SCIENTIFIC OPINION

Scientific Opinion on the substantiation of health claims related to calcium and maintenance of normal bone and teeth (ID 2731, 3155, 4311, 4312, 4703), maintenance of normal hair and nails (ID 399, 3155), maintenance of normal blood LDL-cholesterol concentrations (ID 349, 1893), maintenance of normal blood HDL-cholesterol concentrations (ID 349, 1893), reduction in the severity of symptoms related to the premenstrual syndrome (ID 348, 1892), "cell membrane permeability" (ID 363), reduction of tiredness and fatigue (ID 232), contribution to normal psychological functions (ID 233), contribution to the maintenance or achievement of a normal body weight (ID 228, 229) and regulation of normal cell division and differentiation (ID 237) 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

[1] On request from the European Commission, Question EFSA-Q-2008-1015, EFSA-Q-2008-1016, EFSA-Q-2008-1024, adopted on 11 February 2010 and Question EFSA-Q-2008-1019, EFSA-Q-2008-1020, EFSA-Q-2008-1135, EFSA-Q-2008-1136, EFSA-Q-2008-1150, EFSA-Q-2008-1186, EFSA-Q-2008-2625, EFSA-Q-2008-2626, EFSA-Q-2008-3464, EFSA-Q-2008-3887, EFSA-Q-2010-00264, EFSA-Q-2010-00265, EFSA-Q-2010-00656, adopted on 09 July 2010.

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[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 Cardiovascular Health/Oxidative Stress: Antti Aro, Marianne Geleijnse, Marina Heinonen, Ambroise Martin, Wilhelm Stahl and Henk van den Berg. The members of the Claims Sub-Working Group on Mental/Nervous System: Jacques Rigo, Astrid Schloerscheidt, Barbara Stewart-Knox, Sean (J.J.) Strain, and Peter Willatts. 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.

Suggested citation: EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA); Scientific Opinion on the substantiation of health claims related to calcium and maintenance of normal bone and teeth (ID 2731, 3155, 4311, 4312, 4703), maintenance of normal hair and nails (ID 399, 3155), maintenance of normal blood LDL-cholesterol concentrations (ID 349, 1893), maintenance of normal blood HDL-cholesterol concentrations (ID 349, 1893), reduction in the severity of symptoms related to the premenstrual syndrome (ID 348, 1892), "cell membrane permeability" (ID 363), reduction of tiredness and fatigue (ID 232), contribution to normal psychological functions (ID 233), contribution to the maintenance or achievement of a normal body weight (ID 228, 229) and regulation of cell division and differentiation (ID 237) pursuant to Article 13(1) of Regulation (EC) No 1924/2006. EFSA Journal 2010;8(10):1725. [30 pp.]. doi:10.2903/j.efsa.2010.1725. Available online: www.efsa.europa.eu/efsajournal.htm

Regulation (EC) No 1924/2006. This opinion addresses the scientific substantiation of health claims in relation to calcium and maintenance of normal bone and teeth, maintenance of normal hair and nails, maintenance of normal blood LDL-cholesterol concentrations, maintenance of normal blood HDL-cholesterol concentrations, reduction in the severity of symptoms related to the premenstrual syndrome, "cell membrane permeability", reduction of tiredness and fatigue, contribution to normal psychological functions, contribution to the maintenance or achievement of a normal body weight and regulation of cell division and differentiation. 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 claims is calcium. The Panel considers that calcium is sufficiently characterised.

Maintenance of normal bone and teeth

The claimed effects are "bone health-mineralisation", "bone health", "essential for proper structure and development of bones, teeth and nails" and "calcium is essential for growth". The target population is assumed to be the general population.

A claim on calcium and maintenance of normal bone and teeth has already been assessed with a favourable outcome.

Maintenance of normal hair and nails

The claimed effects are "significant effect on building of hair and nails" and "essential for proper structure and development of bones, teeth and nails". The target population is assumed to be the general population. The Panel considers that maintenance of normal hair and nails is a beneficial physiological effect.

No references have been provided from which conclusions could be drawn for the scientific substantiation of the claimed effect.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and the maintenance of normal hair and nails.

Maintenance of normal blood LDL-cholesterol concentrations

The claimed effect is "cholesterol: calcium reduces LDL-cholesterol and increases HDL-cholesterol, calcium participates to the control of cholesterol". The target population is assumed to be the general population. 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 six out of nine randomised, placebo-controlled, intervention studies (RCTs), including two large RCTs, showed no effect of calcium intake on LDL-cholesterol concentrations, and that no evidence was provided for a biologically plausible mechanism by which calcium could exert the claimed effect.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and the maintenance of normal blood LDL-cholesterol concentrations.

Maintenance of normal blood HDL-cholesterol concentrations

The claimed effect is "cholesterol: calcium reduces LDL-cholesterol and increases HDL-cholesterol. Calcium participates to the control of cholesterol". The target population is assumed to be the general population. The Panel considers that maintenance of normal blood HDL-cholesterol concentrations (without increasing LDL-cholesterol concentrations) may be a beneficial physiological effect.

In weighing the evidence, the Panel took into account that six of the seven small RCTs showed no effect of calcium intake on HDL-cholesterol concentrations, that one large RCT not designed to address the effects of calcium intake on blood lipids showed a significant increase in HDL-cholesterol concentrations, that results from the largest RCT available which was specifically designed to address the effects of calcium intake on blood lipids showed no effect of calcium supplementation on HDL-cholesterol concentrations, and that no evidence was provided for a biologically plausible mechanism by which calcium could exert the claimed effect.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and the maintenance of normal blood HDL-cholesterol concentrations.

Reduction in the severity of symptoms related to the premenstrual syndrome

The claimed effect is "premenstrual health: calcium alleviates premenstrual syndromes". The target population is assumed to be women with premenstrual syndrome. The Panel considers that reduction in the severity of symptoms related to the premenstrual syndrome is a beneficial physiological effect.

