SCIENTIFIC OPINION

Scientific Opinion on the substantiation of health claims related to selenium and protection of DNA, proteins and lipids from oxidative damage (ID 277, 283, 286, 1289, 1290, 1291, 1293, 1751), function of the immune system (ID 278), thyroid function (ID 279, 282, 286, 1289, 1290, 1291, 1293), function of the heart and blood vessels (ID 280), prostate function (ID 284), cognitive function (ID 285) and spermatogenesis (ID 396) pursuant to Article 13(1) of Regulation (EC) No 1924/2006[1]

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

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 1924/2006. This opinion addresses the scientific substantiation of health claims in relation to selenium and the following claimed effects: protection of DNA, proteins and lipids from oxidative damage, function of the immune system, thyroid function, function of the heart and blood vessels, prostate function, cognitive function and spermatogenesis. 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 selenium, which is a well recognised nutrient and is measurable in foods by established methods. The Panel considers that selenium is sufficiently characterised.

The Panel concludes that a cause and effect relationship has been established between the dietary intake of selenium and protection of DNA, proteins and lipids from oxidative damage, normal function of the immune system, normal thyroid function and normal spermatogenesis.

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1 On request from the European Commission, Question No EFSA-Q-2008-1064, EFSA-Q-2008-1065, EFSA-Q-2008-1066, EFSA-Q-2008-1067, EFSA-Q-2008-1069, EFSA-Q-2008-1070, EFSA-Q-2008-1071, EFSA-Q-2008-1072, EFSA-Q-2008-1073, EFSA-Q-2008-1183, EFSA-Q-2008-2027, EFSA-Q-2008-2028, EFSA-Q-2008-2029, EFSA-Q-2008-2031, EFSA-Q-2008-2484 adopted on 02 July 2009.

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The evidence provided does not establish that inadequate intake of selenium leading to impaired function of the above mentioned health relationships occurs in the general EU population.

The Panel considers that, in order to bear the claims, a food should be at least a source of selenium as per Annex to Regulation 1924/2006. Such amounts can be easily consumed as part of a balanced diet. The target population is the general population.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of selenium and normal cognitive function or normal prostate function.

The evidence provided is insufficient to establish a cause and effect relationship between the dietary intake of selenium and normal function of the heart and blood vessels.

KEY WORDS

Selenium, minerals, antioxidant, immune system, iodine utilisation, thyroid hormone, prostate, cognitive, spermatogenesis, cardiovascular, health claims.

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The European Food Safety Authority wishes to thank for the preparation of this opinion:

The members of the Working Group on Claims: Jean-Louis Bresson, Albert Flynn, Marina Heinonen, Hannu Korhonen, Martinus Løvik, Ambroise Martin, Hildegard Przyrembel, Seppo Salminen, Sean (J.J.) Strain, Inge Tetens, Henk van den Berg, 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, Henk van den Berg.

INFORMATION AS PROVIDED IN THE CONSOLIDATED LIST

The consolidated list of health claims pursuant to Article 13 of Regulation (EC) No 1924/2006[3] submitted by Member States contains main entry claims with corresponding conditions of use and literature from similar health claims. The information provided in the consolidated list for the health claims subject to 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 selenium, which is a well recognised nutrient and is measurable in foods by established methods.

Selenium occurs naturally in foods and is authorised for addition to foods and for use in food supplements (Annex I of the Regulation (EC) No 1925/2006[4] and Annex I of Directive 2002/46/EC[5]). This evaluation applies to selenium naturally present in foods and to 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, selenium, which is the subject of the health claims is sufficiently characterised.

2. Relevance of the claimed effect to human health

2.1. Protection of DNA, proteins and lipids from oxidative damage (ID 277, 283, 286, 1289, 1290, 1291, 1293, 1751)

The claimed effects are "protection of body tissues and cells from oxidative damage/stress", "antioxidant activity" and "aging". The Panel assumes that the target population is the general population.

Reactive oxygen species (ROS) including several kinds of radicals are generated in biochemical processes (e.g. respiratory chain) and as a consequence of exposure to exogenous factors (e.g. radiation, pollutants). These reactive intermediates damage biologically relevant molecules such as DNA, proteins and lipids if they are not intercepted by the antioxidant network which includes free radical scavengers like antioxidant nutrients.

No definition has been provided of what constitutes "aging", and therefore the Panel cannot evaluate the "anti-aging effects" implied in claim ID 283. Also, the difference should be noted between the ageing process itself and the increasing risk for specific age-related diseases where oxidative and/or free radical-mediated damage may play a role.

