

# Workshop on Prebiotic as a Health Benefit of Fibre: Future Research and Goals

**beneo**institute  
connecting nutrition and health

## Current International Regulatory Positions on Prebiotics

Bethesda

LSRO, February 10, 2011

Wim Caers  
Regulatory & Nutrition  
Support Manager

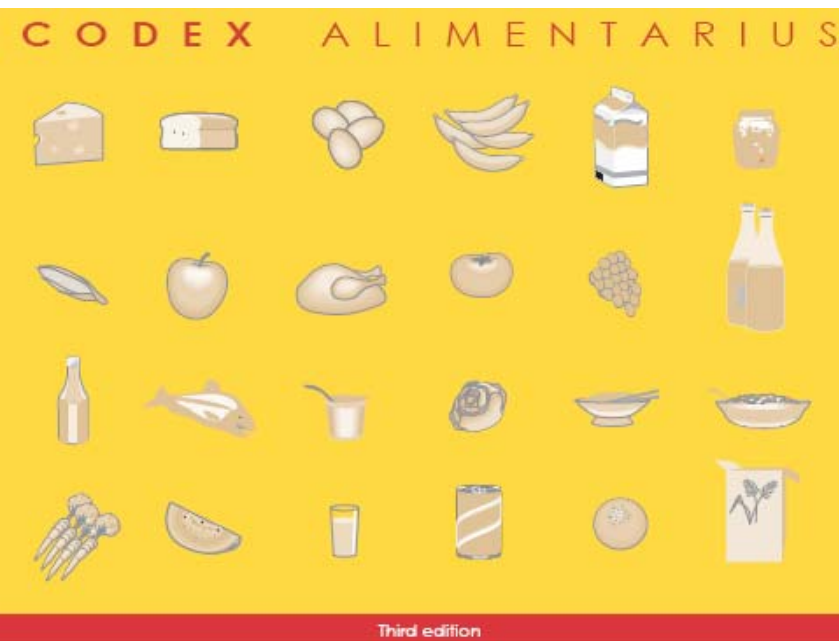


- “Dietary fibre”

	1953	(Hipsley)
• 1st defined:	1972	(Trowell – Burkitt)
• “Harmonised” global definition	2009	(Codex Alimentarius)
- “Prebiotic”

	1995	(Gibson & Roberfroid)
• Still time till	2032.....?	

# What about the “Mission” of Codex Alimentarius



UNDERSTANDING  
THE CODEX ALIMENTARIUS

*“The Codex Alimentarius system presents a unique opportunity for all countries to join the international community in formulating and*  
***harmonising food standards and ensuring their global implementation.”***

# What is “The” Issue No. 1

Dietary Fibre means carbohydrate polymers<sup>1</sup> with **ten or more monomeric units<sup>2</sup>**, which are not hydrolysed by the endogenous enzymes in the small intestine of humans and belong to the following categories

**2 The decision whether to include carbohydrates from 3 to 9 monomeric units should be left to national authorities**



**Not a real harmonising approach...**

„...and which have been shown to have a physiological effect of benefit to health as demonstrated by generally accepted scientific evidence to competent authorities “

- What type of effect...?
- How to measure..?
- How big the difference...?

**JOINT FAO/WHO FOOD STANDARDS PROGRAMME**

**CODEX ALIMENTARIUS COMMISSION**

*Thirty first Session*

*Geneva, Switzerland, 30 June - 5 July 2008*


**REPORT OF THE 29<sup>th</sup> SESSION  
OF THE CODEX COMMITTEE ON NUTRITION AND FOODS  
FOR SPECIAL DIETARY USES**

*Bad Neuenahr-Ahrweiler, Germany*

*12 - 16 November 2007*

## Properties:

Dietary fibre generally has properties such as:

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

## COMMISSION DIRECTIVE 2008/100/EC

of 28 October 2008

amending Council Directive 90/496/EEC on nutrition labelling for foodstuffs as regards recommended daily allowances, energy conversion factors and definitions