In weighing the evidence, the Panel took into account that only one small intervention study in humans was provided from which limited conclusions could be drawn in relation to the claimed effect, and that no evidence for a biologically plausible mechanism by which calcium could exert the claimed effect has been provided.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and reduction in the severity of symptoms related to the premenstrual syndrome.

"Cell membrane permeability"

The claimed effect is "cell functioning". The target population is assumed to be the general population. In the context of the proposed wordings and clarifications provided by Member States, the Panel assumes that the claimed effect refers to "cell membrane permeability".

The Panel considers that the claimed effect, "cell membrane permeability", is not sufficiently defined for a scientific evaluation.

The Panel considers that the claimed effect is general and non-specific and does not refer to any specific health claim as required by Regulation (EC) No 1924/2006.

Reduction of tiredness and fatigue

The claimed effect is "vitamin/mineral supplementation to reduce fatigue and tiredness in situations of inadequate micronutrient status". The target population is assumed to be the general population. The Panel considers that reduction of tiredness and fatigue is a beneficial physiological effect.

No references have been provided from which conclusions could be drawn for the scientific substantiation of the claimed effect.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and reduction of tiredness and fatigue.

Contribution to normal psychological functions

The claimed effect is "the role of vitamins and minerals in mental performance (where mental performance stands for those aspects of brain and nerve functions which determine aspects like concentration, learning, memory and reasoning)". The target population is assumed to be the general

population. The Panel considers that contribution to normal psychological functions, which encompass cognitive and affective domains, is a beneficial physiological effect.

No references have been provided from which conclusions could be drawn for the scientific substantiation of the claimed effect.

On the basis of the data presented, the Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and contribution to normal psychological functions.

Contribution to the maintenance or achievement of a normal body weight

The claimed effect is "weight management". The target population is assumed to be the general population. The Panel considers that contribution to the maintenance or achievement of a normal body weight is a beneficial physiological effect.

In weighing the evidence, the Panel took into account that, although epidemiological studies generally observe an inverse relationship between calcium intake and body weight, evidence from a large number of randomised controlled trials does not support this hypothesis, and that the evidence for possible mechanisms by which calcium intake could exert an effect on body weight control is not convincing.

The Panel concludes that a cause and effect relationship has not been established between the intake of calcium and contribution to the maintenance or achievement of a normal body weight.

Regulation of normal cell division and differentiation

The claimed effect is "colorectal cell protection". The target population is assumed to be the general population. The functional role of calcium in the regulation of cell division and differentiation is not limited to colorectal cells. The Panel considers that normal regulation of cell division and differentiation is a beneficial physiological effect.

The evidence available from consensus opinions/reports from authoritative bodies and reviews shows that there is consensus on the role of calcium in normal regulation of cell division and differentiation.

The Panel concludes that a cause and effect relationship has been established between calcium and normal regulation of cell division and differentiation.

Conditions and possible restrictions of use

The Panel considers that, in order to bear the claims, a food should be at least a source of calcium as per Annex to Regulation (EC) No 1924/2006. Such amounts can be easily consumed as part of a balanced diet. The target population is the general population.

KEY WORDS

Calcium, bone, teeth, hair, nails, LDL-cholesterol, HDL-cholesterol, premenstrual syndrome, cell membrane permeability, psychological functions, body weight, cell division, cell differentiation, tiredness, fatigue, 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 claims is calcium, which is a well recognised nutrient and is measurable in foods by established methods. Calcium occurs naturally in foods in many forms which are generally well utilised by the body. Different forms of calcium are authorised for addition to foods and for use in food supplements (Annex II of the Regulation (EC) No 1925/2006[6] and Annex II of Directive 2002/46/EC[7]). This evaluation applies to calcium naturally present in foods and those forms authorised for addition to foods and for use in food supplements (Annex II of the Regulation (EC) No 1925/2006 and Annex II of Directive 2002/46/EC).

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

2. Relevance of the claimed effect to human health

2.1. Maintenance of normal bone and teeth (ID 2731, 3155, 4311, 4312, 4703)

The claimed effects are “bone health-mineralisation”, “bone health”, “essential for proper structure and development of bones, teeth and nails” and “calcium is essential for growth”. The Panel assumes that the target population is the general population.

In the context of the proposed wordings and clarifications provided by Member States, the Panel assumes that the claimed effects refer to the maintenance of normal bone and teeth.

A claim on calcium and maintenance of normal bone and teeth has already been assessed with a favourable outcome (EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA), 2009).

[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] Briefing document for stakeholders on the evaluation of Article 13.1, 13.5 and 14 health claims: http://www.efsa.europa.eu/en/ndameetings/docs/nda100601-ax01.pdf
[6] Regulation (EC) No 1925/2006 of the European Parliament and of the Council of 20 December 2006 on the addition of vitamins and minerals and of certain other substances to foods. OJ L 404, 30.12.2006, p. 26-38.
[7] Directive 2002/46/EC of the European Parliament and of the Council of 10 June 2002 on the approximation of the laws of the Member States relating to food supplements. OJ L 183, 12.7.2002, p. 51-57.

2.2. Maintenance of normal hair and nails (ID 399, 3155)

The claimed effects are "significant effect on building of hair and nails" and "essential for proper structure and development of bones, teeth and nails". The Panel assumes that the target population is the general population.

In the context of the proposed wordings and clarifications provided by Member States, the Panel assumes that the claimed effects refer to the maintenance of normal hair and nails.

The Panel considers that maintenance of normal hair and nails is a beneficial physiological effect.

2.3. Maintenance of normal blood LDL-cholesterol concentrations (ID 349, 1893)

The claimed effect is "cholesterol: calcium reduces LDL-cholesterol and increases HDL-cholesterol. calcium participates to the control of cholesterol". The Panel assumes that the target population is the general population.

