *N Engl J Med*, 337:1884-1887.
Janatuinen, E. K., *et al.* (2002). No harm from five year ingestion of oats in coeliac disease. *Gut*, 50(3):332-335.
Janatuinen, E. K., *et al.* (2000). Lack of cellular and humoral immunological responses to oats in adults with coeliac disease. *Gut*, 46(3):327-331.
Janatuinen, E. K., *et al.* (1995). A comparison of diets with and without oats in adults with celiac disease. *N Engl J Med*, 333(16):1033-1037.
Lundin, K. E., *et al.* (2003). Oats induced villous atrophy in coeliac disease. *Gut,* 52(11):1649-1652.
Reunala, T., *et al.* (1998). Tolerance to oats in dermatitis herpetiformis. *Gut*, 43:490-493.
Scrinivasa, U., *et al.* (1996). Absence of oats toxicity in adult celiac disease. *BMJ*, 313:1300-1301.
Storsrud, S., *et al.* (2003). Beneficial effects of oats in the gluten-free diet of adults with special reference to nutrient status, symptoms and subjective experiences. *Br J Nutr,* 90(1):101-107.

AAF - European Starch Industry Association

In the current proposal at Step 6, two levels of gluten are considered for gluten-free foods: maximum 200 ppm on dry matter for products containing derivatives of gluten-containing cereals, and maximum 20 ppm on dry matter for naturally gluten-free foods.

Data needed to substantiate a definition of "gluten-free" are basically limited at the current time to the Finnish Dietary Survey Study and the Italian Microchallenge Study.

The Finnish Dietary Survey Study[1-3] determined the gluten content of a range of naturally and wheat starch-based gluten-free flours and baked goods, and estimated the daily use of gluten-free flours from food records of coeliac patients. Wheat starch-based gluten-free foods generally contained about 100 ppm gluten or less, with some products at 100-200 ppm. The daily use of gluten-free flours ranged from 10-300 g in adults (median 80 g) and 20-140 g in children (median 60 g).

No correlation was found in adults between the level of consumption of gluten-free products and the mucosal morphology and antiendomysial antibodies of the coeliac patients.

Based on these data, the maximal values for daily consumption (300 g) and for gluten content of the gluten-free products (200 ppm) would result in 60 mg daily gluten intake. As most values for consumption are below 150 g/day and for gluten content below 100 ppm, a realistic value for the daily gluten intake through the use of wheat starch-based gluten-free foods is 15 mg or below.

The findings of the Finnish Dietary Study are in line with the Italian Microchallenge study[4,5]. In a double blind placebo controlled food challenge study with daily exposure to 10 and 50 mg gluten no significant change is found for the clinical situation and in serological testing, while a slightly lower average value for the ratio villous height on crypt depth (vh/cd) and a slightly higher average value for the intraepithelial lymphocytes count is found for the 50 mg group. Due also to the low number of participants per group, the statistical significance of these values however is not clear, and the low average vh/cd value at the start of the challenge test raises questions about the initial condition of the participants.

In the Finnish study, irrespective of whether wheat starch-based or naturally gluten-free products were used, the clinical and histological recovery was evident. Within the limits of gluten content and intake of gluten-free foods, the long-term treatment of coeliac disease in Finland has been successful. The most important issue is that the adherence to the gluten-free diet is good. It is recognized however that some individuals may be extremely sensitive to trace amounts of gluten.

The data on the gluten content of gluten-free foods as reported in the Finnish study and elsewhere are in line with the maximum level of 200 ppm already commonly used in the market for gluten-free food. Indeed, the gluten content of industrial wheat starch is mainly between 50 and 150 ppm, with maximum values up to 250 ppm. Since wheat starch-based gluten-free flours and baked products contain maximally 70-80 % wheat starch, this means that Gluten-Free Foods available in the market will contain 100 ppm gluten or less.

Therefore the AAF believes that the maximum level of gluten for gluten-free foods can be safely set at 200 ppm.

A second category of "naturally gluten-free" foods with guaranteed lower gluten content would fulfill the needs also of the most sensitive coeliac people.

./…

…/..

