Ingestion of Phytosterols is Not Potentially Hazardous

Dear Editor,

The publication in *The Journal of Nutrition* by Fransen et al. (1) reported plasma phytosterol concentrations in long-term users of plant sterols and stanols and confirmed the efficacy of these food ingredients in lowering of plasma cholesterol. However, after observing modest increases in blood levels of phytosterols, the authors reiterated suggestions by previous authors that using phytosterol esters could potentially be atherogenic and therefore hazardous (2,3). This suggestion is, I believe, speculative and not justified on the basis of available data on phytosterol metabolism. A recent review, Chan et al. (4), concluded there was no overall clear body of evidence that plant sterols in plasma play a role in the development of coronary heart disease. Further, based on evidence from plant sterol feeding trials in both animal models and humans, elevated plant sterol concentrations in the plasma as a result of plant sterol supplementation may well be associated with a decreased risk of coronary heart disease (4). The purpose of this letter is to consider whether there are potential risks of plant sterol consumption.

Plasma data (1) showed an increase in the total phytosterol concentration after sterol ester use of ~11 umol/L (the baseline sterol concentration of cholesterol and phytosterols was 6279 umol/L). The reduction of cholesterol concentration (250 umol/L) in sterol ester users greatly exceeded any increase in phytosterol concentration in the blood after sterol ester use. Even if phytosterols were as atherogenic as cholesterol, the net effect is still much less than if phytosterols had not been used. The changes in blood sterol levels observed in the study by Fransen et al. (1) are within the normal range of variation in the general population, even when allowance is made for differences in assay methods (4).

The authors cited a review by Patel and Thompson (2), who state “Phytosterols have also been recently identified in atheroma-tous plaque obtained from individuals with apparently normal absorption of plant sterols raising the possibility that phytosterols are a novel atherosclerosis risk factor.” The study cited is Mellies et al. (5). The data showed that, although phytosterols are present in normal aorta and mature atheroma, the proportions of phytosterols and cholesterol in the normal and diseased tissue are essentially the same as that reported for blood. The data showed no evidence of selective accumulation of phytosterols in diseased tissue. The properties of phytosterols and cholesterol are similar and both would tend to distribute similarly across body tissues.

The authors referred to the Miettinen et al. (3) study as the strongest indication of plant sterols being atherogenic. In that study, placebo controls were compared with those treated with simvastatin. Certainly, the data showed that with statin treatment, the depression of blood plant sterols by statin ester consumers. The depression of blood plant sterols by statin esters has been reported in a number of studies (4).

Phytosterols have a long history of safe use in humans. The drug Cytellin (7) was marketed in the United States between 1954 and 1982. The dosage was 6–18 g/d, with higher dosages recommended for those patients not responding to the standard dose. Dosages as high as 45 g/d were reported to be well tolerated without serious side effects (7). In the modern era, phytosterols have been used as margarine additives since about 1995, with the introduction of stanol esters to the Finnish market, and in 2000 with the introduction of sterol esters under Novel Foods regulations in the EU. As a requirement for market approval, post-launch monitoring was conducted in the EU, with no unpredicted side effects reported (8). The recommended plant sterol/stanol dosages for margarine and other foods are relatively low compared with that of Cytellin. Consumption levels of ~2 g/d are now the norm. In conclusion, there are no data available at this time which would suggest that ingestion of phytosterols is potentially hazardous.

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Literature Cited


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