(Text with EEA relevance)

In recital 5: “Fibre has one or more beneficial physiological effects such as:

- Decrease intestinal transit time
- Increase stool bulk
- **Is fermentable by colonic microflora**
- Reduce blood total/LDL cholesterol
- Reduce post-prandial blood glucose/insulin levels”



# Let's have a closer “look” at the regulatory status of prebiotics



# FAO

September, 2007

**FAO Technical Meeting Report**

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**Food Quality and Standards Service**

**Food and Agriculture Organization of the United Nations**

## **FAO Technical Meeting on PREBIOTICS**



September, 2007

## 1. Objective of the Meeting

This **Technical Meeting** of experts was convened to begin discussions on guidelines, recommended criteria and methodology for conducting a systematic approach for the evaluation of prebiotics, leading to their safe and efficacious use in food. The purpose was to discuss the prebiotic concept and its application to human health. An aim was to determine if prebiotics is an area of food research which would benefit from an Expert Consultation drawn from independently recognised leading experts convened under the auspices of the FAO.

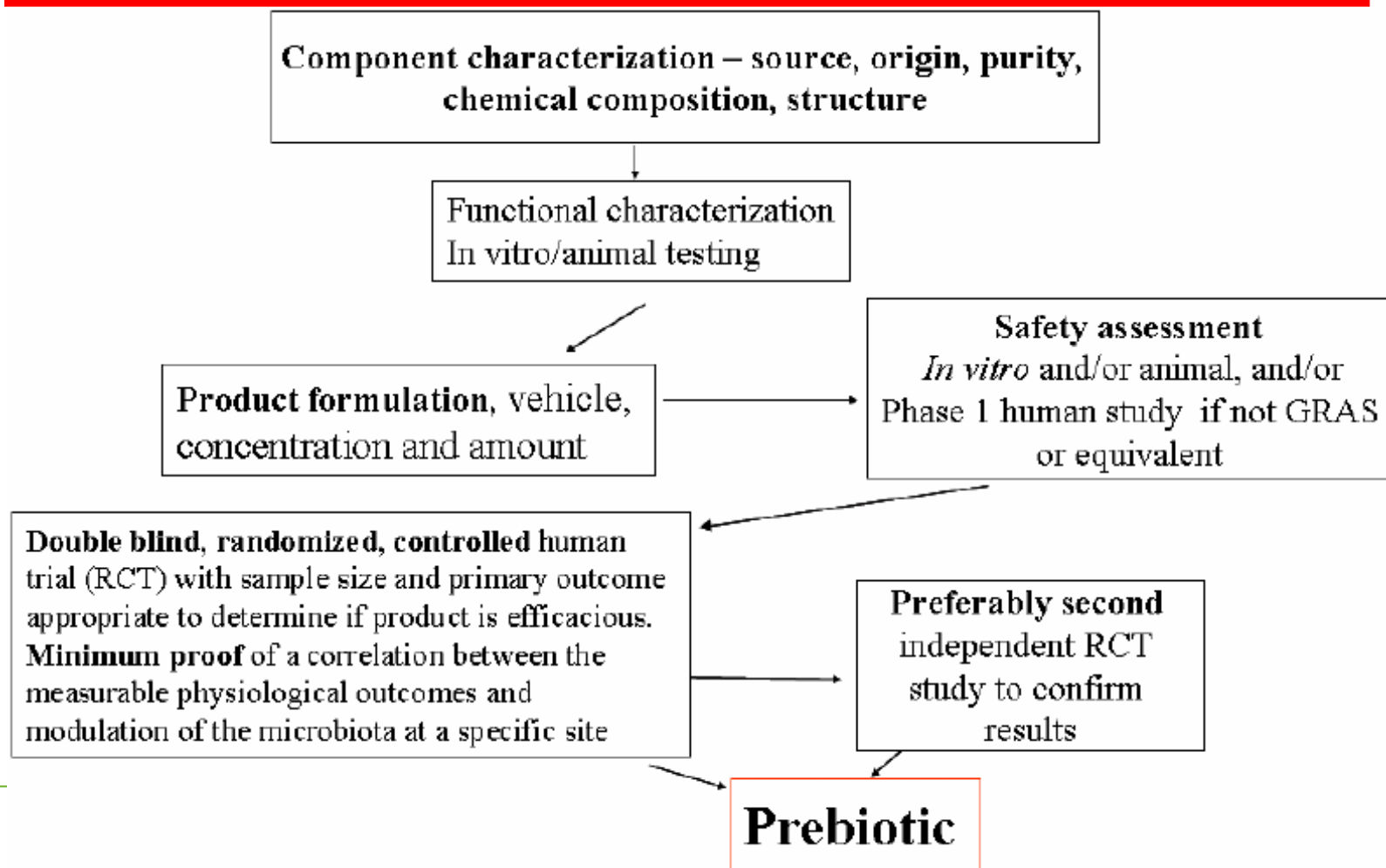
Prebiotics have become a recognised functional food commodity. The Technical Meeting concluded that advances in prebiotic research provide sufficient substance for the FAO to consider a full Expert Consultation.