One category of gluten-free foods with a very low level of gluten acceptable for the most sensitive people, or a further reduction of the maximum gluten content in gluten-free foods derived from gluten-containing cereals, would exclude the use of wheat-starch based gluten-free foods, and thus unnecessarily reduce the availability of gluten-free foods that can be safely used by the majority of coeliac people, and decrease their quality of life.

1. Peräaho, M., Kaukinen, K., Paasikivi, K., Sievänen, H., Lohiniemi, S., Mäki, M., Collin, P. (2003). Wheat-starch-based gluten-free products in the treatment of newly detected coeliac disease. Prospective and randomized study. Aliment Pharmacol Ther, 17:587-594.

2. Collin, P., Thorell, L., Kaukinen, K., Mäki, M. (2004). The safe threshold for gluten contamination in gluten-free products. Can trace amounts be accepted in the treatment of coeliac disease? Aliment Pharmacol Ther, 19:1277-1283.

3. Kaukinen, K., Mäki, M., Collin, P. (2004). Trace amounts of gluten in the treatment of coeliac disease. Proceedings of the 19th meeting of the Working Group on Prolamin Analysis and Toxicity, Prague, 30 september-3 October 2004. Editor: Martin Stern, p. 115-116.

4. Catassi, C., Fabiani, E., Mandolesi, A., Bearzi, I., Iacono, G., D'Agate, C., Francavilla, R., Corazza, G.R., Volta, U., Accomando, S., Picarelli, A., De Vitis, I., Nardone, G., Bardella, M.T., Fasano, A., Pucci, A. (2004). The Italian study on gluten microchallenge: preliminary results. Proceedings of the 19th meeting of the Working Group on Prolamin Analysis and Toxicity, Prague, 30 september-3 October 2004. Editor: Martin Stern, p. 109-114.

5. Catassi, C. The Italian study on gluten microchallenge. AOECS Annual Meeting 2005.

AOECS - Association Of European Coeliac Societies

AOECS is an independent non-profit organisation. Our members are coeliac societies located in 24 European countries, cooperating with medical advisors and giving any possible advise, information and assistance to the gluten intolerant population, which is suffering from coeliac disease or dermatitis herpetiformis Duhring.

We would like to comment on following subjects:

A) Oats: Delete the square brackets around oats in 2.1a), 2.2.1 and 3.1.

The reasons are:

1. In more than 2/3 of our member countries oats is not allowed in the gluten-free diet. In the rest of less than 1/3 the opinion is divided: Only in very few countries oats is allowed, in the rest of the countries doctors give individual advices.

2. Scientists, who are in favour of oats in the gluten-free diet, are speaking about "moderate amounts, which are 50 g per day." The term "moderate amounts" cannot be implemented into legislation or in a Standard, it must be a definite yes or no.

3. A recent research documented, that cloned T-cells of coeliacs are reacting with avenin, which is not the case in the normal population. The official publication is not available till now.

4. In published papers is documented, that some coeliacs do not tolerate oats.

5. In other papers the individuals, who did not finish the oats-challenge, were dropped out in the conclusion.

6. Considering all these facts, we do not think that oats can be released as a gluten-free cereal, but some doctors can feel free to allow some coeliacs the consumption of moderate amounts of uncontaminated oats under medical controlling.

B) Thresholds in 2.1 and 3.1:

Delete the square brackets around 20 ppm in 2.1a) and 3.1 and keep this threshold of 20 ppm for products gluten-free by nature.

The reasons are:

1. The study on gluten microchallenge by Catassi et all has been finished. The final results have been presented by Dr. Catassi at our General Assembly in Edinburgh in September 2005. Because his paper has not been officially published till today, we would like to inform CCNFSDU about the "Preliminary Conclusive Remarks", which are already published (1):

   „Patients challenged with 50 mg gluten/day showed a trend toward minimal histological changes in comparison with the placebo and the 10 mg groups."

   „These results suggest that 10 mg should be considered the maximum tolerable daily intake of gluten in treated coeliacs, as no consequences were detected in patients ingesting this dose for a prolonged period of time (three month). This finding should facilitate the process of defining the highest concentration of gluten that can be tolerated in GF products. These data should, however, be evaluated with caution as it cannot be excluded that (2) some patients might react to even lower

gluten intakes, and (3) the exposure to similar gluten doses for a period of time longer than three months might be harmful in the treatment of coeliac disease.“

2. The coeliac society from Catalunya, Spain, investigated in cooperation with the University of Barcelona the consumption of special gluten-free products. This study is the first one, which is aiming to determine the quantity of special gluten-free products that coeliacs eat per day and to find out whether there is any difference between the diet of Northern and Mediterranean countries.

