EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA); Scientific Opinion on the substantiation of health claims related to chitosan and reduction in body weight (ID 679, 1499), maintenance of normal blood LDL-cholesterol concentrations (ID 4663), reduction of intestinal transit time (ID 4664) and reduction of inflammation (ID 1985) pursuant to Article 13(1) of Regulation (EC) No 1924/2006

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SCIENTIFIC OPINION

Scientific Opinion on the substantiation of health claims related to chitosan and reduction in body weight (ID 679, 1499), maintenance of normal blood LDL-cholesterol concentrations (ID 4663), reduction of intestinal transit time (ID 4664) and reduction of inflammation (ID 1985) pursuant to Article 13(1) of Regulation (EC) No 1924/2006[1]

EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA)[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

SUMMARY

Following a request from the European Commission, the Panel on Dietetic Products, Nutrition and Allergies was asked to provide a scientific opinion on a list of health claims pursuant to Article 13 of Regulation (EC) No 1924/2006. This opinion addresses the scientific substantiation of health claims in relation to chitosan and reduction in body weight, maintenance of normal blood LDL-cholesterol concentrations, reduction of intestinal transit time and reduction of inflammation. The scientific substantiation is based on the information provided by the Member States in the consolidated list of Article 13 health claims and references that EFSA has received from Member States or directly from stakeholders.

The food constituent that is the subject of the health claim is chitosan. The Panel considers that chitosan is sufficiently characterised.

Reduction in body weight

The claimed effect is "weight management". The target population is assumed to be overweight individuals in the general population who wish to reduce their body weight. In the context of the proposed wordings and references provided, the Panel assumes that the claimed effect relates to a

[1] On request from the European Commission, Question No EFSA-Q-2008-1466, EFSA-Q-2008-2236, EFSA-Q-2008-2718, EFSA-Q-2010-00616, EFSA-Q-2010-00617, adopted on 08 April 2011.

[2] Panel members: Carlo Agostoni, Jean-Louis Bresson, Susan Fairweather-Tait, Albert Flynn, Ines Golly, Hannu Korhonen, Pagona Lagiou, Martinus Løvik, Rosangela Marchelli, Ambroise Martin, Bevan Moseley, Monika Neuhäuser-Berthold, Hildegard Przyrembel, Seppo Salminen, Yolanda Sanz, Sean (J.J.) Strain, Stephan Strobel, Inge Tetens, Daniel Tomé, Hendrik van Loveren and Hans Verhagen. The members of the Claims Sub-Working Group on Weight Management/Satiety/Glucose and Insulin Control/Physical Performance: Kees de Graaf, Joanne Harrold, Mette Hansen, Mette Kristensen, Anders Sjödin and Inge Tetens. Correspondence: nda@efsa.europa.eu

[3] Acknowledgement: The Panel wishes to thank for the preparatory work on this scientific opinion: The members of the Working Group on Claims: Carlo Agostoni, Jean-Louis Bresson, Susan Fairweather-Tait, Albert Flynn, Ines Golly, Marina Heinonen, Hannu Korhonen, Martinus Løvik, Ambroise Martin, Hildegard Przyrembel, Seppo Salminen, Yolanda Sanz, Sean (J.J.) Strain, Inge Tetens, Hendrik van Loveren and Hans Verhagen. The members of the Claims Sub-Working Group on Weight Management/Satiety/Glucose and Insulin Control/Physical Performance: Kees de Graaf, Joanne Harrold, Mette Hansen, Mette Kristensen, Anders Sjödin and Inge Tetens.

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reduction in body weight. The Panel considers that a reduction in body weight is a beneficial physiological effect.

In weighing the evidence, the Panel took into account that a meta-analysis of randomised controlled trials, which included all the individual human intervention studies submitted for the scientific substantiation of the claim and which investigated the effects of chitosan consumption on body weight, did not show a significant effect of chitosan when only studies that met the allocation concealment quality criteria were considered for analysis.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has not been established between the consumption of chitosan and reduction in body weight.

Maintenance of normal blood LDL-cholesterol concentrations

The claimed effect is "stimulates the regulation of cholesterol levels due to O-carboxymethyl chitosan". The target population is assumed to be the general population. In the context of the proposed wordings, the Panel assumes that the claimed effect relates to the maintenance of normal blood LDL-cholesterol concentrations. The Panel considers that maintenance of normal blood LDL-cholesterol concentrations is a beneficial physiological effect.