In the context of the proposed wordings and clarifications provided by Member States, the Panel assumes that the claimed effect refers 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.

2.4. Maintenance of normal blood HDL-cholesterol concentrations (ID 349, 1893)

The claimed effect is "cholesterol: calcium reduces LDL-cholesterol and increases-HDL cholesterol. Calcium participates to the control of cholesterol". The Panel assumes that the target population is the general population.

In the context of the proposed wordings and clarifications provided by Member States, the Panel assumes that the claimed effect refers to the maintenance of normal blood HDL-cholesterol concentrations.

High-density lipoproteins (HDL) act as cholesterol scavengers and are involved in the reverse transport of cholesterol in the body (from peripheral tissues back to the liver). Conversely, low-density lipoproteins (LDL) carry cholesterol from the liver to peripheral tissues, including the arteries.

The Panel considers that maintenance of normal blood HDL-cholesterol concentrations (without increasing LDL-cholesterol concentrations) may be a beneficial physiological effect.

2.5. Reduction in the severity of symptoms related to the premenstrual syndrome (ID 348, 1892)

The claimed effect is "premenstrual health: calcium alleviates premenstrual syndromes". The Panel assumes that the target population is women with premenstrual syndrome.

In the context of the proposed wordings, clarifications provided by Member States and references cited for the substantiation of this claim, the Panel assumes that the claimed effect refers to a reduction in the severity of symptoms related to the premenstrual syndrome. Severity of symptoms related to the premenstrual syndrome can be assessed using validated questionnaires.

The Panel considers that reduction in the severity of symptoms related to the premenstrual syndrome is a beneficial physiological effect.

2.6. "Cell membrane permeability" (ID 363)

The claimed effect is "cell functioning". The Panel assumes that the target population is the general population.

In the context of the proposed wordings and clarifications provided by Member States, the Panel assumes that the claimed effect refers to "cell membrane permeability".

The Panel considers that the claimed effect "cell membrane permeability" is not sufficiently defined for a scientific evaluation.

The Panel considers that the claimed effect is general and non-specific and does not refer to any specific health claim as required by Regulation (EC) No 1924/2006.

2.7. Reduction of tiredness and fatigue (ID 232)

The claimed effect is "vitamin/mineral supplementation to reduce fatigue and tiredness in situations of inadequate micronutrient status". The Panel assumes that the target population is the general population.

The Panel considers that reduction of tiredness and fatigue is a beneficial physiological effect.

2.8. Contribution to normal psychological functions (ID 233)

The claimed effect is "the role of vitamins and minerals in mental performance (where mental performance stands for those aspects of brain and nerve functions which determine aspects like concentration, learning, memory and reasoning)". The Panel assumes that the target population is the general population.

The Panel considers that contribution to normal psychological functions, which encompass cognitive and affective domains, is a beneficial physiological effect.

2.9. Contribution to the maintenance or achievement of a normal body weight (ID 228, 229)

The claimed effect is "weight management". The Panel assumes that the target group is the general population.

Weight management can be interpreted as the contribution to the maintenance of a normal body weight. In this context weight loss in overweight subjects without achieving a normal body weight is considered to be a beneficial physiological effect.

The Panel considers that contribution to the maintenance or achievement of a normal body weight is a beneficial physiological effect.

2.10. Regulation of normal cell division and differentiation (ID 237)

The claimed effect is "colorectal cell protection". The Panel assumes that the target population is the general population.

From the proposed wordings the Panel notes that the claimed effect refers to the regulation of division and differentiation of colorectal cells. However, the Panel considers that the functional role of calcium in the regulation of normal cell division and differentiation is not limited to colorectal cells.

The Panel considers that regulation of normal cell division and differentiation is a beneficial physiological effect.

3. Scientific substantiation of the claimed effect

More than 99 % of the total calcium in the body is located in bones and teeth and contributes to their mass, structure and strength. Besides this structural role, calcium acts as an intracellular messenger and as a cofactor for extracellular enzymes and proteins. Overt, symptomatic calcium deficiencies are almost nonexistent given the large skeletal reserves, although inadequate calcium intakes have been associated with a higher risk of bone fractures (IoM, 1997, Weaver and Heaney, 2006).

3.1. Maintenance of normal hair and nails (ID 399, 3155)

Two references were cited for the substantiation of this claim. One reference was not accessible to the Panel despite every reasonable effort to retrieve it. The second reference was an opinion of a scientific body which did not mention the role of calcium in the maintenance of normal hair and nails. The Panel considers that no conclusions can be drawn from this reference for the scientific substantiation of the claimed effect.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and the maintenance of normal hair and nails.

3.2. Maintenance of normal blood LDL-cholesterol concentrations (ID 349, 1893)

Two references were cited for the substantiation of this claim. One was a review on the composition and mineralisation of mollusc shell proteins. The Panel considers that no conclusions can be drawn from this reference for the scientific substantiation of the claimed effect. The second was a narrative review on the effects of calcium intake on blood lipids (Reid, 2004), which refers to a series of small-scale and short-term randomised, placebo controlled trials on the effects of calcium supplementation in various forms (carbonate, citrate, phosphate) on LDL-cholesterol concentrations. The Panel has also identified a number of studies which were published after 2004 and were not included in the review.

Three small-scale and short-term randomised, placebo control trials (RCTs) have observed a statistically significant reduction of LDL-cholesterol (4-11 %) concentrations following the administration of 1 to 2 g per day of calcium compared to placebo (Groot et al., 1980; Bell et al., 1992; Denke et al., 1993). However, four other small-scale and short-term RCTs have shown no effect (Ditscheid et al., 2005; Bostick et al., 2000; Karandish et al., 2009; Karanja et al., 1987). A large RCT originally designed to assess the effects of calcium supplementation on bone health also addressed the effect of calcium supplementation on LDL-cholesterol concentrations. A total of 223 postmenopausal women were randomly assigned to consume either calcium citrate (1 g/d, n = 111) or placebo (n = 112) for one year (Reid et al., 2002). Changes in LDL-cholesterol concentrations were not significantly different between the intervention and placebo groups.

