

Maisons-Alfort, 10 July 2008

OPINION

of the French Food Safety Agency (AFSSA) regarding the assessment of the vitamin D and magnesium enrichment of a soy-based drink presented as being intended for postmenopausal women and related claims

On 23 June 2003, the Directorate General for Competition Policy, Consumer Affairs and Fraud Control (DGCCRF) requested by letter dated 21 June 2003, that the French Food Safety Agency (AFSSA) assess the vitamin D and magnesium enrichment of a soy-based drink presented as being intended for post-menopausal women and analyse the claims relating to this enrichment. After consulting the Scientific Panel on Human Nutrition, which met on 24 November 2005 and 19 June 2007, AFSSA is issuing the following opinion:

The request concerns the vitamin D and magnesium enrichment of a soy-based drink containing calcium. The product contains, for 100 mL: 3.7 g protein, 2.5 g carbohydrates, 2.2 g fat (including 0.4 g saturated fatty acids), 0.6 g fibre, 0.06 g sodium, 120 mg calcium, from calcareous *Lithothamnion sp.* (15% of Recommended Daily Allowance or RDA), 1 µg vitamin D₂ (20% of RDA) and 51 mg magnesium (17% of RDA). It has 45.8 kcal or 192.2 KJ. The petitioner proposes a daily consumption of 200 mL. The product is presented as a health food product that is meant to be part of a special diet specifically tailored to the needs of postmenopausal women. The petitioner is making the following claims:

- "A soy-based health drink, a natural source of calcium and rich in protein, enriched with magnesium and vitamin D, particularly suitable for the needs of postmenopausal women";
- "One glass (200 mL) of the drink [...] contains 1/3 of the Recommended Daily Allowances of calcium and magnesium, and 40% of the Recommended Daily Allowance of vitamin D";
- "Low in saturated fat";
- "Lactose-free, cholesterol-free";
- "Soy is naturally rich in plant protein: satisfactory amounts of the 8 amino acids that the body cannot synthesize are present in soy protein";
- "Calcium and vitamin D participate in bone accrual";
- "Magnesium is a major component of bone";
- "Calcium, magnesium and vitamin D play a role in preserving bone mass";
- "Recent nutrition surveys (SU.VI.MAX in particular) have shown that post-menopausal women consume, on average, less than the recommended amounts of calcium, magnesium and vitamin D. This soy-based drink contains these three nutrients and thus contributes to post-menopausal women's daily dietary intake";
- "beauty food: soy-magnesium-vitamin D".

The DGCCRF is requesting AFSSA's opinion on the following points:

- do postmenopausal women present "special physiological conditions that can benefit specifically from the controlled consumption of certain substances in foods"?
- is vitamin D and magnesium enrichment justified for this population?
- does vitamin D and magnesium enrichment present risks for the general population?
- are the claims present on the label and in the application, regarding the maintenance of strong bones, justified?
- are the claims listed on the label and made in the application, regarding calcium, magnesium and vitamin D deficiencies in post-menopausal women, justified?
- are the claims present on the label, regarding the quality of soy protein, justified?

Assessment framework:

AFSSA considers that food for particular nutritional uses must satisfy the nutritional needs of a target population. It is not meant for other populations. Food intended for particular nutritional uses must fulfil the following condition: it is tailored to a specific population whose nutritional needs are not met by the vitamins, minerals and other substances found in a normal diet or who run a health-related risk (AFSSA, 2008).

According to current knowledge, women over the age of 55 are at risk for having an inadequate intake of calcium and magnesium (AFSSA, 2004 a). Calcium needs are higher after menopause, and inadequate intake decreases bone mineralisation and increases the risk of fractures (Dawson-Hugues, 1998; Flynn, 2003). It is therefore important to make sure that the calcium intake of post-menopausal women is close to the recommended intake for this population (Cynober et al., 2001). However, the nutritional needs of post-menopausal women can be met by a standard diet. Calcium supplements are not recommended for women whose spontaneous calcium intake is close to the recommended intake. In this case, calcium supplements have no beneficial effect on fracture risk and could increase the risk of urolithiasis (Jackson *et al.*, 2006).

AFSSA therefore considers that post-menopausal women are not a target population for food intended for particular nutritional uses.

The product proposed by the petitioner will therefore be assessed as an enriched standard food product, in accordance with the provisions stipulated in the regulation of the European Parliament and Council of 20 December 2006 on the addition of vitamins, minerals and certain other substances to foods.