   The data show, that a higher quantity of people eat between 200 g and 300 g gluten-free products per day, that means, that the daily gluten intake would be between 40 and 60 mg gluten, if every product could have a gluten content of 20 mg/100g = 200 ppm. The threshold of 200 ppm gluten for all kinds of gluten-free products was requested by few Observers during last Codex meetings. Accordingly to these data, the majority of people would ingest more that 40 mg gluten/day.

3. Many producers of gluten-free foods are able to offer products below 20 ppm gluten since many years.

4. Many coeliacs demand the complete exclusion of even traces of gluten in their diet and some coeliacs indeed do not tolerate gluten traces from wheat starch based products.

5. It is known, that the reaction to small amounts of gluten in coeliac patients is different, even the reaction of one individual is depending on the age of the individual - lower reaction during the period of adolescence, higher reaction before and later on.

6. Considering all these facts, such products as described in 2.1a) must be available below the threshold of 20 ppm gluten.

7. This threshold can easily be monitored by the R 5 ELISA method, which has been endorsed as a Typ 1 method by CCMAS in May 2006.

Delete the square brackets and replace the 200 ppm with 100 ppm in 2.1b), 2.1c) and 3.1.

The reasons are:

1. Since many years many coeliacs eat also gluten-free bread based on wheat starch and do not want to miss these products.

2. Some published papers informed about the fact, that 80 % of the wheat starch-based products contain less that 100 ppm gluten, some are very far below this threshold. Such products have been available on the market for several years.

Why two thresholds?

1. With these two thresholds a compromise can be achieved, which gives space for free choice based on individual requirements.

2. There will be no change for the large majority of all wheat starch based products, which are already on the market since several years and labelled “gluten-free”, but coeliacs can be sure that contamination in products gluten-free by nature is avoided because of the threshold of 20 ppm gluten in these kinds of products.

3. Coeliacs are always confronted with unavoidable or unknown gluten intake, if they live a normal social life, e.g. eating in restaurants, when travelling or on holiday. Furtheron the contamination problem in food for normal consumption still exists and it is impossible to avoid this potential risk. Therefore the thresholds in products for special dietary uses should be on one hand as low as possible

to protect the health of coeliacs but on the other hand to be achievable by the food industry.

C) General outline of the method of analysis and sampling

6.1. We suggest following additions to 6.1, that the whole chapter should be read:

6.1 Determination of gluten in foodstuffs and ingredients

Enzyme-Linked Immunoassay Sorbent R5 Mendez (ELISA) method. This method was endorsed as a Typ 1 method by CCMAS in May 2006.

The R5 ELISA is a method based on a monoclonal antibody raised against secalin, the rye prolamin and is able for detection of gluten in natural and heat-processed samples (sandwich ELISA). The antibody reacts with the pentapeptide QQPFP, which is presented in all gliadins, secalins and hordeins; QQPFP is also present in coeliac-active epitopes. For the detection of hydrolyzed gluten a modification of the R5 assay (competitive ELISA) has to be applied.

Delete 6.2

References:

(1) Catassi et all: The Italian study on gluten microchallenge: preliminary results. Proceedings of the 19th Meeting of the Working Group on Prolamin Analysis and Toxicity 2004; 109-114.
(2) Catassi et all: Dose dependent effects of protracted ingestion of small amounts of gliadin in coeliac disease children: a clinical and jejunal morphometric study. Gut 1993; 34: 1515-1519.
(3) Ciclitira et all: Evaluation of a gluten free product containing wheat gliadin in patients with coeliac disease. BMJ 1984; 289 : 83

ISDI – International Special Dietary Foods Industries

Section 1. SCOPE

- ISDI suggests that it might be useful to add the sentence under section 1.3 of the current CODEX STAN 118-1981 FOR "GLUTEN-FREE FOODS", which reads:

"This standard does not apply to foods which in their normal form do not contain gluten".

