

# VITAMIN A AND D FORTIFICATION OF MARGARINES AND FAT SPREADS ACROSS COUNTRIES OF THE EUROPEAN COMMUNITY

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## Introduction – Legislative Background

Margarine was initially developed in 1914 as an alternative to butter. In 1925 margarine was voluntarily fortified with vitamins A and D at levels equivalent to butter, a key source of these vitamins in the diet. Since 1940, certain Governments took action to safeguard their national nutritional status by making it compulsory to add vitamins A and D to margarine. In many of these countries for example the Netherlands and Finland, it is no longer possible to insist on mandatory fortification otherwise this would create barriers to trade. However, many countries voluntarily fortify margarine, reduced and low fat spreads with vitamins A and D (Table 1). Legislation on the fortification of margarine and fat spreads with vitamins A and D varies between member states of the European

**Table 1: Policies of EC member states on fortification of margarine and fat spreads**

Country	Vitamin A <sup>1</sup> (µg/100 g)	Vitamin D <sup>1</sup> (µg/100 g)	Rule for fortification of margarine
Austria	No limits	No limits	Not mandatory
Belgium	750-900	6.25-7.5	Mandatory
Denmark	840	Prohibited	Not mandatory
		Authorisation few cases	
Finland	500-1000	5-10	Not mandatory
France	300-1800	Prohibited	Not mandatory
Germany	1000	2.5	Not mandatory
Greece	750	3.75	Not mandatory
Ireland	No limit	No limit	Not mandatory
Italy	No limits/150% RDA per serving	No limits/150% RDA per serving	Not mandatory
Luxembourg	100% RDA per serving	100% RDA per serving	Not mandatory
Netherlands	600-800	5.6-7.5	Not mandatory but covenant agreed
Portugal	600	5	Not mandatory
Spain	No limits	No limits	Not mandatory
Sweden	900-1500	7.5-10	Mandatory
UK	800-1000	7.05-8.82	Mandatory in margarine

<sup>1</sup> Maximum level of fortification allowed; (IMACE, 2003)

level (UL) for adults of 3000 µg preformed vitamin A (SCF, 2002). In Britain, intakes at the 97.5 percentile of vitamin A are high compared with the UL. This is explained by high levels of vitamin A present in liver and kidney, which accounted for 58% of total vitamin A intake from food sources in British adults in 1986/7 (Gregory, 1990). With the removal of vitamin A from animal feed in the UK, vitamin A intakes have almost halved in the last decade (Gregory, 1990; Henderson, 2003).

## Vitamin D

Vitamin D is essential for calcium and phosphate absorption, for normal functioning of the nervous system, as well as for bone growth and maintenance of bone density. Low intake and status of vitamin D are risk factors for osteoporosis, a worldwide public health problem (IOF, 2001). The few foods that contain vitamin D include some fatty fish (herring, salmon, and sardines), fish liver oils, butter, margarine, fat spreads and eggs (Berg van den, 1997; Holick, 1999; Loveridge, 1994). In Europe, margarine and cereals are the main foods fortified with vitamin D (Holick et al, 1992).

**Table 3: Concentration of 25-hydroxyvitamin D and prevalence of low concentrations in European populations (SENECA study)**

	Mean < 30 nmol/L (nmol/L) (%)		Mean < 30 nmol/L (nmol/L) (%)	
	Men	Men	Women	Women
Denmark	44	24	40	32
Netherlands	42	20	42	38
France (Romans)	40	34	37	44
Portugal	39	31	39	33
France (Haguenau)	35	47	37	62
Italy	32	42	24	92
Spain	30	52	21	86
Greece (Markopoulo)	31	52	22	80

(Van der Wielen et al, 1995)

Union, which is due to different views on the relevance to public health. Fortification with vitamin A is not prohibited in any of the European countries, but there is wide variability in the quantity added. The addition of vitamin D is prohibited in some countries, while it is mandatory in others.

## Recommended Daily Allowances (RDAs) and Intakes for Vitamins A and D Across Europe

European RDAs have been set by the Scientific Committee for Food at 800 µg vitamin A and 5 µg vitamin D (SCF, 2003) and similar RDAs have been set by many countries across Europe. Reported intakes of vitamins A and D in various European countries show generally adequate intakes of vitamin A, although a significant proportion of the population still do not meet the RDAs for this vitamin. In contrast average intakes of vitamin D are significantly lower than the RDAs for all age groups (Table 2).

## Vitamin A

Retinol plays a key role in many biological processes for example immune response and cell differentiation (West, 2002; FAO/WHO, 2002). The main dietary sources of preformed vitamin A in the British adult diet are meat and meat products (61%), dairy products such as milk, cheese and ice cream (14%), and fortified margarines and fat spreads (13%) (Gregory, 1990). Intake of vitamin A in both the UK and Netherlands has declined and this is in part due to reduction in visible fat intake (Bouwman, 2000).

In 2002, the Scientific Committee for Food agreed a tolerable upper intake

**Table 2: Dietary vitamin A & D intakes across Europe in key age groups**

Country	Children	Adults	Elderly
<b>Dietary vitamin A (Retinol Equivalent) intakes (µg/day)</b>			
Germany	711/672	840/780	840/1040
France	602	840	780
Spain	367/342	558/422	304/387
Netherlands	686/683	803/1081	797/1113
UK	481/5056	671/911	969/1173
<b>Dietary vitamin D intakes (µg/day)</b>			
Germany	-	2.9/3.5	3.0/3.8
France	2.1	2.5	2.5
Spain	2.8/3.0	3.4/4.9	3.0/4.3
Netherlands	2.8/2.9	3.2/4.4	3.6/4.8
UK	2.1/2.46	2.8/3.7	2.9/4.1

Female/male

While in some population groups low intakes may be compensated for by internal production of vitamin D on exposure of the skin to sunlight, this is less likely to be the case in elderly population groups. In all age groups, the trend towards greater use of sunscreen is also likely to have a negative impact on vitamin D status as the capacity to produce vitamin D in the body is reduced (Holick, 1995).

Vitamin D status decreases with age. Vitamin D has been shown to be a high-risk nutrient among free-living elderly in Europe (van der Wielen et al, 1995). Wintertime serum 25-hydroxyvitamin D [25(OH)D] concentrations were assessed in European populations and overall 36% of men and 47% of women had 25(OH)D concentrations below 30nmol/L (Table 3). Levels of 25(OH)D below 30nmol/L have been associated with secondary hyperparathyroidism, increased bone turnover and decreased bone mass density at the hip (Ooms, 1994). The lowest mean 25(OH)D concentrations were observed in Southern European countries where there may be limited vitamin D fortification of foodstuffs.

## Conclusions

**Fortification of margarines and spreads with vitamins A & D is both safe and important in public health terms. The consequences of dietary and lifestyle trends, and the impact of disease prevention recommendations (e.g. consumption of reduced fat diets and greater use of sunscreen) are also relevant to the intake levels and status of vitamins A and D. It is therefore important to maintain and harmonise fortification levels whatever the fat level of margarine and spreads, particularly since both vitamins are naturally present in only a limited number of foods. Therefore we propose the addition of 800 µg vitamin A and 7.5 µg vitamin D per 100 g product can be safely incorporated whilst being nutritionally relevant. However the different legislation on fortification on margarine and fat spread with vitamins A and D and the fact that they are omitted from the proposed addition of nutrients to food and its regulation (SANCO/329/03) may well act as a barrier to achieve desirable levels.**

## References

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