In weighing the evidence, the Panel took into account that a meta-analysis of randomised controlled trials which investigated the effects of chitosan consumption on blood lipids showed a small but statistically significant reduction in total and LDL-cholesterol concentrations.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has been established between the consumption of chitosan and maintenance of normal blood LDL-cholesterol concentrations.

The Panel considers that in order to obtain the claimed effect, 3 g of chitosan should be consumed daily. The target population is adults.

Reduction of intestinal transit time

The claimed effect is "stimulates the intestinal transit by volume effect". The target population is assumed to be the general population. In the context of the proposed wordings, the Panel assumes that the claimed effect refers to a reduction in intestinal transit time. The Panel considers that reduction of intestinal transit time may be a beneficial physiological effect, provided that it does not result in diarrhoea.

No references were provided from which conclusions could be drawn for the scientific substantiation of the claim.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has not been established between the consumption of chitosan and reduction of intestinal transit time.

Reduction of inflammation

The claimed effect is "réduit l'inflammation". The target population is assumed to be the general population.

In the context of the proposed wordings, the Panel assumes that the claimed effect refers to the reduction of inflammation in the context of maintaining joint flexibility.

The Panel considers that the evidence provided does not establish that a reduction of inflammation in relation to the maintenance of joint flexibility in the general population is a beneficial physiological effect.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has not been established between the consumption of chitosan and a beneficial physiological effect for the general population related to the reduction of inflammation.

KEY WORDS

Chitosan, fibre, body weight, LDL-cholesterol, intestinal transit time, inflammation, health claims.

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INFORMATION AS PROVIDED IN THE CONSOLIDATED LIST

The consolidated list of health claims pursuant to Article 13 of Regulation (EC) No 1924/2006[4] submitted by Member States contains main entry claims with corresponding conditions of use and literature for similar health claims. EFSA has screened all health claims contained in the original consolidated list of Article 13 health claims which was received by EFSA in 2008 using six criteria established by the NDA Panel to identify claims for which EFSA considered sufficient information had been provided for evaluation and those for which more information or clarification was needed before evaluation could be carried out[5]. The clarifications which were received by EFSA through the screening process have been included in the consolidated list. This additional information will serve as clarification to the originally provided information. The information provided in the consolidated list for the health claims which are the subject of this opinion is tabulated in Appendix C.

ASSESSMENT

1. Characterisation of the food/constituent

The food constituent that is the subject of the health claim is chitosan.

Chitosan is a linear cationic polysaccharide composed of randomly distributed β-(1-4)-linked D-glucosamine and N-acetyl-D-glucosamine produced commercially by the deacetylation of chitin, which is a component of the exoskeleton of crustaceans and the cell walls of fungi. The degree of deacetylation can be measured by established methods, and ranges from 60-100 % in commercial preparations. The molecular weight of chitosan in commercial preparations ranges from 3,800 to 20,000 Da. Chitosan is insoluble in water.

The Panel considers that the food constituent, chitosan, which is the subject of the health claims, is sufficiently characterised.

2. Relevance of the claimed effect to human health

2.1. Reduction in body weight (ID 679, 1499)

The claimed effect is "weight management". The Panel assumes that the target population is overweight individuals in the general population who wish to reduce their body weight.

In the context of the proposed wordings and references provided, the Panel assumes that the claimed effect relates to a reduction in body weight.

Weight loss can be interpreted as the achievement of a normal body weight in previously overweight subjects. In this context, weight loss in overweight subjects without the achievement of a normal body weight is considered to be a beneficial physiological effect.

The Panel considers that a reduction in body weight is a beneficial physiological effect.

[4] Regulation (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods. OJ L 404, 30.12.2006, p. 9–25.

[5] EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA), 2011. General guidance for stakeholders on the evaluation of Article 13.1, 13.5 and 14 health claims. EFSA Journal, 9(4):2135, 24 pp.

2.2. Maintenance of normal blood LDL-cholesterol concentrations (ID 4663)

The claimed effect is "stimulates the regulation of cholesterol levels due to O-carboxymethyl chitosan". The Panel assumes that the target population is the general population.

In the context of the proposed wordings, the Panel assumes that the claimed effect relates to the maintenance of normal blood LDL-cholesterol concentrations.

Low-density lipoproteins (LDL) carry cholesterol from the liver to peripheral tissues, including the arteries. Elevated LDL-cholesterol, by convention >160 mg/dL (>4.14 mmol/L), may compromise the normal structure and function of the arteries.