Sections 2 & 3. DESCRIPTION & ESSENTIAL COMPOSITION AND QUALITY FACTORS

1. Comments on oats

ISDI noticed that *"oats"* is mentioned in the Draft revised Standard at five places in the text and that at three places it is in square brackets. Therefore, ISDI would like to suggest that the advice of WGPAT is asked for the position of "oats".

2. Comments on the levels for gluten

ISDI recognises that the industry for gluten-free foods has been producing, for a significant number of years, naturally gluten-free foods that do not exceed a gluten level of 20 ppm, and wheat starch-based gluten-free foods that do not exceed a gluten level of 200 ppm.
ISDI recognises that, with progress over time, it has recently become possible to produce wheat starch based gluten-free foods with gluten levels not exceeding 100 ppm, although at this moment it is not clear if, in the long term, sufficient quantities of gluten-free wheat starch will be available to meet the needs of the entire gluten-free food industry.
ISDI supports the expert work of the Working Group on Prolamin Analysis and Toxicity (WGPAT) in their efforts to determine a suitable test method and in their work to determine the level of gluten of clinical significance to most coeliac consumers.

ISDI welcomes the new scientific work completed in an attempt to bring clarity to the issue of tolerable levels of gluten in patients with coeliac disease following a gluten-free diet, but awaits the recommendations of the WGPAT since this scientific work is not definitive in suggesting a clinical level.
ISDI believes that a single limit for the maximum permitted gluten content should be adopted for all foods presented for coeliacs, taking into consideration current practice which provides consumer choice from both naturally gluten-free products and rendered gluten-free products, e.g. wheat starch based products.
Conclusion
ISDI requests that CCNFSDU, at this stage, does not try yet to resolve the debate on clinical levels, or set a safe maximum level of consumption, without:

- Recognising the recommendations of the WGPAT since the new clinical studies do not provide enough evidence to support a definite clinical level.

Section 3.1. ESSENTIAL COMPOSITION AND QUALITY FACTORS
ISDI requests that CCNFSDU changes *"on a dry matter basis"* to *"as consumed"*, taking into account the earlier CCNFSDU discussions on limits on an "*as consumed*" basis within the Standard.

Section 4. LABELLING
ISDI would appreciate that WGPAT be consulted for guidance on the labelling of gluten-free foods as required.

IWGA - International Wheat Gluten Association

In the current proposal at Step 6, two levels of gluten are considered for gluten-free foods: maximum 200 ppm on dry matter for products containing derivatives of gluten-containing cereals, and maximum 20 ppm on dry matter for naturally gluten-free foods.

Data needed to substantiate a definition of "gluten-free" are basically limited at the current time to the Finnish Dietary Survey Study and the Italian Microchallenge Study.

The Finnish Dietary Survey Study[1-3] determined the gluten content of a range of naturally and wheat starch-based gluten-free flours and baked goods, and estimated the daily use of gluten-free flours from food records of coeliac patients. Wheat starch-based gluten-free foods generally contained about 100 ppm gluten or less, with some products at 100-200 ppm. The daily use of gluten-free flours ranged from 10-300 g in adults (median 80 g) and 20-140 g in children (median 60 g). No correlation was found in adults between the level of consumption of gluten-free products and the mucosal morphology and antiendomysial antibodies of the coeliac patients.
Based on these data, the maximal values for daily consumption (300 g) and for gluten content of the gluten-free products (200 ppm) would result in 60 mg daily gluten intake. As most values for consumption are below 150 g/day and for gluten content below 100 ppm, a realistic value for the daily gluten intake through the use of wheat starch-based gluten-free foods is 15 mg or below.

The findings of the Finnish Dietary Study are in line with the Italian Microchallenge study[4,5]. In a double blind placebo controlled food challenge study with daily exposure to 10 and 50 mg gluten no significant change is found for the clinical situation and in serological testing, while a slightly lower average value for the ratio villous height on crypt depth (vh/cd) and a slightly higher average value for the intraepithelial lymphocytes (IELs) count is found for the 50 mg group. Due also to the low number of participants per group, the statistical significance of these values however is not clear, and the low average vh/cd value at the start of the challenge test raises questions about the initial condition of the participants.