Regarding enrichment

AFSSA's report regarding enrichment (AFSSA, 2004a) proposes a methodology that may be used to verify, firstly, that enrichment has nutritional advantages and, secondly, that it does not present a risk for the individuals who are likely to consume the enriched food. Verification of the relevance of the nutrient-food vehicle pair includes three phases:

- i) identification of the at-risk populations for each nutrient;
- ii) assessment of the choice of food vehicle;
- iii) determination of the enrichment level to guarantee the safety and utility of enrichment for a nutrient-food vehicle pair.

Identification of at-risk populations

Females over the age of 10 and males over the age of 15 are at risk for inadequate magnesium intake (AFSSA, 2004a). This risk is higher in adolescents than in post-menopausal women, the confidence intervals for the prevalence of inadequate intake being [86%-97%] among 15-19-year-old females and [73%-84%] in women over 55. Magnesium enrichment therefore is beneficial for the entire female population over the age of 10 and for the entire male population over the age of 15.

The petitioner states that inadequate intake of vitamin D in post-menopausal women has been demonstrated in several French nutritional surveys (Lemoine *et al.*, 1986; Guillard *et al.*, 1986; Van der Wielen *et al.*, 1995; Chapuy *et al.*, 1997; Volatier, 2000). These data however are not admissible, either because of the reference values used (RDA of 10 µg/d instead of 5 µg/d since 2001) or because of the ages of the women surveyed (35 to 60 years in the Su.Vi.Max survey, 18 to 75 years in the INCA survey and over 70 years in the survey published by Van der Wielen *et al.* 1995).

Females aged 10 to 19, women over the age of 55 and men over the age of 65 are populations at risk for inadequate calcium intake (AFSSA, 2004a). Confidence intervals for the prevalence of inadequate intake are as follows: [66%-79%] for young women aged 10 to 19, [60%-73%] for women over the age of 55 and [56%-74%] for men over the age of 65.

Choice of food vehicle

Soy drinks are an alternative to dairy products in populations who do not consume dairy for reasons such as lactose intolerance, allergies to cow's milk proteins or taste preferences.

Safety of enrichment

Soy milk is obtained from soybean seeds that have been soaked, ground and heat-treated. The production process is briefly described, and data relative to packaging and shelf life are provided. However, the technical data provided by the petitioner are incomplete, particularly concerning the source of the raw material, soy extraction techniques, heat treatments, phytate levels, the absence of genetically modified organisms, the absence of organochlorine and organophosphorous derivatives and pyrethroids and levels of heavy metals and mycotoxins.

Information about the process used to obtain soy milk is also unsatisfactory to assess the risk of cancer (particularly breast cancer) associated with the consumption of the product. Studies have shown that this process influences the composition of the extracted product and its anti- or pro-oestrogenic properties, with an impact on the proliferation of transplanted MCF-7 tumour cells in ovariectomized mice (Galati *et al.*, 2004; Allred *et al.*, 2004).

The product's phytoestrogen content is not specified. According to AFSSA (2005), little information is available on the long-term consequences of phytoestrogen consumption in children under 3, in women with a personal or family history of breast cancer and in pregnant women. AFSSA (2005) recommends that the label should indicate the amount of isoflavones in the final product, in the form of aglycone equivalents, in addition to information concerning the maximum consumption of aglycone isoflavones (1 mg/kg body weight/d) and at-risk populations (women with a history of breast cancer and children under 3).

Enrichment levels

According to the petitioner, one 200 mL glass of the product would contain: 240 mg calcium (30% of RDA), 102 mg magnesium (34% of RDA) and 2 µg vitamin D₂ (40% of RDA). However, no data are provided regarding the tests conducted to verify the calcium, magnesium and vitamin C content of the final product. The calcium and vitamin D levels given by the petitioner correspond to the levels authorised in other soy drinks (AFSSA, 2004b).

However, the product's label should indicate that it should not be consumed in combination with large amounts of dairy products, so as to avoid the risk of exceeding the safety limits, particularly among individuals who consume large amounts of vitamin D.