In a recently published RCT on the effects of calcium supplementation on blood lipids (primary outcome) a total of 323 healthy men were randomly assigned to consume either calcium (600 mg/d, n=108 or 1200 mg/d, n=108) or placebo (n=107) for two years (Reid et al., 2010). No significant differences between the calcium and placebo groups were observed with respect to changes in total

cholesterol, LDL- and HDL-cholesterol, and triglyceride concentrations or in the HDL to LDL-cholesterol ratio during the study.

No evidence was provided for a biologically plausible mechanism by which calcium could exert the claimed effect.

In weighing the evidence, the Panel took into account that six out of nine RCTs, including two large RCTs, showed no effect of calcium intake on LDL-cholesterol concentrations, and that no evidence was provided for a biologically plausible mechanism by which calcium could exert the claimed effect.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and maintenance of normal blood LDL-cholesterol concentrations.

3.3. Maintenance of normal blood HDL-cholesterol concentrations (ID 349, 1893)

Two references were cited for the substantiation of this claim. One was a review on the composition and mineralisation of mollusc shell proteins. The Panel considers that no conclusions can be drawn from this reference for the scientific substantiation of the claimed effect. The second was a narrative review on the effects of calcium intake on blood lipids (Reid, 2004), which refers to a series of small-scale and short-term randomised, placebo controlled trials on the effects of calcium supplementation in various forms (carbonate, citrate, phosphate) on HDL-cholesterol concentrations. The Panel has also identified a number of studies which were published after 2004 and were not included in the review, including two large RCTs. Of the smaller studies, one observed a statistically significant increase in HDL-cholesterol concentrations following the administration of 1 to 2 g per day of calcium compared to placebo (Bell et al., 1992), whereas six others showed no effect in adults with normal or elevated blood cholesterol concentrations (Groot et al., 1980; Denke et al., 1993; Ditscheid et al., 2005; Bostick et al., 2000; Karandish et al., 2009; Karanja et al., 1987).

A large RCT originally designed to assess the effects of calcium supplementation on bone health also assessed the effect of calcium supplementation on HDL-cholesterol concentrations. A total of 223 postmenopausal women were randomly assigned to consume either calcium citrate (1 g/d, n=111) or placebo (n=112) for one year (Reid et al., 2002). HDL-cholesterol concentrations and the HDL to LDL-cholesterol ratio significantly increased in the intervention group (by 0.09 mmol/L; 95 % CI=0.02-0.17, and by 0.05; 95 % CI=0.02-0.08; respectively) compared to placebo during the study.

In a recently published RCT on the effects of calcium supplementation on blood lipids (primary outcome) a total of 323 healthy men were randomly assigned to consume either calcium (600 mg/d, n=108 or 1200 mg/d, n=108) or placebo (n=107) for two years (Reid et al., 2010). No significant differences between the calcium and placebo groups were observed with respect to changes in total cholesterol, LDL- and HDL-cholesterol, and triglyceride concentrations or in the HDL to LDL ratio during the study.

No evidence was provided for a biologically plausible mechanism by which calcium could exert the claimed effect.

In weighing the evidence, the Panel took into account that six of the seven small RCTs showed no effect of calcium intake on HDL-cholesterol concentrations, that one large RCT not designed to address the effects of calcium intake on blood lipids showed a significant increase in HDL-cholesterol concentrations, that results from the largest RCT available which was specifically designed to address the effects of calcium intake on blood lipids showed no effect of calcium supplementation on HDL-cholesterol concentrations, and that no evidence was provided for a biologically plausible mechanism by which calcium could exert the claimed effect.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and the maintenance of normal blood HDL-cholesterol concentrations.

3.4. Reduction in the severity of symptoms related to the premenstrual syndrome (ID 348, 1892)

Two references were cited for the substantiation of this claim. One was a narrative review on the protein components of the shell matrix of molluscs. The Panel considers that no conclusions can be drawn for the scientific substantiation of the claimed effect.

The second (Thys-Jacobs et al., 1989) reports on a double-blind, randomised, placebo controlled, cross-over intervention in pre-menopausal women selected on the basis of a history of recurrent pre-menstrual symptoms (PMS) and on the results of a prospective assessment of daily symptom scores. Only women with symptom scores during the latter half of the luteal phase at least 50 % greater than those during the early inter-menstrual phase (days following the menstrual period) and with symptoms recorded as moderate or severe in the latter half of the menstrual cycle were recruited (n=60 out of 78 initially screened). Women were asked to consume either 1 g per day of calcium or placebo for three months each in a random order. The 14 symptoms evaluated were nervousness, irritability, crying, mood swings, depression, fatigue, violent tendencies, abdominal bloating, headache, breast fullness, increased appetite, abdominal cramps, back pain, and craving for sweets by using a validated questionnaire. Each symptom was rated daily from zero to three by the study participants. Out of the 60 women randomised, 27 dropped out before cross-over and only 33 entered the (per protocol) data analysis, 22 of which reported a compliance of at least 90 %. A significant decrease in the total mean symptom score was observed for the calcium treatment compared to placebo during both the luteal and menstrual phases (3.33 *vs* 5.34, p=0.011; 4.71 *vs* 6.02, p=0.032, respectively). The repeated measures analysis showed no significant carryover effects or cycle effects on symptoms. In order to evaluate the specific symptoms, a factor analysis was performed by clustering the 14 symptoms in four groups as follows: factor 1 included nervousness, irritability, crying, mood swings, depression, and violent tendencies ("negative affect group"); factor 2 included fatigue, abdominal bloating, headache, and breast fullness ("water retention group"); factor 3 included increased appetite, craving for sweets; and factor 4 included abdominal cramps and back pain ("pain goup"). Mean scores for all these factors except for factor 3 significantly decreased during the luteal phase and factor 4 significantly decreased during the menstrual phase on calcium treatment as compared to placebo. The Panel notes the high number of drop outs in the study and that only per protocol data analyses were performed, which limits the conclusions that can be drawn from this study for the scientific substantiation of the claim.