The Panel considers that maintenance of normal blood LDL-cholesterol concentrations is a beneficial physiological effect.

2.3. Reduction of intestinal transit time (ID 4664)

The claimed effect is "stimulates the intestinal transit by volume effect". The Panel assumes that the target population is the general population.

In the context of the proposed wordings, the Panel assumes that the claimed effect refers to a reduction of intestinal transit time.

The Panel considers that reduction of intestinal transit time may be a beneficial physiological effect, provided that it does not result in diarrhoea.

2.4. Reduction of inflammation (ID 1985)

The claimed effect is "réduit l'inflammation". The Panel assumes that the target population is the general population.

The Panel notes that the claimed effect refers to reduction of inflammation in the context of maintaining joint flexibility. Inflammation is a non-specific physiological response and changes in markers of inflammation such as various interleukins do not indicate a beneficial physiological effect *per se*. In the context of the proposed wordings, the Panel assumes that the claimed effect refers to a reduction of inflammation in the context of maintaining joint flexibility. The Panel considers that the evidence provided does not establish that a reduction of inflammation in relation to the maintenance of joint flexibility is a beneficial physiological effect for the general population.

The Panel concludes that a cause and effect relationship has not been established between the consumption of chitosan and a beneficial physiological effect related to the reduction of inflammation.

3. Scientific substantiation of the claimed effect

3.1. Reduction in body weight (ID 679 and 1499)

The references provided for the scientific substantiation of the claim included narrative reviews and book chapters which did not provide original data for a scientific evaluation, one human intervention study which investigated the effects of a combination of chitosan and glucomannan on body weight, and one intervention study using chitosan which did not report on body weight. Two references on internal reports were not available to the Panel even after every reasonable effort had been made to

retrieve them. The Panel considers that no conclusions can be drawn from these references for the scientific substantiation of the claim.

In addition, one meta-analysis of randomised controlled trials (RCTs, Ernst and Pittler, 2000), one Cochrane systematic review and meta-analysis of RCTs (Ni Mhurchu et al., 2005) and seven human intervention studies on the effect of chitosan on body weight were provided. The Panel notes that all of the intervention studies provided, and those included in the systematic review and meta-analysis, were considered in a more recent update of the Cochrane systematic review (Jull et al., 2008), which was considered by the Panel for the scientific evaluation of the claim. This systematic review was restricted to RCTs which assessed the effects of chitosan on body weight, compared to placebo or standard care in adult overweight or obese males and females, and which had a minimum duration of four weeks. A total of 15 studies out of 42 identified met the inclusion criteria, and these studies comprised a total of 1,216 participants (640 allocated to chitosan and 640 to placebo) with a mean age of 44 years (range 18 to 70 years). Mean trial duration was 8.3 weeks (range 4-24 weeks) and mean study size was 81 subjects (range 24 to 250). All trials compared chitosan at doses ranking from 0.24 g/day to 15 g/day (mean 3.7 g/day) to placebo, but five studies did not report any dose (Colombo and Sciutto, 1996; Giustina and Ventura, 1995; Sciutto and Colombo, 1995; Veneroni et al., 1996; Woodgate and Conquer, 2003). Sufficient data on body weight were available only for 13 trials, which were considered for data analysis (Colombo and Sciutto, 1996; Giustina and Ventura, 1995; Ho et al., 2001; Kaats et al., 2006; Macchi, 1996; Ni Mhurchu et al., 2004; Pittler et al., 1999; Schiller et al., 2001; Sciutto and Colombo, 1995; Veneroni et al., 1996; Williams, 1998; Woodgate and Conquer, 2003; Zahorska-Markiewicz et al., 2002). Seven studies (Colombo and Sciutto, 1996; Girola et al., 1996; Giustina and Ventura, 1995; Kaats et al., 2006; Sciutto and Colombo, 1995; Veneroni et al., 1996; Woodgate and Conquer, 2003) used treatment preparations which contained other active ingredients in addition to chitosan, while the remainder used chitosan alone. The treatment preparations contained, in addition to chitosan, guar gum, ascorbic acid and other micronutrients (Colombo and Sciutto, 1996; Giustina and Ventura, 1995; Sciutto and Colombo, 1995; Veneroni et al., 1996), glucomannan, fenugreek, *Gymnema sylvestre* and vitamin C (Woodgate and Conquer, 2003), *Garcinia cambogia* extract and chrome (Girola et al., 1996), and beta-glucan, snow white oat fibre, betamine HCL and aloe saponins (Kaats et al., 2006). The Panel considers that no conclusions can be drawn from these studies, and thus from the meta-analysis in which they were included, for the scientific substantiation of the claim.