September  
2007

## Guidelines for the evaluation and substantiation of prebiotics



***A prebiotic is a non-viable food component that confers a health benefit on the host associated with modulation of the microbiota.***



- In most countries, no requirement for pre-market approval
  - No established or implemented system for health claims
  - Claim not related to a disease (including risk reduction)
  - Scientific substantiation should be available on request by authorities

- Prebiotic claim considered as a structure function claim



no need for pre-marketing approval

- IoM report on DF definition (2001) and inclusion in “Dietary Reference Intakes...” (2005)

*Other Potential Physiological Effects.* An important effect of inulin intake is considered to be the production of *Bifidobacteria*. *Bifidobacteria* contain high amounts of  $\beta$ -fructosidase, which are specific for the  $\beta$ -(1,2) bond present in inulin and oligofructose. A number of studies in humans have shown that the ingestion of fructooligosaccharides leads to an increase in fecal *Bifidobacteria* (Bouhnik et al., 1996, 1999; Buddington et al., 1996;

- Pre-approval not required



Health  
Canada

Santé  
Canada

*Your health and  
safety... our priority.*

*Votre santé et votre  
sécurité... notre priorité.*

## **Guidance Document for Preparing a Submission for Food Health Claims**

Bureau of Nutritional Sciences  
Food Directorate, Health Products and Food Branch  
Health Canada

- Pre-approval not required

## 1.3 When to Use this Guidance Document

Health claims that do not bring the food under the definition of a drug do not require pre-market approval or regulatory amendment. However, such claims must be truthful and not misleading (Section 5 of the *Act*) and manufacturers are expected to have evidence (in-house) substantiating the health claim should they be questioned by enforcement agencies. They are thus advised to follow this guidance document to ensure the health claim is properly substantiated and/or to prepare a voluntary submission to Health Canada.





## Guidance Document – The Use of Probiotic Microorganisms in Food

Food Directorate  
Health Products and Food Branch  
Health Canada

April 2009

### “Probiotic” and similar terms

7. The term “probiotics” and similar terms or representations (e.g. “with beneficial probiotic cultures”; “contains bacteria that are essential to a healthy system”; and a Latin name of a microbial species modified to suggest a health benefit) in text or graphics on food labels and in advertising that suggest a food confers a health benefit are examples<sup>3</sup> of health claims.