The Panel considers that the protection of biologically relevant molecules such as DNA, proteins and lipids from oxidative damage is beneficial to human health.

[3] 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.
[4] 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.
[5] 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. Function of the immune system (ID 278)

The claimed effects are "immune system" and "normal immune function". The Panel assumes that the target population is the general population.

The Panel considers that normal function of the immune system is beneficial to human health.

2.3. Thyroid function (ID 279, 282, 286, 1289, 1290, 1291, 1293)

The claimed effects are "thyroid function", "iodine utilisation", "thyroid hormone production" and "normal thyroid hormone metabolism". The Panel assumes that the target population is the general population.

The Panel considers that normal thyroid function is beneficial to human health.

2.4. Function of the heart and blood vessels (ID 280)

The claimed effects are "normal cardiovascular function" and "cardiovascular health". The Panel assumes that the target population is the general population.

Cardiovascular health has not been defined in the consolidated list and is interpreted by the Panel as function of the heart and blood vessels in order to allow a scientific evaluation.

The Panel considers that normal function of the heart and blood vessels is beneficial to human health.

2.5. Prostate function (ID 284)

The claimed effect is "prostate health". The Panel assumes that the target population is the general male population.

The Panel considers that normal prostate function is beneficial to human health.

2.6. Cognitive function (ID 285)

The claimed effect is "brain health". The Panel assumes that the target population is the general population.

Brain health has not been sufficiently defined in the list and is interpreted by the Panel as cognitive function in order to allow a scientific evaluation.

The Panel considers that normal cognitive function is beneficial to human health

2.7. Spermatogenesis (ID 396)

The claimed effect is "spermatogenesis". The Panel assumes that the target population is the general male population.

The Panel considers that normal spermatogenesis is beneficial to human health.

3. Scientific substantiation of the claimed effect

Selenium is an essential trace element. Twenty-five selenoprotein genes have been identified in the human genome (Kryukov et al., 2003). Selenoproteins have a number of functions, comprising various catalytic roles (glutathione peroxidases, thioredoxin reductases, and iodothyronine

deiodinases), structural roles, detoxifying functions (e.g. selenoprotein P) and storage and transport activities. Selenium is present in foods mainly as selenomethionine and selenocysteine. It is absorbed efficiently by the intestine over a wide range of concentrations and across a variety of different molecular forms (Bates, 2005).

3.1. Protection of DNA, proteins and lipids from oxidative damage (ID 277, 283, 286, 1289, 1290, 1291, 1293, 1751)

The role of selenium as an indirect component of the antioxidant network is well established. This defence system comprises low molecular weight antioxidants and antioxidant enzymes like glutathione peroxidases which catalyse the reduction of hydrogen peroxide or organic hydroperoxides using reduced glutathione as a co-substrate (Papp et al., 2007). These enzymes and other selenoenzymes, such as the thioredoxin reductases, which are also involved in antioxidant defence are selenium-dependent and can respond to selenium supplementation.

The Panel concludes that a cause and effect relationship has been established between the dietary intake of selenium and the protection of DNA, proteins and lipids from oxidative damage. However, the evidence provided does not establish that inadequate intake of selenium leading to impaired protection of DNA, proteins and lipids from oxidative damage occurs in the general EU population.

3.2. Function of the immune system (ID 278)

Selenium appears to play a role in cell-mediated immunity. Human supplementation with selenium was able to stimulate the proliferation of activated T cells of the immune system. It elicited an enhanced response to antigen stimulation, an enhanced ability to generate cytotoxic lymphocytes, an enhanced ability to destroy tumour cells, and increased natural killer cell activity. Growth-regulatory interleukin-2 receptors on the surface of activated lymphocytes and natural killer cells became upregulated (Bates, 2005).

The Panel concludes that a cause and effect relationship has been established between the dietary intake of selenium and normal function of the immune system. However, the evidence provided does not establish that inadequate intake of selenium leading to impaired function of the immune system occurs in the general EU population.

3.3. Thyroid function (ID 279, 282, 286, 1289, 1290, 1291, 1293)

Deiodination is a pathway of thyroid hormone metabolism implicated in activation and deactivation of thyroid hormones. The metabolism is catalysed by three iodothyronine deiodinases (D1-3) which are homologous selenoproteins. In humans the enzymes are found in various tissues; D1 and D2 but not D3 also occur in the thyroid gland (Kuiper et al., 2005). Thus, the known biological functions of selenium include regulation of thyroid hormone action. 2005).