No evidence was provided for a biologically plausible mechanism by which calcium could exert the claimed effect.

In weighing the evidence, the Panel took into account that only one small intervention study in humans was provided from which limited conclusions can be drawn in relation to the claimed effect, and that no evidence for a biologically plausible mechanism by which calcium could exert the claimed effect has been provided.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and a reduction in the severity of symptoms related to the premenstrual syndrome.

3.5. Reduction of tiredness and fatigue (ID 232)

One book chapter and one consensus opinion on the health effects of calcium were provided for the substantiation of this claim. None referred to a role of calcium in the reduction of fatigue and/or tiredness. The Panel considers that no conclusions can be drawn from these references for the scientific substantiation of the claimed effect.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and reduction of tiredness and fatigue.

3.6. Contribution to normal psychological functions (ID 233)

Three book chapters and one consensus opinion on the health effects of calcium were provided for the substantiation of the claim. No role of calcium in psychological functions was mentioned in any of these. In addition, an intervention study on the effects of an oral multivitamin and mineral supplementation on psychological outcomes was cited (Carroll et al., 2000). The Panel considers that no conclusions can be drawn from this reference for the scientific substantiation of the claimed effect.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of calcium and contribution to normal psychological functions.

3.7. Contribution to the maintenance or achievement of a normal body weight (ID 228, 229)

The literature provided includes mechanistic studies, opinions from authoritative bodies, (systematic) reviews, original research papers of observational epidemiological studies, and randomised clinical trials (RCT) on the effects of calcium intake on body weight control.

In addition, the Panel has identified five other references pertinent to the claimed effect (Winzenberg et al., 2007; Lorenzen et al., 2006; van Loan, et al. 2009; Bortolotti, et al 2008; Christensen et al., 2009).

Most of the individual studies presented have been included in two systematic reviews of randomised controlled trials (RCT) which investigated the effects of calcium intake on body weight (Winzenberg et al., 2007; Trowman et al., 2006). Four of the most recent RCTs presented were not included in these reviews (Lorenzen et al., 2006; Thompson et al., 2005; Bowen et al., 2005; Gunther et al., 2005)

A systematic review and subsequent meta-analysis of 13 RCT on the effects of calcium supplementation on body weight (including papers published up to 2004 mostly on adult females) concluded that calcium supplementation has no statistically significant association with a reduction in body weight (Trowman et al., 2006). Another systematic review of 19 RCT on the effects of calcium supplementation in healthy children concluded that calcium supplements do not affect weight gain, height or body composition (Winzenberg et al., 2007). Some recently published randomised clinical trials on the effect of calcium on body weight also show no beneficial effects of calcium intake on body weight control, either following calcium supplementation (Lorenzen et al., 2006) or by increasing calcium intake from dairy products (Thompson et al., 2005; Bowen et al., 2005; Gunther et al., 2005).

A recent review (van Loan, 2009) suggests that human observational retrospective, cross-sectional and prospective studies support the idea that dietary calcium is associated with body weight control. However, a causal relationship cannot be inferred from these studies as the observed relationships in human observational studies between dietary calcium and body weight control may be confounded by other dietary components and/or by life style factors related to calcium intake.

The suggested mechanisms for an effect of calcium intake on body weight control are an increase in fat oxidation, inhibition of lipogenesis, and/or an increased fat excretion (Astrup, 2008). However, in a well controlled study by Bortolotti et al. (2008) dairy calcium supplementation in overweight subjects with habitual low calcium intakes failed to alter fat metabolism. In addition, a recently published meta-analysis of 13 RCT on the effects of additional calcium intake from dairy and dietary supplements on faecal fat excretion concluded that increasing dietary calcium by 800-6000 mg per day increases fat excretion by about 2 g per day, with no evidence of a dose-response relationship.

However, the relevance of such an effect for the daily energy balance and body-weight regulation is unknown (Christensen et al., 2009).

In weighing the evidence, the Panel took into account that, although epidemiological studies generally observe an inverse relationship between calcium intake and body weight, evidence from a large number of RCTs does not support this hypothesis, and that the evidence for possible mechanisms by which calcium intake could exert an effect on body weight control is not convincing.

The Panel concludes that a cause and effect relationship has not been established between the intake of calcium and the contribution to the maintenance or achievement of a normal body weight.

3.8. Regulation of normal cell division and differentiation (ID 237)

The evidence available from consensus opinions/reports from authoritative bodies and reviews shows that there is consensus on the role of calcium in the normal regulation of cell division and differentiation (SCF, 1993; IoM, 1997; Weaver and Heaney, 2006).

Calcium is a cofactor for extracellular enzymes and proteins and also functions as intracellular messenger. Calcium messenger systems include trigger proteins in excitable cells and sustained responses in both excitable and non-excitable cells (Weaver and Heaney, 2006). Calcium activates phospholipases and mitogen-activated protein kinase, inhibits adenylate cyclase (among other enzymes) and has an important regulatory role in diverse cellular processes, including cell proliferation and differentiation (SCF, 1993; IoM, 1997; Weaver and Heaney, 2006).

Some of the references provided relate to intervention trials which investigated the effects of calcium on colon cancer risk. The Panel considers that no conclusions can be drawn from these studies for the scientific substantiation of an effect of calcium on the regulation of cell division and differentiation.

The Panel concludes that a cause and effect relationship has been established between calcium and the regulation of normal cell division and differentiation.