## **Proposed Policy: Definition and Energy Value for Dietary Fibre**

Bureau of Nutritional Sciences  
Food Directorate, Health Products and Food Branch  
Health Canada

December 2010

- **Physiological benefits for novel fibres**
  - **(Traditional) Well established & acknowledged by the scientific community:**
    - improved laxation
    - attenuation of blood glucose responses
    - normalisation of blood lipid levels
  - **Emerging benefits currently under investigation**
    - **stimulation of growth of specific intestinal bacteria**
    - impact on immune system
    - modification of mineral absorption

- Approval of inulin & oligofructose as prebiotic
  - Letter of 2/12/2003 from AVA (Agri-Food & Veterinary Authority of Singapore): Ref. FCD 337.0
  - 'Prebiotics (inulin)'; 'Prebiotics (oligofructose)'

- Approval of inulin & oligofructose as prebiotic
  - Addition of inulin/ oligofructose can be applicable for all food except infant formula
  - At 1,25 g/portion
- Letter of 10/2004 from the Ministry of Health Malaysia, Food Quality Control Division
- 'Inulin/oligofructose helps increase intestinal bifidobacteria and helps maintain a good intestinal environment.'
- 'Inulin/oligofructose is bifidogenic/prebiotic.'

- Last update:  
March, 2010

## GUIDE TO NUTRITION LABELLING AND CLAIMS

(as at March 2010)

## NUTRIENT FUNCTION CLAIMS AND REQUIRED CONDITIONS

A nutrient function claim is a nutrition claim that describes the physiological role of the nutrient in growth, development and normal functions of the body. A nutrient function claim should not imply that the nutrient cures, treats or protects from diseases.

The permitted nutrient function claims are as listed below:

Inulin and oligofructose (fructo-oligosaccharide):-

- i) Inulin helps increase intestinal bifidobacteria and helps maintain a good intestinal environment\*
- ii) Oligofructose (fructo-oligosaccharide) helps increase intestinal bifidobacteria and helps maintain a good intestinal environment\*
- iii) Inulin is bifidogenic\*
- iv) Oligofructose (fructo-oligosaccharide) is bifidogenic\*
- v) Inulin is prebiotic\*
- vi) Oligofructose (fructo-oligosaccharide) is prebiotic\*

## NUTRIENT FUNCTION CLAIMS AND REQUIRED CONDITIONS

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The permitted nutrient function claims are as listed below:

Oligosaccharide mixture containing 90%(wt/wt) GOS and 10% (wt/wt) LcFOS:-

- i) Oligosaccharide mixture containing 90%(wt/wt) GOS and 10% (wt/wt) LcFOS is prebiotic\*
- ii) Oligosaccharide mixture containing 90%(wt/wt) GOS and 10% (wt/wt) LcFOS is bifidogenic\*
- iii) Oligosaccharide mixture containing 90%(wt/wt) GOS and 10% (wt/wt) LcFOS helps increase intestinal bifidobacteria and helps maintain a good intestinal environment\*
- iv) Oligosaccharide mixture containing 90%(wt/wt) GOS and 10% (wt/wt) LcFOS helps to improve the gut/ intestinal immune system of babies / infant\*

Polydextrose:-

- i) Polydextrose is bifidogenic\*
- ii) Polydextrose helps increase intestinal bifidobacteria and helps maintain a good intestinal microflora\*



- Ministry of Health within the Thai Food and Drug Administration:  
creation of a working group on Probiotics and Prebiotics
- Guidelines and Criteria for the assessment on the effectiveness of Health, Safety , and Health claim of Probiotic in Foods; September 2008
- Similar document on Prebiotics is on its way

- Claim is related to specific products and need a FOSHU approval arising from an application for final food products.
- Claim is based on data from scFOS from sucrose.
- ‘Food that improve gastrointestinal conditions.’