The Panel concludes that a cause and effect relationship has been established between the dietary intake of selenium and normal thyroid function. However, the evidence provided does not establish that inadequate intake of selenium leading to impaired thyroid function occurs in the general EU population.

3.4. Function of the heart and blood vessels (ID 280)

A total of nine references were provided in the consolidated list to support this claim. These included six reviews, one opinion from a scientific body, one textbook and one human study.

Selenium deficiency has been found to play a role in Keshan disease, an endemic cardiomyopathy, postulated to have a mutated coxsackie B virus also as part of its aetiology and which particularly affects children and women of child-bearing age in China. The acute form is characterised by sudden onset of insufficient heart function, whereas patients with chronic disease exhibit moderate to severe heart enlargement with varying degrees of heart insufficiency (Burk and Levander, 2006). However, selenium supplements were not able to restore the ultrastructural changes in the myocardium of latent Keshan disease patients and new latent and naturally-occurring chronic cases were found in the endemic area even after selenium status had been elevated. Thus, selenium might be a conditional predisposing factor for the occurrence of Keshan disease (Xu et al., 1997).

Flores-Mateo et al. (2006) performed a meta-analysis on the association of selenium biomarkers with coronary heart disease endpoints and reported that few randomised trials have addressed the cardiovascular efficacy of selenium supplementation, and, moreover, that the findings from these trials are inconclusive.

The Panel concludes that the evidence provided is insufficient to establish a cause and effect relationship between the dietary intake of selenium and normal function of the heart and blood vessels.

3.5. Prostate function (ID 284)

A total of 11 references were provided in the consolidated list to support this claim. These included four reviews, one opinion from a scientific body, three human studies and three *in vitro* studies.

Nine references provided in the consolidated list dealt with selenium as a potential chemopreventive agent against prostate cancer. Two references were concerned with the general requirements of selenium in human nutrition. It has been suggested that selenium may have chemoprotective effects that are mediated through the antioxidant properties of selenoenzymes (Peters et al., 2007). However, expert reviews of the evidence show that there is no consensus about the role of selenium in prostate cancer prevention (Burk and Levander, 2006; Combs, 2005; Gupta, 2007; Thomson, 2004). A recent large randomised placebo-controlled trial in men aged ≥ 50 years (n=35,533) showed that daily supplementation with selenium (200 µg) had no significant effect on risk of development of prostate cancer over three years with a median overall follow-up of 5.5 years (Lippman et al., 2009).

In weighing the evidence, the Panel took into account that the evidence provided by expert reviews shows that there is no consensus about the role of selenium in prostate cancer prevention and that a recent large randomized controlled trial in men aged ≥ 50 years showed no significant effect of selenium on risk of development of prostate cancer over three years with a median overall follow-up of 5.5 years.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of selenium and normal prostate function.

3.6. Cognitive function (ID 285)

A total of 11 references were provided in the consolidated list to support this claim. These included five reviews, one opinion from a scientific body, two animal studies and three *in vitro* studies.

Selenium is particularly well maintained in the brain, even upon prolonged dietary selenium deficiency. The preferential retention of selenium was suggested to reflect important functions of selenium in the brain. Changes in selenium concentration in blood and brain have been reported in Alzheimer's disease and brain tumors. Several selenoproteins are expressed in the brain, but many questions remain about their roles in neuronal function. Genetic inactivation of selenoprotein P in mice leads to a marked reduction of brain selenium content, and to a movement disorder and

spontaneous seizures (Chen and Berry, 2003; Schweizer et al., 2004). A protective role of selenium against cerebral ischaemia-induced neuronal damage has been reported in two animal studies (Ansari et al., 2004; Yousuf et al., 2007). Two *in vitro* studies reported an involvement of selenium in the protection of neuronal cells from oxidative damage; another *in vitro* study examined the antimigratory role of selenium on microglial cells, possibly attenuating the secondary cell death cascade after stroke or excitotoxicity (Dalla Puppa et al., 2007).

Selenium deficiency has been well documented in humans. Impairment in neurological function is not among the established signs and symptoms of selenium deficiency described in humans (Burk and Levander, 2006). No evidence has been provided on the effects of selenium supplementation on cognitive or neurological function.

The Panel concludes that a cause and effect relationship has not been established between the dietary intake of selenium and cognitive function.