4. Panel's comments on the proposed wording

4.1. Regulation of normal cell division and differentiation (ID 237)

The Panel considers that the following wording reflects the scientific evidence: "Calcium contributes to normal cell division and differentiation".

5. Conditions and possible restrictions of use

5.1. Regulation of normal cell division and differentiation (ID 237)

The Panel considers that in order to bear the claim a food should be at least a source of calcium as per Annex to Regulation (EC) No 1924/2006. Such amounts can be easily consumed as part of a balanced diet. The target population is the general population. No Tolerable Upper Intake Levels (UL) have been established for calcium in children and adolescents; the UL for calcium in adults is 2500 mg/day (SCF, 2003).

CONCLUSIONS

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

- The food constituent, calcium, which is the subject of the health claims is sufficiently characterised.

Maintenance of normal bone and teeth (ID 2731, 3155, 4311, 4312, 4703)

- The claimed effects are "bone health-mineralisation", "bone health", "essential for proper structure and development of bones, teeth and nails" and "calcium is essential for growth". The target population is assumed to be the general population.

- A claim on calcium and maintenance of normal bone and teeth has already been assessed with a favourable outcome.

Maintenance of normal hair and nails (ID 399, 3155)

- The claimed effects are "significant effect on building of hair and nails", and "essential for proper structure and development of bones, teeth and nails". The target population is assumed to be the general population. Maintenance of normal hair and nails is a beneficial physiological effect.

- A cause and effect relationship has not been established between the dietary intake of calcium and maintenance of normal hair and nails.

Maintenance of normal blood LDL-cholesterol concentrations (ID 349, 1893)

- The claimed effect is "cholesterol: calcium reduces LDL-cholesterol and increases HDL-cholesterol. Calcium participates to the control of cholesterol". 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 not been established between the dietary intake of calcium and maintenance of normal blood LDL-cholesterol concentrations.

Maintenance of normal blood HDL-cholesterol concentrations (ID 349, 1893)

- The claimed effect is "cholesterol: calcium reduces LDL-cholesterol and increases HDL-cholesterol. Calcium participates to the control of cholesterol". The target population is assumed to be the general population. Maintenance of normal blood HDL-cholesterol concentrations (without increasing LDL-cholesterol concentrations) may be a beneficial physiological effect.

- A cause and effect relationship has not been established between the dietary intake of calcium and maintenance of normal blood HDL-cholesterol concentrations.

Reduction in the severity of symptoms related to the premenstrual syndrome (ID 348, 1892)

- The claimed effect is "premenstrual health: calcium alleviates premenstrual syndromes". The target population is assumed to be women with premenstrual syndrome. Reduction in the severity of symptoms related to the premenstrual syndrome is a beneficial physiological effect.

- A cause and effect relationship has not been established between the dietary intake of calcium and reduction in the severity of symptoms related to the premenstrual syndrome.

"Cell membrane permeability" (ID 363)

- The claimed effect is "cell functioning". The target population is assumed to be the general population. In the context of the proposed wordings and clarifications provided by Member States, it is assumed that the claimed effect refers to "cell membrane permeability". The claimed effect "cell membrane permeability" is not sufficiently defined for a scientific evaluation.

- The Panel considers that the claimed effect is general and non-specific and does not refer to any specific health claim as required by Regulation (EC) No 1924/2006.

Reduction of tiredness and fatigue (ID 232)

- The claimed effect is "vitamin/mineral supplementation to reduce fatigue and tiredness in situations of inadequate micronutrient status". The target population is assumed to be the general population. Reduction of tiredness and fatigue is a beneficial physiological effect.

- A cause and effect relationship has not been established between the dietary intake of calcium and reduction of tiredness and fatigue.

Contribution to normal psychological functions (ID 233)

- The claimed effect is "the role of vitamins and minerals in mental performance (where mental performance stands for those aspects of brain and nerve functions which determine aspects like concentration, learning, memory and reasoning)". The target population is assumed to be the general population. Contribution to normal psychological functions, which encompass cognitive and affective domains, is a beneficial physiological effect.
- A cause and effect relationship has not been established between the dietary intake of calcium and contribution to normal psychological functions.

Contribution to the maintenance or achievement of a normal body weight (ID 228, 229)

- The claimed effect is "weight management". The target population is assumed to be the general population. Contribution to the maintenance or achievement of a normal body weight is a beneficial physiological effect.
- A cause and effect relationship has not been established between the intake of calcium and contribution to the maintenance or achievement of a normal body weight.

Regulation of normal cell division and differentiation (ID 237)

- The claimed effect is "colorectal cell protection". The target population is assumed to be the general population. The functional role of calcium on the regulation of cell division and differentiation is not limited to colorectal cells. Regulation of normal cell division and differentiation is a beneficial physiological effect.
- A cause and effect relationship has been established between calcium and regulation of normal cell division and differentiation.
- The following wording reflects the scientific evidence: "Calcium contributes to normal cell division and differentiation".

Conditions and possible restrictions of use

- In order to bear the claim a food should be at least a source of calcium as per Annex to Regulation (EC) No 1924/2006. Such amounts can be easily consumed as part of a balanced diet. The target population is the general population.

DOCUMENTATION PROVIDED TO EFSA

Health claims pursuant to Article 13 of Regulation (EC) No 1924/2006 (No: EFSA-Q-2008-1015, EFSA-Q-2008-1016, EFSA-Q-2008-1019, EFSA-Q-2008-1020, EFSA-Q-2008-1024, EFSA-Q-2008-1135, EFSA-Q-2008-1136, EFSA-Q-2008-1150, EFSA-Q-2008-1186, EFSA-Q-2008-2625, EFSA-Q-2008-2626, EFSA-Q-2008-3464, EFSA-Q-2008-3887, EFSA-Q-2010-00264, EFSA-Q-2010-00265, EFSA-Q-2010-00656). 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[8] (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[9]

Foods are commonly involved in many different functions[10] 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.