When the analysis was limited to trials which used chitosan alone as intervention (Ho et al., 2001; Macchi, 1996; Ni Mhurchu et al., 2004; Pittler et al., 1999; Schiller et al., 2001; Wuolijoki et al., 1999; Zahorska-Markiewicz et al., 2002), a small but statistically significant weight loss of -0.9 kg (95 % CI -1.4 to -0.4, p=0.0009) was observed with chitosan compared to placebo. However, when the analysis was limited to trials that met the allocation concealment quality criteria (Ni Mhurchu et al., 2004; Pittler et al., 1999; Schiller et al., 2001), no significant differences between the effect of chitosan and placebo on body weight changes were observed (-0.6 kg, 95 % CI -1.3 to 0.1, p=0.09). Similar results were obtained when the analysis was limited to studies of six months duration (Ni Mhurchu et al., 2004; Zahorska-Markiewicz et al., 2002). The Panel notes that this meta-analysis does not show an effect of chitosan consumption on body weight loss.

The mechanism by which chitosan is presumed to exert the claimed effect is by binding to negatively charged lipids and hence reducing their gastro-intestinal uptake, and these effects were observed in some animal studies (Deuchi et al., 1995; Sugano et al., 1980; Zacour et al., 1992). However, the effects of chitosan on 24 h faecal fat excretion in healthy human volunteers at doses of about 3 g daily were not statistically significant, and thus were unlikely to have an impact on body weight (Guerciolini et al., 2001).

In weighing the evidence, the Panel took into account that a meta-analysis of RCTs, which included all the individual human intervention studies submitted for the scientific substantiation of the claim

and which investigated the effects of chitosan consumption on body weight, did not show a significant effect of chitosan when only studies that met the allocation concealment quality criteria were considered for analysis.

The Panel concludes that a cause and effect relationship has not been established between the consumption of chitosan and reduction in body weight.

3.2. Maintenance of normal blood LDL-cholesterol concentrations (ID 4663)

Five animal studies and one human intervention study on the effects of chitosan on blood lipids were provided for the scientific substantiation of the claim.

The Cochrane systematic review (Jull et al., 2008) cited in section 3.1. also reported on the effects of chitosan on blood lipids and included the only human intervention study submitted for the scientific substantiation of the claim (Macchi, 1996).

Statistical analyses combining the nine trials that provided data on total cholesterol concentrations (Colombo and Sciutto, 1996; Ho et al., 2001; Kaats et al., 2006; Macchi, 1996; Ni Mhurchu et al., 2004; Pittler et al., 1999; Veneroni et al., 1996; Wuolijoki et al., 1999; Zahorska-Markiewicz et al., 2002) were reported in the meta-analysis. However, the Panel notes that some of these studies used treatment preparations which contained other active ingredients in addition to chitosan, and considers that no conclusions can be drawn from these analyses for the scientific substantiation of the claim. When the trials were limited to those that used chitosan alone as intervention (Ho et al., 2001; Macchi, 1996; Ni Mhurchu et al., 2004; Pittler et al., 1999; Zahorska-Markiewicz et al., 2002), a small but statistically significant reduction in total cholesterol concentrations of -0.15 mmol/L (95 % CI -0.23 to -0.07, p=0.0002) was observed. Similar results were obtained when the analyses were limited to trials that met the allocation concealment quality criteria (Ni Mhurchu et al., 2004; Pittler et al., 1999) (-0.15 mmol/L; 95 % CI -0.23 to -0.07, p=0.0004). The I^2-statistic indicated substantial heterogeneity (I^2=59.5 %).