3.7. Spermatogenesis (ID 396)

The sperm mitochondrial capsule selenoprotein has a structural as well as an enzymatic role, and it is responsible for both the maintenance of motility and the structural integrity of the tail of the sperm. Both human and other mammals exhibit reduced sperm motility and increased sperm rupture under conditions of low selenium supply (Bates, 2005).

The Panel concludes that a cause and effect relationship has been established between the dietary intake of selenium and normal spermatogenesis. However, the evidence provided does not establish that inadequate intake of selenium leading to impaired spermatogenesis occurs in the general EU population.

4. Panel's comments on the proposed wordings

4.1. Protection of DNA, proteins and lipids from oxidative damage (ID 277, 283, 286, 1289, 1290, 1291, 1293, 1751)

The Panel considers that the following wording reflects the scientific evidence: "selenium contributes to the protection of cell constituents from oxidative damage".

4.2. Function of the immune system (ID 278)

The Panel considers that the following wording reflects the scientific evidence: "selenium contributes to the normal function of the immune system".

4.3. Thyroid function (ID 279, 282, 286, 1289, 1290, 1291, 1293)

The Panel considers that the following wording reflects the scientific evidence: "selenium contributes to normal thyroid function".

4.4. Spermatogenesis (ID 396)

The Panel considers that the following wording reflects the scientific evidence: "selenium contributes to normal spermatogenesis".

5. 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 selenium 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. Tolerable Upper Intake Levels (UL) have been established as 300 µg/day for adults and for pregnant and lactating woman. For children and adolescents UL were established as 60 µg/day for 1-3 years, 90 µg/day for 4-6 years, 130 µg/day for 7-10 years, 200 µg/day for 11-14 years and 250 µg/day for 15-17 years (SCF, 2000).

CONCLUSIONS

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

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

Protection of DNA, proteins and lipids from oxidative damage (ID 277, 283, 286, 1289, 1290, 1291, 1293, 1751)

- The claimed effects are "protection of body tissues and cells from oxidative damage/stress", "antioxidant activity" and "aging". The target population is assumed to be the general population. The protection of DNA, proteins and lipids from oxidative damage is beneficial to human health.

- A cause and effect relationship has been established between the dietary intake of selenium and the protection of DNA, proteins and lipids from oxidative damage.

- The evidence provided does not establish that inadequate intake of selenium leading to impaired protection of DNA, proteins and lipids from oxidative damage occurs in the general EU population.

- The following wording reflects the scientific evidence: "selenium contributes to the protection of body cell constituents from oxidative damage".

Function of the immune system (ID 278)

- The claimed effects are "immune system" and "normal immune function". The target population is assumed to be the general population. Normal function of the immune system is beneficial to human health.

- A cause and effect relationship has been established between the dietary intake of selenium and normal function of the immune system.

- The evidence provided does not establish that inadequate intake of selenium leading to impaired function of the immune system occurs in the general EU population.

- The following wording reflects the scientific evidence: "selenium contributes to the normal function of the immune system".

Thyroid function (ID 279, 282, 286, 1289, 1290, 1291, 1293)

- The claimed effects are "thyroid function", "iodine utilisation", "thyroid hormone production", "normal thyroid hormone metabolism". The target population is assumed to be the general population. Normal thyroid function is beneficial to human health.

- A cause and effect relationship has been established between the dietary intake of selenium and normal thyroid function.
- The evidence provided does not establish that inadequate intake of selenium leading to impaired thyroid function occurs in the general EU population.
- The following wording reflects the scientific evidence: "selenium contributes to normal thyroid function".

Function of the heart and blood vessels (ID 280)

- The claimed effects are "normal cardiovascular function" and "cardiovascular health". The target population is assumed to be the general population. Normal function of the heart and blood vessels is beneficial to human health.
- The evidence provided is insufficient to establish a cause and effect relationship between the dietary intake of selenium and normal function of the heart and blood vessels.

Prostate function (ID 284)

- The claimed effect is "prostate health". The target population is assumed to be the general male population. Normal prostate function is beneficial to human health.
- A cause and effect relationship has not been established between the dietary intake of selenium and normal prostate function.

Cognitive function (ID 285)

- The claimed effect is "brain health". The target population is assumed to be the general population. Normal cognitive function is beneficial to human health.
- A cause and effect relationship has not been established between the dietary intake of selenium and normal cognitive function.