The levels of vitamin D, calcium and magnesium per 200 mL of the product, as given by the petitioner, are significantly lower than the European safety limits (50 µg/d for vitamin D, 2 500 mg/d for calcium and 250 mg for magnesium). Consuming one glass of the soy drink per day would present no risk of toxicity in the target population nor in the general population. However, the label states "[...] may be consumed at any time of day, hot or cold, with cereal, plain or flavoured. It may be used in all recipes in the place of milk", which is in contradiction with the daily consumption recommended by the petitioner in the application (200 mL) and based on which the petitioner has justified his claims.

The consumption recommendations appearing on the label should be consistent with those used to justify the product's advantages.

Concerning the target population:

The product targets "post-menopausal women", represented, according to the petitioner, by women over the age of 50. The petitioner states that simultaneous calcium, magnesium and vitamin D enrichment has advantages for this target group, given its inadequate intake of these three nutrients and their effects on bone mineralisation. However, AFSSA considers that post-menopausal women are not the target population. AFSSA considers that this drink presents advantages for populations who replace milk and dairy products with soy-based products.

Moreover, the target population also evokes the ambiguity of the soy/menopause association, which implies that soy has a positive isoflavone-related impact on menopause-related symptoms, an impact which has not yet been scientifically demonstrated to date (AFSSA, 2005).

Assessment of the claims:

The functional claim “Calcium and vitamin D participate in bone accrual” is consistent with the list presented in the annex to CEDAP’s opinion (1996).

The claims “Magnesium is a major component of bone” and “Calcium, magnesium and vitamin D play a role in preserving bone mass” are admissible as statements of properties, which are justified for the general population.

The nutrition claims “a natural source of calcium and rich in protein, enriched with magnesium and vitamin D, particularly tailored to the needs of post-menopausal women”; “One glass (200 mL) of the drink [...] contains 1/3 of the Recommended Daily Allowances of calcium and magnesium, and 40% of the Recommended Daily Allowances of vitamin D”; “Low in saturated fat”; “Lactose-free, cholesterol-free” are justified under the annex to Regulation (EC) No. 1924/2006 concerning nutrition and health claims made on foods which defines nutrition claims and their terms of application. However, given that the product may not be considered as a food intended for particular nutritional uses, the statement “health beverage” may not be used.

The claim relative to the quality of soy protein is justified, but its wording risks being misunderstood by consumers. This claim indicates that “[...] satisfactory amounts of the 8 amino acids that the body cannot synthesize are present [...]”, whereas there are 9 essential amino acids. The claim should therefore specify “8 of the 9 amino acids”.

The petitioner provides no information that may be used to assess the merit of the claim “Beauty food: soy-magnesium-vitamin D”. This claim is therefore not admissible.

Due to the lack of information concerning the origin of, the quality of and the process used to obtain the soy that is used as a raw material, AFSSA considers it is impossible to rule on the safety of consuming the drink.

AFSSA considers that the soy drink’s vitamin D and magnesium enrichment does not present risks for consumers. Moreover, the presence of calcium, vitamin D and magnesium in the drink presents advantages for consumers who replace milk and dairy products with other soy-based products. The population targeted by the petitioner is therefore not appropriate.

AFSSA considers that, subject to this reservation, the nutritional claims proposed by the petitioner for the label are admissible, while emphasizing that the calcium present in the drink comes from a calcareous algae (*Lithothamnion sp.*) and is not a “natural” component of soy.

The functional claims, regarding the preservation of bone mass, are admissible as statements of properties justified for the entire population and give no indication of the effects of consuming the product.

The claim “beauty food: soy-magnesium-vitamin D” is not justified.

Lastly, AFSSA considers that the product’s label should indicate that “this product should not be consumed in combination with large amounts of products rich in or enriched with vitamin D”; and that it should include the level of isoflavones in the product in “aglycone equivalents” and AFSSA’s labelling recommendations: “limit daily consumption to 1 mg of isoflavones/kg bodyweight. Not recommended for children under 3 or women with a personal or family history of breast cancer”.

Bibliography:

AFSSA (2004a) « Cahier des charges pour le choix d’un couple Nutriment-Aliment vecteur ». Saisine n° 2000-SA-0239, février 2004. <http://www.afssa.fr>

AFSSA (2004b) « Avis de l’Agence de sécurité sanitaire des aliments relatif à l’évaluation des justificatif concernant l’emploi de vitamine D dans la fabrication de tonyus destinés à l’alimentation courante », 15 juillet 2004, saisine n°2004-SA-0100.