Statistical analyses combining the seven trials that included data on LDL-cholesterol concentrations (Colombo and Sciutto, 1996; Ho et al., 2001; Kaats et al., 2006; Ni Mhurchu et al., 2004; Veneroni et al., 1996; Wuolijoki et al., 1999; Zahorska-Markiewicz et al., 2002) were provided in the meta-analysis. However, the Panel notes that four of these trials used treatment preparations which contained other active ingredients in addition to chitosan (Colombo and Sciutto, 1996; Kaats et al., 2006; Veneroni et al., 1996; Wuolijoki et al., 1999), and that no separate analysis of the trials using chitosan alone was provided. The Panel notes, however, that whereas the studies by Ho et al. (2001) and Zahorska-Markiewicz et al. (2002), including 68 and 32 subjects respectively, did not show a significant effect on LDL-cholesterol concentrations, the largest study, by Ni Mhurchu et al. (2004), which included 250 subjects (125 per group), observed a small but statistically significant reduction in LDL-cholesterol concentrations in favour of chitosan (-0.12 mmol/L, 95 % CI -0.19 to -0.05). Similar results were obtained when the analysis was limited to the two studies of 6 months duration (-0.14 mmol/L, 95 % CI -0.19 to -0.06) (Ni Mhurchu et al., 2004; Zahorska-Markiewicz et al., 2002).

Statistical analyses combining the seven trials that provided data on HDL-cholesterol concentrations (Colombo and Sciutto, 1996; Ho et al., 2001; Kaats et al., 2006; Macchi, 1996; Ni Mhurchu et al., 2004; Veneroni et al., 1996; Zahorska-Markiewicz et al., 2002) were also provided. The Panel notes that three of these trials used treatment preparations which contained other active ingredients in addition to chitosan (Colombo and Sciutto, 1996; Kaats et al., 2006; Veneroni et al., 1996), and that no separate analysis of the trials using chitosan alone was provided in the meta-analysis. The Panel also notes that only the smallest study using chitosan alone showed a statistically significant increase in HDL-cholesterol concentrations compared to placebo (0.15 mmol/L, 95 % CI 0.03 to 0.27; 10 subjects per group) (Macchi, 1996), whereas no significant differences between chitosan and

placebo were observed in any of the other three studies, including the largest study by NiMhurchu et al. (2004), which had the longest duration (6 months).

The Panel notes that while chitosan consumption at doses of about 3 g/day showed, in the meta-analysis by Jull et al. (2008), a small but statistically significant effect on the reduction of both total (combining five studies) and LDL-cholesterol (combining two studies) concentrations, no effect was observed on HDL-cholesterol concentrations.

The mechanism by which chitosan is presumed to exert the claimed effect is by binding to negatively charged lipids and hence reducing their gastro-intestinal uptake, and these effects were observed in some animal studies (Deuchi et al., 1995; Sugano et al., 1980; Zacour et al., 1992). The effects of chitosan on 24 h faecal fat excretion in healthy human volunteers at doses of about 3 g daily were not statistically significant (Guerciolini et al., 2001), and it is unclear whether this could play a role on the claimed effect.

In weighing the evidence, the Panel took into account that a meta-analysis of RCTs, which investigated the effects of chitosan consumption on blood lipids, showed a small but statistically significant reduction in total and LDL-cholesterol concentrations.

The Panel concludes that a cause and effect relationship has been established between the consumption of chitosan and maintenance of normal blood LDL-cholesterol concentrations.

3.3. Reduction of transit time (ID 4664)

Only one reference was provided in relation to the claim.

In a double-blind, placebo-controlled study, Kaats et al. (2006) evaluated the safety and efficacy of chitosan on body composition in a group of 134 overweight/obese adults. The Panel notes that the study did not address outcome measures related to the claimed effect, and considers that no conclusions can be drawn from this study for the scientific substantiation of the claim.

The Panel concludes that a cause and effect relationship has not been established between the consumption of chitosan and reduction of intestinal transit time.

4. Panel's comments on the proposed wording

4.1. Maintenance of normal blood cholesterol concentrations (ID 4663)

The Panel considers that the following wording reflects the scientific evidence: "Chitosan may contribute to maintaining normal blood cholesterol levels".

5. Conditions and possible restrictions of use

5.1. Maintenance of normal blood cholesterol concentrations (ID 4663)

The Panel considers that in order to obtain the claimed effect, 3 g of chitosan should be consumed daily. The target population is adults.

CONCLUSIONS

On the basis of the data presented, the Panel concludes that:

- The food constituent, chitosan, which is the subject of the claim, is sufficiently characterised.

Reduction in body weight (ID 679, 1499)

- The claimed effect is "weight management". The target population is assumed to be overweight individuals in the general population who wish to reduce their body weight. A reduction in body weight is a beneficial physiological effect.