Spermatogenesis (ID 396)

- The claimed effect is "spermatogenesis". The target population is assumed to be the general male population. Normal spermatogenesis is beneficial to human health.
- A cause and effect relationship has been established between the dietary intake of selenium and normal spermatogenesis.
- The evidence provided does not establish that inadequate intake of selenium leading to impaired spermatogenesis occurs in the general EU population.
- The following wording reflects the scientific evidence: "selenium contributes to normal spermatogenesis".

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 selenium 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-2008-1064, EFSA-Q-2008-1065, EFSA-Q-2008-1066, EFSA-Q-2008-1067, EFSA-Q-2008-1069, EFSA-Q-2008-1070, EFSA-Q-2008-1071, EFSA-Q-2008-1072, EFSA-Q-2008-1073, EFSA-Q-2008-1183, EFSA-Q-2008-2027, EFSA-Q-2008-2028, EFSA-Q-2008-2029, EFSA-Q-2008-2031, EFSA-Q-2008-2484). The scientific substantiation is based on the information provided by the Members 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 DISCAIMER

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 selenium, including conditions of use from similar claims, as proposed in the Consolidated List.

ID	Food or Food component	Health Relationship	Proposed wording
277	Selenium	Protection of body tissues and cells from oxidative damage; Antioxidant activity, Normal antioxidant activity.	- Selenium is necessary for cells protection - Selenium helps scavenging free radicals
	Conditions of use - Must at least be a source of minerals as per annex to Regulation 1924/2006 - Adolescents, adults 5-15 µg, UL 25 µg - Adolescents, adults 20-50 µg, UL 100 µg - Adolescents, adults 20 µg - Adults 55 µg, at least 6 µg / 100g / 100 ml - sportsmen - Guidance level is 350 µg/day or less from supplements (FSA). Intakes greater than 900mcg/day may cause toxicity (FSA). - 15 % American RDA for adults per 100 µg, Applicable to both children and adults - 20 – 80 µg - Food supplement with 50-100 µg of selenium in the daily dose - Quantity in Average daily serving: 65 µg selenium - Daily amount to be consumed to produce claimed effect: 65 microgram(s) - Length of time after consumption for claimed effect to become apparent: habitual intake - 30 – 70 µg / d—adults - 100 µg pro Tag - Selenium yeast, selenium salts		
ID	**Food or Food component**	**Health Relationship**	**Proposed wording**
278	Selenium	Immune system and normal immune function	- Selenium is necessary for the function of the immune system.
	Conditions of use - Must at least be a source of minerals as per annex to Regulation 1924/2006 - Applicable to both children and adults 20 - 80 µg - Food supplement with 50-100 µg of selenium in the daily dose - At least 15% RDA per 100 g or 100 ml or per portion according to 90/496/EWG - Adolescents, adults 20 bis 50 µg; UL 100 µg - Adults 55 µg, at least 6 µg / 100 g / 100 ml - Adults 595-1188 mg, period of consumption 14-30d, UL 1188 mg		

ID	Food or Food component	Health Relationship	Proposed wording
279	Selenium	Iodine utilisation/thyroid hormone production/ normal thyroid hormone metabolism	- Selenium is needed by the body to use iodine in the production of thyroid hormones
	Conditions of use - Adolescents, adults 20 bis 50 µg; UL 100 µg - Must at least be a source of minerals as per annex to Regulation 1924/2006 - 20 - 80 µg		
ID	**Food or Food component**	**Health Relationship**	**Proposed wording**
280	Selenium	Normal cardiovascular function/cardiovascular health	- Selenium is necessary for normal cardiovascular function.
	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 - Food supplement with 50-100 µg of selenium in the daily dose		
ID	**Food or Food component**	**Health Relationship**	**Proposed wording**
282	Selenium	Thyroid function	- Selenium is essential for the production of active thyroid hormone [and/or] the healthy functioning of the thyroid gland.
	Conditions of use - The RNI of selenium (UK) is 75 µg daily for men and 60 µg daily for women. - Selenium is potentially toxic, the maximum recommended dose daily is 350 µg. - The study referenced involving autoimmune thyroid patients got results with a dose of 200 µg. - 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.		
ID	**Food or Food component**	**Health Relationship**	**Proposed wording**
283	Selenium	Antioxidants and aging	- Antioxidant vitamins and minerals act against age-accelerating free radicals
	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.		
ID	**Food or Food component**	**Health Relationship**	**Proposed wording**
284	Selenium	Prostate Health	- Selenium for a healthy prostate - Selenium is beneficial for prostate health
	Conditions of use - 30-50 µg selenium		