- Approval of inulin & oligofructose as prebiotic
  - At 2,5 g/portion, recommending 5 g/day
- Lista de Alegações de propriedade funcional aprovadas (July 2008), published by ANVISA([www.anvisa.gov.br/alimentos/comissoes/tecno\\_lista\\_alega.htm](http://www.anvisa.gov.br/alimentos/comissoes/tecno_lista_alega.htm))  
ANVISA Letter May 2010
- ‘FOS/inulin as prebiotics contribute to a balance/equilibrium of the intestinal flora. Their consumption should be associated with a balanced diet and a healthy life-style’

- Approval of inulin & oligofructose as prebiotic
  - At 1,5 g/portion, recommending a minimum of 3 g/day
    - Resolución exenta n°556 (03/10/05): Normas Técnicas sobre Directrices Nutricionales
    - Resolución exenta n°764/09 (15/10/09): Normas Técnicas sobre Directrices Nutricionales
- Oligosaccharides as prebiotics (including inulin, polydextrose and others)
- ‘Contributes to maintain the balance of the intestinal flora’

- “Prebiotics”
  - Resolución 288 (31/01/2008)
  - ‘A moderate nutrition and a regular consumption of foods with prebiotics, stimulates the growth of beneficial intestinal bacteria and helps to improve the intestinal function and the natural resistance’

STAATSKOERANT, 1 MAART 2010

No. 32975 3

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## GOVERNMENT NOTICE

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DEPARTMENT OF HEALTH

**No. R. 146**

**1 March 2010**

“novel fibres” means edible carbohydrates, of which a physiological effect of benefit to health was demonstrated by generally accepted scientific evidence to competent authorities and approved and registered by the South African Health Products Regulatory Authority (SAHPRA) -

- any oligomers (oligofructose/fructooligosaccharides), polymers (inulin) or mixtures thereof -
  - in which the degree of polymerization (DP) varies from two to sixty monomeric units;
  - for which a prebiotic claim could be made; and
  - of which the prebiotic activity is demonstrated by scientific proof of the following criteria:
    - resistance to gastric acidity, hydrolysis by mammalian enzymes and gastrointestinal absorption;
    - fermentation by intestinal microflora;
    - stimulation of the growth of the whole indigenous population of *bifidobacteria*;
    - and
    - the selective stimulation of growth and/or activity of other indigenous gastrointestinal microflora that contribute to health and well-being.

# France

- AFSSA published a scientific opinion in February 2005 on pre- & probiotics

- Effects of probiotics and prebiotics on flora and immunity in adults



**Effets des probiotiques et prébiotiques sur la flore et l'immunité de l'homme adulte**

***Effects of probiotics and prebiotics on flora and immunity in adults***



- Approval for oligofructose as prebiotic
  - At 5 g/day
  - AFSSA – Saisine 2000-SA-0118 – Opinion (9/05/2000)
  - ‘A bifidogenic effect at a daily dose of 5g oligofructose per day.’

- Approval for inulin as prebiotic
  - At 5 g/day
  - AFSSA – Saisine 2004-SA-0365 – Opinion (20/04/2005):  
<http://www.afssa.fr/Documents/NUT2004sa0365.pdf>
  - - ‘Native inulin from chicory is bifidogenic (stimulation of the growth of intestinal bifidobacteria) at a daily dose of 5g/d.’
    - ‘Native inulin from chicory is prebiotic at a daily dose of 5g/d.’
    - ‘Native inulin from chicory at a daily dose of 5g/d helps to maintain a healthy intestinal flora in the colon.’

- Approval of inulin in Vitaalbrood® flora
  - The bread must contain min. 5g of inulin per 100g.
- Assessment Report of Netherlands Nutrition Centre:  
[http://www.voedingscentrum.nl/NR/rdonlyres/85938396-FFD6-44B0-8143-769E3B25A14C/0/beoordelingsrapport\\_vitaalbrood\\_florapdf.pdf](http://www.voedingscentrum.nl/NR/rdonlyres/85938396-FFD6-44B0-8143-769E3B25A14C/0/beoordelingsrapport_vitaalbrood_florapdf.pdf)
- ‘Three slices per day supports a well-balanced gut flora composition and colonic function by selectively stimulating the growth of Bifidobacterium’