- A cause and effect relationship has not been established between the consumption of chitosan and reduction in body weight.

Maintenance of normal blood LDL-cholesterol concentrations (ID 4663)

- The claimed effect is "stimulates the regulation of cholesterol levels due to O-carboxymethyl chitosan". The target population is assumed to be the general population. Maintenance of normal blood LDL-cholesterol concentrations is a beneficial physiological effect.

- A cause and effect relationship has been established between the consumption of chitosan and maintenance of normal blood LDL-cholesterol concentrations.

- The following wording reflects the scientific evidence: "Chitosan may contribute to maintaining normal blood cholesterol levels".

- In order to obtain the claimed effect, 3 g of chitosan should be consumed daily. The target population is adults.

Reduction of intestinal transit time (ID 4664)

- The claimed effect is "stimulates the intestinal transit by volume effect". The target population is assumed to be the general population. Reduction of intestinal transit time may be a beneficial physiological effect, provided it does not result in diarrhoea.

- A cause and effect relationship has not been established between the consumption of chitosan and reduction of intestinal transit time.

Reduction of inflammation (ID 1985)

- The claimed effect is "réduit l'inflammation". The target population is assumed to be the general population. In the context of the proposed wordings, it is assumed that the claimed effect refers to a reduction of inflammation in the context of maintaining joint flexibility. The evidence provided does not establish that a reduction of inflammation in relation to the maintenance of joint flexibility is a beneficial physiological effect for the general population.

- A cause and effect relationship has not been established between the consumption of chitosan and a beneficial physiological effect related to the reduction of inflammation.

DOCUMENTATION PROVIDED TO EFSA

Health claims pursuant to Article 13 of Regulation (EC) No 1924/2006 (No: EFSA-Q-2008-1466, EFSA-Q-2008-2236, EFSA-Q-2008-2718, EFSA-Q-2010-00616, EFSA-Q-2010-00617). The

scientific substantiation is based on the information provided by the Member States in the consolidated list of Article 13 health claims and references that EFSA has received from Member States or directly from stakeholders.

The full list of supporting references as provided to EFSA is available on: http://www.efsa.europa.eu/panels/nda/claims/article13.htm.

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APPENDICES

APPENDIX A

BACKGROUND AND TERMS OF REFERENCE AS PROVIDED BY THE EUROPEAN COMMISSION

The Regulation 1924/2006 on nutrition and health claims made on foods[6] (hereinafter "the Regulation") entered into force on 19th January 2007.

Article 13 of the Regulation foresees that the Commission shall adopt a Community list of permitted health claims other than those referring to the reduction of disease risk and to children's development and health. This Community list shall be adopted through the Regulatory Committee procedure and following consultation of the European Food Safety Authority (EFSA).

Health claims are defined as "any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health".

In accordance with Article 13 (1) health claims other than those referring to the reduction of disease risk and to children's development and health are health claims describing or referring to:

a) the role of a nutrient or other substance in growth, development and the functions of the body; or

b) psychological and behavioural functions; or

c) without prejudice to Directive 96/8/EC, slimming or weight-control or a reduction in the sense of hunger or an increase in the sense of satiety or to the reduction of the available energy from the diet.

To be included in the Community list of permitted health claims, the claims shall be:

(i) based on generally accepted scientific evidence; and

(ii) well understood by the average consumer.

Member States provided the Commission with lists of claims as referred to in Article 13 (1) by 31 January 2008 accompanied by the conditions applying to them and by references to the relevant scientific justification. These lists have been consolidated into the list which forms the basis for the EFSA consultation in accordance with Article 13 (3).

ISSUES THAT NEED TO BE CONSIDERED

IMPORTANCE AND PERTINENCE OF THE FOOD[7]

Foods are commonly involved in many different functions[8] of the body, and for one single food many health claims may therefore be scientifically true. Therefore, the relative importance of food e.g. nutrients in relation to other nutrients for the expressed beneficial effect should be considered: for functions affected by a large number of dietary factors it should be considered whether a reference to a single food is scientifically pertinent.

[6] OJ L12, 18/01/2007
[7] The term 'food' when used in this Terms of Reference refers to a food constituent, the food or the food category.
[8] The term 'function' when used in this Terms of Reference refers to health claims in Article 13(1)(a), (b) and (c).

It should also be considered if the information on the characteristics of the food contains aspects pertinent to the beneficial effect.