	- 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.		
ID	**Food or Food component**	**Health Relationship**	**Proposed wording**
285	Selenium	Brain Health	- Selenium supports better brain functioning
	Conditions of use - 0 -50 µg selenium - 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.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
286	Selenium in Eggs and Egg Products Selenium in Milk and Dairy Products Selenium in Meat & Meat products	Antioxidant to prevent oxidative stress, Proper thyroid function, Maintenance of cellular redox status	- Selenium is an essential trace element involved in the development and maintenance of immuno-competence, thyroid function and as an antioxidant to prevent oxidative stress in living tissues. - Selenium-Enriched* - Sel-Plex Inside* - Contains x micrograms Se/100
	Conditions of use - The product must state that the source of selenium-enrichment is via the animal's feed, and is by means of an approved source of organic selenium (e.g. selenomethionine and other organic selenium molecules from an approved selenium yeast). - 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. - Selenium-Enriched* - "Sel-Plex Inside"* - Contains x µg Se/100 g		
ID	**Food or Food component**	**Health Relationship**	**Proposed wording**
396	Selenium	Spermatogenesis	- Selenium positively influences fecundity in men
	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. - Supplementation for 8 weeks		

ID	Food or Food constituent	Health Relationship	Proposed wording
1289	Beef and beef products	Antioxidant to prevent oxidative stress, Proper thyroid function, Maintenance of cellular redox status	- Selenium is an essential trace element involved in the development and maintenance of immuno-competence, thyroid function and as an antioxidant to prevent oxidative stress in living tissues. - Selenium-Enriched* - Sel-Plex Inside* - Contains x micrograms Se/100 g (*by feeding animals the approved selenium yeast, Sel-Plex®)
	Conditions of use - Selenium to be present at a significant amount linked to the newly agreed reference intake value.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
1290	Chicken and chicken products	Antioxidant to prevent oxidative stress, Proper thyroid function Maintenance of cellular redox status	- The product must state that the source of selenium-enrichment is via the animal's feed, and is by means of an approved source of organic selenium (e.g. selenomethionine and other organic selenium molecules from an approved selenium yeast). - Selenium is an essential trace element involved in the development and maintenance of immuno-competence, thyroid function and as an antioxidant to prevent oxidative stress in living tissues. - Selenium-Enriched* - Sel-Plex Inside* - Contains x micrograms Se/100 g (*by feeding animals the approved selenium yeast, Sel-Plex®)
	Conditions of use - Selenium to be present at a significant amount linked to the newly agreed reference intake value.		

ID	Food or Food constituent	Health Relationship	Proposed wording
1291	Egg and egg products	Antioxidant to prevent oxidative stress, Proper thyroid function, Maintenance of cellular redox status	- The product must state that the source of selenium-enrichment is via the animal's feed, and is by means of an approved source of organic selenium (e.g. selenomethionine and other organic selenium molecules from an approved selenium yeast). - Selenium is an essential trace element involved in the development and maintenance of immuno-competence, thyroid function and as an antioxidant to prevent oxidative stress in living tissues. - Selenium-Enriched* - Sel-Plex Inside* - Contains x micrograms Se/100 g (*by feeding animals the approved selenium yeast, Sel-Plex®)
	Conditions of use - Selenium to be present at a significant amount linked to the newly agreed reference intake value.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
1293	Pork and related products	Antioxidant to prevent oxidative stress, Proper thyroid function, Maintenance of cellular redox status	- Selenium is an essential trace element involved in the development and maintenance of immunocompetence, thyroid function and as an antioxidant to prevent oxidative stress in living tissues. - Selenium-Enriched* - Sel-Plex Inside* - Contains x micrograms Se/100 g (*by feeding animals the approved selenium yeast, Sel-Plex®)
	Conditions of use - Selenium to be present at a significant amount linked to the newly agreed reference intake value.		
ID	**Food or Food constituent**	**Health Relationship**	**Proposed wording**
1751	Selenomethionine enriched Saccharomyces cerevisiae ATY-SC-107	Protection of body tissues and cells from oxidative damage	- Selenomethionine contributes to cell protection from oxidation caused by free radicals
	Conditions of use - 55 µg Se/day		

GLOSSARY / ABBREVIATIONS

UL Tolerable Upper Intake Levels