# Last....But not least!!!

European Union / European Commission

# efsa

- 18 Years after introducing dietary fibre

29.10.2008

EN

Official Journal of the European Union

L 285/9

## DIRECTIVES

**COMMISSION DIRECTIVE 2008/100/EC**

**of 28 October 2008**

**amending Council Directive 90/496/EEC on nutrition labelling for foodstuffs as regards recommended daily allowances, energy conversion factors and definitions**

**(Text with EEA relevance)**

- 2008/100/EC; interesting recitals

- (5) Fibre has been traditionally consumed as plant material and has one or more beneficial physiological effects such as: decrease intestinal transit time, increase stool bulk, is fermentable by colonic microflora, reduce blood total cholesterol, reduce blood LDL cholesterol levels, reduce post-prandial blood glucose, or reduce blood insulin levels. Recent scientific evidence has shown that similar beneficial physiological effects may be obtained from other carbohydrate polymers that are not digestible and not naturally occurring in the food as consumed.
- Therefore it is appropriate that the definition of fibre should include carbohydrate polymers with one or more beneficial physiological effects.

- Nutrition and Health Claim Regulation EC 1924/2006; 30 December 2006
  - Article 13.1 list: **to be submitted by 31 January 2008 by MS**
  - Adoption of Community list of approved claims: 31 January 2010
  - Submission as prebiotic for > 18 different ingredients
  - Examples of suggested wording for Prebiotic / Bifidogenic:
    - ‘... stimulates the growth of Bifidobacteria in the colon’;
    - ‘... beneficially affects the intestinal flora’;
    - ‘... is prebiotic’;
    - ‘... promotes healthy/balanced/good gut bacteria’.

# Article 13.1 list

- Inulin/oligofructose from chicory
- Inulin with  $\beta$  (2-1) linkage
- Jerusalem artichoke
- scFOS from sugar
- GOS
- Lactulose
- Resistant starch
- Polydextrose
- Isomalt-oligosaccharides
- Xylo-oligosaccharides
- D-Tagatose
- Acacia gum
- Gluco-mannan
- Partially hydrolysed guar gum
- Arabinogalactan
- Fermented whey
- Fermented dairy products



- Article 13.5: Published: 7 July, 2009



European Food Safety Authority

*The EFSA Journal* (2009) 1107, 1-10

## SCIENTIFIC OPINION

**Bimuno<sup>TM</sup> and help to maintain a healthy gastro-intestinal function**

**Scientific substantiation of a health claim related to Bimuno<sup>TM</sup> and help to maintain a healthy gastro-intestinal function pursuant to Article 13(5) of Regulation (EC) No 1924/2006<sup>1</sup>**

- Article 13.5: Published: 7 July, 2009
- Food constituent:       Beta-galacto-oligosaccharide

Health relationship:

“Selectively stimulates and increases the number of bifidobacteria in the gut... Bifidobacteria are recognised as health promoting bacteria that support the general well-being of the host.”

- Health claim  
“Helps maintain a healthy GI function

- The efsa opinion:
- “The panel considers that a normal GI health function is beneficial to human health.”
- “The Panel considers that the studies provide ... demonstrate that the consumption of Bimuno™ ... significantly increases the number of bifidobacteria in the gut.”
- “However, the results do not show that the changes in the number of bifidiobacteria are beneficial for the gut function.”

- Article 13.1: Published: 1 October, 2009



European Food Safety Authority

EFSA Journal 2009; 7(9):1233

## SCIENTIFIC OPINION

**Scientific Opinion on the substantiation of health claims related to fermented dairy products and decreasing potentially pathogenic intestinal microorganisms (ID 1376) pursuant to Article 13(1) of Regulation (EC) No 1924/2006<sup>1</sup>**

- Ingredient: Bifidobacterium Bb-12 & soluble fibre in DP

- Claimed effect: “Healthy digestion”

“‘Healthy digestion’ is not sufficiently defined. In the context of the proposed wording, the Panel assumes that the claimed effect relates to aspects of promoting the growth of “beneficial” bacteria and decreasing potentially pathogenic intestinal microorganisms.”