SUBSTANTIATION OF CLAIMS BY GENERALLY ACCEPTABLE SCIENTIFIC EVIDENCE

Scientific substantiation is the main aspect to be taken into account to authorise health claims. Claims should be scientifically substantiated by taking into account the totality of the available scientific data, and by weighing the evidence, and shall demonstrate the extent to which:

(a) the claimed effect of the food is beneficial for human health,

(b) a cause and effect relationship is established between consumption of the food and the claimed effect in humans (such as: the strength, consistency, specificity, dose-response, and biological plausibility of the relationship),

(c) the quantity of the food and pattern of consumption required to obtain the claimed effect could reasonably be achieved as part of a balanced diet,

(d) the specific study group(s) in which the evidence was obtained is representative of the target population for which the claim is intended.

EFSA has mentioned in its scientific and technical guidance for the preparation and presentation of the application for authorisation of health claims consistent criteria for the potential sources of scientific data. Such sources may not be available for all health claims. Nevertheless it will be relevant and important that EFSA comments on the availability and quality of such data in order to allow the regulator to judge and make a risk management decision about the acceptability of health claims included in the submitted list.

The scientific evidence about the role of a food on a nutritional or physiological function is not enough to justify the claim. The beneficial effect of the dietary intake has also to be demonstrated. Moreover, the beneficial effect should be significant i.e. satisfactorily demonstrate to beneficially affect identified functions in the body in a way which is relevant to health. Although an appreciation of the beneficial effect in relation to the nutritional status of the European population may be of interest, the presence or absence of the actual need for a nutrient or other substance with nutritional or physiological effect for that population should not, however, condition such considerations.

Different types of effects can be claimed. Claims referring to the maintenance of a function may be distinct from claims referring to the improvement of a function. EFSA may wish to comment whether such different claims comply with the criteria laid down in the Regulation.

WORDING OF HEALTH CLAIMS

Scientific substantiation of health claims is the main aspect on which EFSA's opinion is requested. However, the wording of health claims should also be commented by EFSA in its opinion.

There is potentially a plethora of expressions that may be used to convey the relationship between the food and the function. This may be due to commercial practices, consumer perception and linguistic or cultural differences across the EU. Nevertheless, the wording used to make health claims should be truthful, clear, reliable and useful to the consumer in choosing a healthy diet.

In addition to fulfilling the general principles and conditions of the Regulation laid down in Article 3 and 5, Article 13(1)(a) stipulates that health claims shall describe or refer to "the role of a nutrient or other substance in growth, development and the functions of the body". Therefore, the requirement to

describe or refer to the 'role' of a nutrient or substance in growth, development and the functions of the body should be carefully considered.

The specificity of the wording is very important. Health claims such as "Substance X supports the function of the joints" may not sufficiently do so, whereas a claim such as "Substance X helps maintain the flexibility of the joints" would. In the first example of a claim it is unclear which of the various functions of the joints is described or referred to contrary to the latter example which specifies this by using the word "flexibility".

The clarity of the wording is very important. The guiding principle should be that the description or reference to the role of the nutrient or other substance shall be clear and unambiguous and therefore be specified to the extent possible i.e. descriptive words/ terms which can have multiple meanings should be avoided. To this end, wordings like "strengthens your natural defences" or "contain antioxidants" should be considered as well as "may" or "might" as opposed to words like "contributes", "aids" or "helps".

In addition, for functions affected by a large number of dietary factors it should be considered whether wordings such as "indispensable", "necessary", "essential" and "important" reflects the strength of the scientific evidence.

Similar alternative wordings as mentioned above are used for claims relating to different relationships between the various foods and health. It is not the intention of the regulator to adopt a detailed and rigid list of claims where all possible wordings for the different claims are approved. Therefore, it is not required that EFSA comments on each individual wording for each claim unless the wording is strictly pertinent to a specific claim. It would be appreciated though that EFSA may consider and comment generally on such elements relating to wording to ensure the compliance with the criteria laid down in the Regulation.

In doing so the explanation provided for in recital 16 of the Regulation on the notion of the average consumer should be recalled. In addition, such assessment should take into account the particular perspective and/or knowledge in the target group of the claim, if such is indicated or implied.