In the Finnish study, irrespective of whether wheat starch-based or naturally gluten-free products were used, the clinical and histological recovery was evident. Within the limits of gluten content and intake of gluten-free foods, the long-term treatment of coeliac disease in Finland has been successful. The most important issue is that the adherence to the gluten-free diet is good. It is recognized however that some individuals may be extremely sensitive to trace amounts of gluten.

The data on the gluten content of gluten-free foods as reported in the Finnish study and elsewhere, are in line with the maximum level of 200 ppm gluten already commonly used in the market for gluten-free food. Indeed, the gluten content of industrial wheat starch is mainly between 50 and 150 ppm, with maximum values up to 250 ppm. Since wheat starch-based gluten-free flours and baked products contain maximally 70-80 % wheat starch, this means that gluten-free foods available in the market will contain 100 ppm gluten or less.

Therefore the IWGA believes that the maximum level of gluten for gluten-free foods can be safely set at 200 ppm.

A second category of gluten-free foods with guaranteed lower gluten content would fulfill the needs also of the most sensitive coeliac people.

One category of gluten-free foods with a very low level of gluten acceptable for the most sensitive people, or a further reduction of the maximum gluten content in gluten-free foods derived from gluten-containing cereals, would exclude the use of wheat-starch based gluten-free foods, and thus unnecessarily reduce the availability of gluten-free foods that can be safely used by the majority of coeliac people, and decrease their quality of life.

1. Peräaho, M., Kaukinen, K., Paasikivi, K., Sievänen, H., Lohiniemi, S., Mäki, M., Collin, P. (2003). Wheat-starch-based gluten-free products in the treatment of newly detected coeliac disease. Prospective and randomized study. Aliment Pharmacol Ther, 17:587-594.
2. Collin, P., Thorell, L., Kaukinen, K., Mäki, M. (2004). The safe threshold for gluten contamination in gluten-free products. Can trace amounts be accepted in the treatment of coeliac disease? Aliment Pharmacol Ther, 19:1277-1283.
3. Kaukinen, K., Mäki, M., Collin, P. (2004). Trace amounts of gluten in the treatment of coeliac disease. Proceedings of the 19th meeting of the Working Group on Prolamin Analysis and Toxicity, Prague, 30 september-3 October 2004. Editor: Martin Stern, p. 115-116.
4. Catassi, C., Fabiani, E., Mandolesi, A., Bearzi, I., Iacono, G., D'Agate, C., Francavilla, R., Corazza, G.R., Volta, U., Accomando, S., Picarelli, A., De Vitis, I., Nardone, G., Bardella, M.T., Fasano, A., Pucci, A. (2004). The Italian study on gluten microchallenge: preliminary results. Proceedings of the 19th meeting of the Working Group on Prolamin Analysis and Toxicity, Prague, 30 september-3 October 2004. Editor: Martin Stern, p. 109-114.
5. Catassi, C. The Italian study on gluten microchallenge. AOECS Annual Meeting 2005.

WGPAT - Working Group on Prolamin Analysis and Toxicity

Report of the WGPAT

M. Stern, University Children's Hospital, 72076 Tübingen, Germany

The Codex Alimentarius Committee on Nutrition and Food for Special Dietary Use (CCNFSDU) adopted a first Codex standard on gluten-free food in 1981 (Draft revised standard for gluten-free foods [CODEX STAN 118-1981, amended 1983] which is now at step 6 of the procedure [CL 2006/5-NFSDU, March 2006]). It defined cereals toxic to coeliac patients (wheat, rye, barley, oats and cross-bred varieties) and set the limit of gluten allowed in raw materials to produce gluten-free food to 0.05 g Kjeldahl nitrogen per 100 g dry matter. Since that time there has been slow but definitive scientific progress in gluten analysis and in the clinical investigation of gluten effects in coeliac disease. In this context the international Working Group on Prolamin Analysis and Toxicity (WGPAT) has been instrumental among others.
A new gliadin standard has been introduced by WGPAT (van Eckert *et al.,* Towards a new gliadin reference material - isolation and characterization, *J Cer Sci* 2006; 43:331-341). Based on this reference material, the R5 ELISA method for gluten/gliadin determination in food has been published (Valdés *et al*, Innovative