[8] OJ L12, 18/01/2007
[9] The term 'food' when used in this Terms of Reference refers to a food constituent, the food or the food category.
[10] 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 calcium, including conditions of use from similar claims, as proposed in the Consolidated List.

ID	Food or Food constituent	Health Relationship	Proposed wording
228	Calcium	Weight management	Calcium helps manage your weight Calcium contributes to weight control. Calcium modulates energy metabolism
	Conditions of use - 500-1000 mg Calcium als Calciumcitrat, 10 µg Vitamin D, 8-16 mg Zink - Must at least be a source of mineral/s as per Annex to Regulation 1924/2006 - Low-energy milk drink with calcium content of 180mg/100g, 360mg/serving and vitamin D content of 0.5microg/100g, 1.0 microg/serving. Yoghurts with calcium content of 180mg/100g, 315mg/serving and vitamin D content of 0.5microg/100g, 0.88 µg/serving. Fresh (unripened) cheeses with 110mg/100g of calcium, 33mg/serving - 25 % of RDA per serving, 90/496/EEC		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
229	Calcium in dairy products	Weight management	Calcium naturally present in dairy products is important for weight management Dairy calcium has been shown to stimulate lipolysis. Consumption of dairy calcium aids weight loss. Dairy calcium modulates fat metabolism. Dairy calcium helps promote fat loss.
	Conditions of use - Dairy products containing a minimum of 30 mg calcium per gram protein. 800-1200 mg/day as part of an energy restricted diet. Must meet minimum requirements for use of the claim "source of [name of vitamin/s] and/or [name of mineral/s]" as per Annex to Regulation 1924/2006. Agency guidance for supplements is that products containing >1500mg calcium should carry the label advisory statement "this amount of calcium may cause mild stomach upset in sensitive individuals" - Daily amount to be consumed to produce claimed effect: 800 miligram(s). Are there factors that could interfere with bioavailability: Yes. Please give reason: The bioavailability of calcium from different dietary sources is variable. Bioavailability may be affected by dietary components which inhibit absorption such as phytates, oxalates and certain minerals. Length of time after consumption for claimed effect to become apparent: Habitual intake. Is there a limit to the amount of food which should be		

	consumed in order to avoid adverse health effects: No. - Number of nutrients/other substances that are essential to claimed effect: 1. Names of nutrient/other substances and Quantity in Average daily serving: 200mg dairy calcium. Daily amount to be consumed to produce claimed effect: 800 miligram(s). Are there factors that could interfere with bioavailability: No. Length of time after consumption for claimed effect to become apparent: 12 weeks. Is there a limit to the amount of food which should be consumed in order to avoid adverse health effects: No. Other conditions for use: 800-1200mg per day as part of a calorie restricted diet.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
232	Calcium.	Vitamin/mineral supplementation to reduce fatigue and tirednes in situations of inadequate micronutrient status. Clarification provided Reduce fatigue and tiredness, particularly in situations of inadequate micronutrient status	Supplementation with B-vitamins, iron, magnesium as well as vitamin C can reduce fatigue and tiredness in situations of inadequate micro-nutrient status.
	Conditions of use - Must meet minimum requirements for use of the claim "source of [name of vitamin/s] and/or [name of mineral/s]," as per Annex to Regulation 1924/2006. Agency guidance for supplements is that products containing >1500 mg of Calcium should carry the label advisory statement "[This amount of Calcium]* may cause mild stomach upset in sensitive individuals."		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
233	Calcium.	The role of vitamins and minerals in mental performance (where mental performance stands for those aspects of brain and nerve functions which determine aspects like concentration, learning, memory and reasoning).	Water-soluble vitamins, calcium, magnesium and zinc are essential for mental function and performance In situations of inadequate micronutrient status, supplementation with water-soluble vitamins, minerals and zinc can sustain mental performance (e.g. concentration, learning, memory, reasoning).
	Conditions of use - 15 % RDA. Agency guidance for supplements is that products containing >1500 mg of Calcium should carry the label advisory statement "[This amount of Calcium] may cause mild stomach upset in sensitive individuals".		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
237	Calcium	Colorectal cell protection	- Calcium helps protects gut cells. - Calcium helps gut cells to maintain normal regulation

			of growth and development.
	Conditions of use - Must at least be a source of mineral/s as per annex to regulation 1924/2006. - Source of / 15% of RDA per 100 g. Agency guidance for supplements is that products containing >1500mg calcium should carry the label advisory statement "this amount of calcium may cause mild stomach upset in sensitive individuals" - Mind 120 mg / 100g // 100 ml - 500-1000 mg Calcium als Calcium citrat, 10 µg Vitamin D, 8-16 mg Zink - Names of nutrient/other substances and Quantity in Average daily serving: 120 mg calcium Weight of average daily food serving: 360 miligram(s) Daily amount to be consumed to produce claimed effect: 360 miligram(s) Number of food portions this equates to in everyday food portions: 1 Length of time after consumption for claimed effect to become apparent: Studies have shown that regular consumption over a period of 1-5 years promotes a healthy digestive system. Other conditions for use: The product must contain 15% RDA Calcium - Names of nutrient/other substances and Quantity in Average daily serving: 160 mg calcium. Weight of average daily food serving: 1.33 gram(s) Daily amount to be consumed to produce claimed effect: 1.33 gram(s) Number of food portions this equates to in everyday food portions: 1 Length of time after consumption for claimed effect to become apparent: Studies have shown that regular consumption over a period of 1-5 years promotes a healthy digestive system. Other conditions for use: The product must contain 20% RDA Calcium - Names of nutrient/other substances and Quantity in Average daily serving: 120 miligrams calcium. Weight of average daily food serving: 666 miligram(s). Daily amount to be consumed to produce claimed effect: 666 miligram(s) Number of food portions this equates to in everyday food portions: 1 Length of time after consumption for claimed effect to become apparent: Studies have shown that regular consumption over a period of 1-5 years promotes a healthy digestive system. Other conditions for use: The product must contain 15% RDA Calcium		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
348	Coquille d'huître. <u>Clarification provided</u> Shells of Ostrea spp. /Crassastrea spp. (oyster shell) are rich source of calcium	Cycle menstruel. Soulage les PMS. (PreMenstrual Syndrome). <u>Clarification provided</u> Premenstrual health: calcium alleviates premenstrual syndromes.	Recommandé lors de problèmes liés au cycle menstruel. Soulage les douleurs liées au cycle menstruel. A utiliser en cas de règles douloureuses. <u>Clarification provided</u> Oyster shells are rich source of calcium that alleviates the premenstrual syndrome/oyster shells are a rich source of calcium that reduces premenstrual pain and premenstrual water retention.
	Conditions of use - Poudre. 1 g de carbonate de calcium/jour.		