- Ingredient: Bifidobacterium Bb-12 & soluble fibre in DP

The number/proportions of bacterial groups that would constitute a “beneficial” bacteria have not been established. Increasing the number of **any** groups of bacteria **is not in itself considered as beneficial.**

- The Panel considers that decreasing potentially pathogenic intestinal microorganisms might be beneficial to human health.”

- Stakeholder meeting: 1<sup>st</sup> on December 2, 2010



**FIRST ANNOUNCEMENT**

**PUBLIC CONSULTATION AND SCIENTIFIC MEETING**

**SCIENTIFIC REQUIREMENTS FOR HEALTH CLAIMS RELATED TO  
GUT AND IMMUNE FUNCTION**

*Public Consultation in October 2010*

*Scientific meeting 2 December 2010, Amsterdam, The Netherlands*

- Stakeholder meeting: 1<sup>st</sup> on December 2, 2010



European Food Safety Authority

EFSA Journal 2010;volume(issue):NNNN

## SCIENTIFIC OPINION

### DRAFT

# Guidance on the scientific requirements for health claims related to gut and immune function<sup>1</sup>

EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA)<sup>2</sup>



- Stakeholder meeting: 1<sup>st</sup> on December 2, 2010
- “Based upon current scientific knowledge, it is not possible to define the exact numbers of the different bacterial groups that would constitute a normal microbiota.”
- “The evidence available to the panel does not establish that increasing the number of specific microorganisms or any group of microorganisms, including lactobacilli and/or bifidobacteria, is in itself a beneficial physiological effect.”

- Stakeholder meeting: 1<sup>st</sup> on December 2, 2010
- Reducing pathogens...
- Distinction between function claim and DRR claim
- For DDR claims, only reduction in incidence or duration of infections...=> **NOT sufficient**

Number of episodes of infection, severity of symptoms or duration of infection evidenced by diarrhoea clearly linked to infection...=> **OK**

- Stakeholder meeting: 1<sup>st</sup> on December 2, 2010
- Reducing pathogens...
- Only those pathogens who have been demonstrated to be pathogenic, decreased by AT LEAST 1 log
  - Food-borne: Salmonella, Campylobacter, Listeria, (E. Coli), Toxoplasma, E. sakzakii...
  - GI bugs transmitted between humans or originating from the environment: H pylori, C. difficile, Candida
- SCFA production, pH, intestinal permeability only to support the mechanism



European Food Safety Authority

## Scientific requirements for gastrointestinal microbiota claims

**Yolanda Sanz**

Panel Member

EFSA Scientific Panel on Dietetic Products, Nutrition & Allergies

EFSA Scientific Meeting on Health Claims related to Gut and Immune Function  
2 December 2010, Amsterdam

# The gastrointestinal ecosystem



## Background

- **Associations** between the **microbiota** composition and **health - no causality.**
- **Beneficial roles** of some commensal bacteria (e.g. bifidobacteria or lactobacilli) **mainly based on generalisations.**
- **Uncertainties about adverse roles of commensal bacteria** associated with disease by observational studies (e.g. enterobacteria or bacteroides).
- **The pathogenicity of specific microorganisms is well established.**

## Is the claim effect a beneficial physiological effect?

**No, in the following cases:**

- Increasing numbers of bifidobacteria or lactobacilli.
- Decreasing numbers of commensal microorganisms (e.g. enterobacteria, clostridia, bacteroides, etc.).
- *The evidence available to the Panel does not establish that increasing/decreasing numbers of specific microorganisms, is in itself a beneficial physiological effect.*

## Pre/Probiotic





**“You’ve got a rare condition called ‘good health’.  
Frankly, we’re not sure how to treat it.”**