approach to low-level gluten determination in foods using a novel sandwich enzyme-linked immuno sorbent assay protocol, *Eur J Gastroenterol Hepatol* 2003; 15:465-474; García *et al.*, Development of a general procedure for complete extraction of gliadins for heat processed and unheated foods, *Eur J Gastroenterol Hepatol* 2005; 17:529-539). A monoclonal antibody reacting with the specific gliadin pentapeptide QQPFP and homologous sequences contained in coeliac-toxic gliadin peptides (Shan *et al.*, Structural basis for gluten intolerance in celiac sprue, *Science* 2002; 287:2275-2279; Kahlenberg *et al.*, Monoclonal antibody R5 for detection of putatively coeliac-toxic gliadin peptides. *Eur Food Res Technol* 2006; 222:78-82) is the basis of this immunological test system. Gliadin is the analyte. Using a conversion factor of 2, gluten content of the sample is calculated. Sensitivity and limit of detection (1.5 ppm gliadin) are superior to older methods. By a collaborative study the test has proved to be robust and reproducible (Méndez *et al.*, Report of a collaborative trial to investigate the performance of the R5 enzyme-linked immuno assay to determine gliadin and gluten-free food, *Eur J Gastroenterol Hepatol* 2005; 17:1053-1063). It has been endorsed as a type I method by the Codex Committee on Methods of Analysis and Sampling (CCMAS) in 2006.

Several clinical studies have addressed the difficult problem of how much gluten might be tolerable in the gluten-free diet for coeliac patients. These studies were based on dietary survey or *in vivo* gluten challenge in children and adult coeliac patients (Stern *et al.*, Analysis and clinical effects of gluten in coeliac disease, *Eur J Gastroenterol Hepatol* 2001; 13:741-747; Hischenhuber *et al.*, Safe amounts of gluten for patients with wheat allergy or coeliac disease, *Aliment Pharmacol Ther* 2006; 23:559-575). Recently new data have been reported from Tampere (Finland) (Collin *et al.,* The safe threshold for gluten contamination in gluten-free product. Can trace amounts be accepted in the treatment of coeliac disease? *Aliment Pharmacol Ther* 2004; 19:1277-1283). In 76 adult patients on gluten-free diet it was made clear that even with a high daily flour intake of 300 g a set level of 100 ppm gluten resulted in 30 mg of daily gluten intake. This was shown to be safe by clinical assessment including small intestinal biopsy and histology. In addition, there are new data still unpublished by Catassi *et al.* from Ancona (Italy) based on challenge with 10 and 50 mg of gluten per day. Taking all available data into account, WGPAT proposes with a majority of 9 out of 12 votes the <u>following renewed definition</u> of "gluten-free" foods (compare CL 2006/5-NFSDU Annex, page III):

<u>2. DESCRIPTION</u>

2.1 Definition

"Gluten-free" foods are foodstuffs so described:

a) consisting of or made only from ingredients which do not contain any prolamins from wheat, rye, barley, [oats] or their crossbred varieties with a gluten level not exceeding 20 ppm;

or

b) consisting of ingredients from wheat, rye, barley, oats or their crossbred varieties, which have been rendered "gluten-free"; with a gluten level not exceeding 100 ppm;

or

any mixture of the two ingredients as in a) and b) with a gluten level not exceeding 100 ppm.

A group minority of 1/12 voted for the single limit of 20 ppm, another minority of 2/12 voted for a single limit of 100 ppm. WGPAT considers the 20/100 ppm proposal a reasonable compromise.
WGPAT proposes the <u>following additional renewed paragraph</u>:

<u>4. LABELLING</u>

The term "gluten-free" shall be given in the immediate proximity of the name of the product. If ingredients (starches) derived from gluten-containing cereals are present (rendered gluten-free), the botanical origin of the cereal from which the starch originates shall be stated in the ingredient list.

Questions remain open on the clinical long-term data of gluten toxicity, on the integration of consumption data in different regions of the world into regulations and on the inclusion of glutelins into analytical standardization. Gluten analysis and the investigation of clinical effects of gluten still remain open to further new development and scientific progress.

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