ID	Food or Food constituent	Health Relationship	Proposed wording
349	Coquille d'huître. Clarification provided Shells of Ostrea spp./ Crassastrea spp. (oyster shell) are rich source of calcium.	Cholestérol, Hypolipidémiant. Clarification provided Cholesterol: calcium reduces LDL cholesterol ans increases HDL cholesterol. Calcium participates to the control of cholesterol.	Contribue à un bon cholestérol. Aide à maîtriser le cholesterol. Clarification provided Oyster shells are rich source of calcium that contributes to healthy blood cholesterol level/ Oyster shells are a rich source of calcium that helps to maintain normal cholesterol level/Oyster shells are a rich source of calcium that decreases LDL cholesterol and increase HDL cholesterol.
	Conditions of use - Poudre. 6x370 mg/jour.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
363	Calcium.	Cell functioning. Clarification provided Cell functioning; Cell membrane permeability.	Calcium contributes to normal functioning of cells.
	Conditions of use - No conditions of use provided		
	Comments from Member States Example of wording: Calcium contributes to the maintanence of normal permeability of cell membranes.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
399	Mineralwasser/Calcium Clarification provided mineral water/calcium.	Haare und Nägel(Aufbau) Clarification provided Significant effect on building of hair and nails.	[In german:] kräftigt die Nägel Clarification provided strengthens the nails.
	Conditions of use - ab 150 mg/l Calcium. (siehe EG-Mineralwasser-Richtlinie).		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
1892	Coquille d'huître. Clarification provided Shells of Ostrea spp. /Crassastrea spp. (oyster shell) are rich source of calcium.	Cycle menstruel. Soulage les PMS. (PreMenstrual Syndrome). Clarification provided Premenstrual health: calcium alleviates premenstrual syndromes.	Recommandé lors de problèmes liés au cycle menstruel. Soulage les douleurs liées au cycle menstruel. A utiliser en cas de règles douloureuses.

			Clarification provided Oyster shells are rich source of calcium that alleviates the premenstrual syndrome/oyster shells are a rich source of calcium that reduces premenstrual pain and premenstrual water retention.
	Conditions of use - Poudre. 1 g de carbonate de calcium/jour.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
1893	Coquille d'huître. Clarification provided Shells of Ostrea spp. /Crassastrea spp. (oyster shell) are rich source of calcium.	Cholestérol. Hypolipidémiant. Clarification provided Cholesterol: calcium reduces LDL cholesterol ans increases HDL cholesterol. Calcium participates to the control of cholesterol.	Contribue à un bon cholestérol. Aide à maîtriser le cholesterol. Clarification provided Oyster shells are rich source of calcium that contributes to healthy blood cholesterol level/ Oyster shells are a rich source of calcium that helps to maintain normal cholesterol level/Oyster shells are a rich source of calcium that decreases LDL cholesterol and increase HDL cholesterol.
	Conditions of use - Poudre. 6x370 mg/jour		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
2731	Lithothamnium calcareum (calcium carbonate).	Bone health – mineralization.	Beneficial for bone mineralization thanks to its calcium carbonate content. Representing an intake of calcium carbonate, Lithothamnium calcareum promotes bone mineralization. Thanks to its high calcium carbonate content, is a natural support for bone health. For growth, development and maintenance of healthy bones. Helps to maintain bone density and strength. Can help to strengthen the bones.

	Conditions of use - Intake of a Lithothamnium calcareum powder equivalent to at least an intake of 1000 mg of calcium as carbonate.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
3155	Egg shell, crushed, without membrane.	Essential for proper structure and development of bones, teeth and nails. Clarification provided Calcium source with good biological availabilityNecessary for the proper structure and development of teeth and nails.	It maintains the good condition of bonesIt protects and nourishes bones, it is a suitable source of calcium for bone restoration.
	Conditions of use - The shortest time of administration is 6 to 12 months.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
4311	Shells of Ostrea spp. /Crassastrea spp. (oyster shells) are rich source of calcium (calcium carbonates).	Bone health.	Oyster shells are a rich source of calcium that contributes to the maintenance of normal bone.
	Conditions of use - 1-1.2 g powder/jour.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
4312	Dolomite is a rich source of calcium $CaMg(CO_3)_2$	Bone health.	Dolomite is a rich source of calcium that contributes to the maintenance of normal bone.
	Conditions of use - 2,4 g powder/day		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
4703	yogurt-calcium	calcium is essential for growth	Yogurt is a natural source of calcium, indispensable for growth.
	Conditions of use - source of Calcium, as per the annex to Regulation CE 1924/2006.		

GLOSSARY AND ABBREVIATIONS

CI	Confidence interval
HDL	High-density lipoprotein
LDL	Low-density lipoprotein
PMS	Pre-menstrual symptoms
RCT	Randomised controlled trial
UL	Tolerable Upper Intake Levels