TERMS OF REFERENCE

HEALTH CLAIMS OTHER THAN THOSE REFERRING TO THE REDUCTION OF DISEASE RISK AND TO CHILDREN'S DEVELOPMENT AND HEALTH

EFSA should in particular consider, and provide advice on the following aspects:

- Whether adequate information is provided on the characteristics of the food pertinent to the beneficial effect.
- Whether the beneficial effect of the food on the function is substantiated by generally accepted scientific evidence by taking into account the totality of the available scientific data, and by weighing the evidence. In this context EFSA is invited to comment on the nature and quality of the totality of the evidence provided according to consistent criteria.
- The specific importance of the food for the claimed effect. For functions affected by a large number of dietary factors whether a reference to a single food is scientifically pertinent.

In addition, EFSA should consider the claimed effect on the function, and provide advice on the extent to which:

- the claimed effect of the food in the identified function is beneficial.
- a cause and effect relationship has been established between consumption of the food and the claimed effect in humans and whether the magnitude of the effect is related to the quantity

consumed.

- where appropriate, the effect on the function is significant in relation to the quantity of the food proposed to be consumed and if this quantity could reasonably be consumed as part of a balanced diet.
- the specific study group(s) in which the evidence was obtained is representative of the target population for which the claim is intended.
- the wordings used to express the claimed effect reflect the scientific evidence and complies with the criteria laid down in the Regulation.

When considering these elements EFSA should also provide advice, when appropriate:

- on the appropriate application of Article 10 (2) (c) and (d) in the Regulation, which provides for additional labelling requirements addressed to persons who should avoid using the food; and/or warnings for products that are likely to present a health risk if consumed to excess.

APPENDIX B

EFSA DISCLAIMER

The present opinion does not constitute, and cannot be construed as, an authorisation to the marketing of the food/food constituent, a positive assessment of its safety, nor a decision on whether the food/food constituent is, or is not, classified as foodstuffs. It should be noted that such an assessment is not foreseen in the framework of Regulation (EC) No 1924/2006.

It should also be highlighted that the scope, the proposed wordings of the claims and the conditions of use as proposed in the Consolidated List may be subject to changes, pending the outcome of the authorisation procedure foreseen in Article 13(3) of Regulation (EC) No 1924/2006.

APPENDIX C

Table 1. Main entry health claims related to chitosan, including conditions of use from similar claims, as proposed in the Consolidated List.

ID	Food or Food constituent	Health Relationship	Proposed wording
679	Chitosane Clarification provided Chitosan (D-glucosamin+ N-acétyl-D-glucosamin)	Combat l'obésité Clarification provided Weight management	Aide à combattre les excès de poids Aide dans le cadre d'un régime amincissant Soutient lors d'amincissement Clarification provided Contributes to management of weight control/can help in the reduction of body weight/can help to the control of weight by reducing the quantity of fat absorbed from the diet.
	Conditions of use - 6x250mg/jour		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
1499	Chitosan	Weight Management	Contributes to management of weight control -can help in the reduction of body weight -can help to the control of weight by reducing the quantity of fat absorbed from the diet
	Conditions of use - 600 mg Chitosan—weiteres B-Vitamine, 150 µg Chrom. - 2-3 g /day, divided uniformly to the main meals a [?]. - 1-6 g per day, 30 minutes before the main meals.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
1985	Hydrolysat de chitosan	Réduit l'inflammation	Maintien de la flexibilité articulaire Aide au maintien de la santé articulaire Bien-être articulaire
	Conditions of use - Dose journalière recommandée: 1500 mg; A utiliser pendant 1 mois ; Destiné aux adultes, plus particulièrement aux seniors; A déconseiller aux femmes enceintes et allaitantes; Ne doit pas être consommé par des personnes allergiques à l'iode ou aux fruits de mer.		
	No clarification provided by Member States		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
4663	Chitosan-Natural insoluble	Stimulates the regulation	Stimulates regulation of cholesterol.

	fibre from crustaceans shell.	of cholesterol levels due to O-carboxymethyl chitosan.	
	Conditions of use - Recommended dose: 1 - 6 g chitosan/day, 30 minutes before the main meals.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
4664	Chitosan - Natural insoluble fibre from crustaceans shell.	Stimulates the intestinal transit by volume effect.	Increases in volume in the interior of the digestive tube by hydration, launches laxation in non-irritative way.
	Conditions of use - Recommended dose: 1 - 6 g chitosan/day, 30 minutes before the main meals.		

GLOSSARY AND ABBREVIATIONS

RCT	Randomised Controlled Trial
LDL	Low-density lipoproteins
HDL	High-density lipoproteins