AFSSA (2005) « Sécurité et bénéfices des phyto-estrogènes apportés par l’alimentation – Recommandations », mars 2005. <http://www.afssa.fr>

AFSSA (2008) « Avis de l’Agence française de sécurité sanitaire des aliments relatif à l’identification des populations concernées par l’alimentation particulière : définition, identification des populations concernées par l’alimentation particulière et démarche d’évaluation », 2008 Saisine n°2006-SA-0237. <http://www.afssa.fr>

Arrêté du 11 octobre 2001 relatif à l’emploi de vitamine D dans le lait et les produits laitiers frais (yaourt et laits fermentés, fromages frais) de consommation courante. J.O n° 243 du 19 octobre 2001.

Cedap (1996) Avis n°15 du 18 décembre 1996 sur les recommandations relatives au caractère non trompeur des allégations nutritionnelles fonctionnelles.

- Chapuy MC., Preziosi P., Maamer M., Arnaud S., Galan P., Hercberg S., Meunier PJ. Prevalence of vitamin D insufficiency in an adult normal population. *Osteoporos Int.* 1997 ; 7 : 439-43.
- Cynober L., Alix E., Arnaud-Battandier F., Bonnefoy M., Brocker P., Cals MJ., Coplo C., Ferry M., Ghisolfi-Marque A., Lesourd B., Mignot C., Patureau Mirand, P. Personnes âgées. *In Apports nutritionnels conseillés pour la population française.* Paris, coord. Martin A. Tec&Doc.
- Dawson-Hughes B. (1998) Vitamin D and calcium: recommended intake for bone health. *Osteoporosis International*; 8 Suppl 2: S30-S34
- Décret n° 91-287 du 29 août 1991 modifié relatif aux aliments destinés à une alimentation particulière.
- Flynn A. (2003) The role of dietary calcium in bone health. *Proc Nutr Soc*; 62:851-8
- Galati G., O'Brien PJ. (2005) Potential toxicity of flavonoids and other dietary phenolics: significance for their chemopreventive and anticancer properties. *Free Radic Biol Med.* 2004 Aug 1;37(3):287-303 ; Allred CD, Allred KF, Ju YH, Goepfing TS, Doerge DR, Helferich WG. Soy processing influences growth of estrogen-dependent breast cancer tumors. *Carcinogenesis.* 25(9):1649-57
- Guilland J.C., Boggio V., Mreau D., Kleping J. (1986) Evaluation de l'apport alimentaire vitaminique en Bourgogne (France). *Ann. Nutr. Metab.* 30 : 21-46.
- Jackson RD, LaCroix AZ, Gass M, Wallace RB, Robbins J, Lewis CE, Bassford T, Beresford SA, Black HR, Blanchette P, Bonds DE, Brunner RL, Brzyski RG, Caan B, Cauley JA, Chlebowski RT, Cummings SR, Granek I, Hays J, Heiss G, Hendrix SL, Howard BV, Hsia J, Hubbell FA, Johnson KC, Judd H, Kotchen JM, Kuller LH, Langer RD, Lasser NL, Limacher MC, Ludlam S, Manson JE, Margolis KL, McGowan J, Ockene JK, O'Sullivan MJ, Phillips L, Prentice RL, Sarto GE, Stefanick ML, Van Horn L, Wactawski-Wende J, Whitlock E, Anderson GL, Assaf AR, Barad D; Women's Health Initiative Investigators. (2006) Calcium plus vitamin D supplementation and the risk of fractures. *New Engl J Med.* 354: 669-83
- Lemoine A., Le Devehat C., Berberth B. (1986) ESVITAF. Enquêtes sur le statut vitaminique de 3 groupes d'adultes français, témoins, obèses et buveurs excessifs. *Ann. Nutr. Metab.* 30 : 1-94.
- Van der Wielen RP, Lowik MR, van den Berg H, de Groot LC, Haller J, Moreiras O, van Staveren WA. (1995) Serum vitamin D concentrations among elderly people in Europe. *Lancet.* 346(8969):207-10.
- Volatier J.L. (1999) Enquête individuelle et nationale sur les consommations alimentaires (INCA). Tec et Doc Lavoisier, Paris.

Keywords: Food intended for particular nutritional uses; normal diet; deficient/inadequate intake; women; phytoestrogens; isoflavone; calcium; vitamin D2/ergocalciferol; milk; dairy product; menopause; bone; soy.