Plant sterols and stanols: Proven to lower cholesterol

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For nearly 50 years it has been known that plant sterols and stanols, also called phytosterols and phytostanols, lower blood cholesterol levels by partly blocking absorption of cholesterol in the gut. Now, they are widely available in a range of food products for those who want to lower their cholesterol levels.

Plant sterols and stanols have a structure that is very similar to that of cholesterol. Sterols are found naturally in small quantities in many fruits, vegetables, nuts, seeds, legumes, vegetable oils and other plant sources and are essential components of plant cell membranes. Stanols are found in trace levels in similar foodstuffs but are produced by hydrogenation of plant sterols for commercial use. Individuals eating typical Western diets consume 20-50 mg per day of stanols and 150-400 mg per day of sterols. At these low levels they have a clinically insignificant effect on cholesterol absorption.

The benefit of sterols and stanols in reducing blood cholesterol levels

The link between raised blood cholesterol levels, especially raised low density lipoprotein (LDL) cholesterol, and the increased risk of coronary heart disease (CHD) is well established. People can reduce their cholesterol and cardiovascular risk if they eat a healthy, balanced diet (low in saturated fat and cholesterol, with optimal levels of omega-3 and omega-6 polyunsaturated fatty acids, and high in fruit and vegetables), and are regularly physically active.

There is substantial evidence from a vast number of clinical studies that plant sterols and stanols lower total and low density lipoprotein (LDL) cholesterol, by partly inhibiting cholesterol absorption, and that their effect is additional to that achieved by other strategies e.g. a low fat diet and/or the use of cholesterol-lowering drugs like statins.

Studies have shown that a reduction in blood cholesterol can be achieved by consuming 1-3g of plant sterols or stanols per day, but no further reductions are achieved with intakes above 3g. Intakes of 2g plant sterols or plant stanols per day typically result in a 10% lowering of LDL-cholesterol. A 15% lowering of LDL cholesterol can be achieved if 2g of plant sterols or plant stanols is combined with a heart-healthy diet low in saturated fat. Based on epidemiological data it has been estimated that a 10% lowering of LDL cholesterol will lower CHD risk by 20% over a lifetime.

Safety aspects

An extensive safety evaluation programme (and Novel Food approval for plant sterols), and a sound history of safe use since 1999 in several European countries, have confirmed the safety of plant sterols and stanols.

However, the consumption of 2-3g of sterols and stanols daily over periods of one to twelve months can result in a modest decrease in plasma carotenoid levels, although this can be prevented by consuming a
diet including the recommended 5 servings of fruit and vegetables with high carotenoid content (e.g. dark green, yellow and orange fruits and vegetables).

**Product regulations and labelling aspects**

Since intakes above 3g per day will not result in additional cholesterol-lowering benefits and might reduce beta-carotene levels in the blood, the Scientific Committee on Food agreed that it was prudent to avoid intakes higher than 3g. As a result, the European Commission authorised addition of plant sterols and stanols to a range of foods (e.g. yellow fat spreads, salad dressings, milk, fermented milk, yoghurt and cheese type products, soya drinks and spicy sauces) providing they are presented in such a manner that they can easily be divided into portions that contain a maximum of 3g (when one portion per day is consumed) or 1g (when 3 portions per day are consumed).

The Commission’s labelling regulation specifies that each product should be clearly labelled as containing plant sterols or stanols and with a number of statements regarding their suitability and use (e.g. intended exclusively for people who want to lower their blood cholesterol levels; patients on cholesterol lowering medication should only consume the product under medical supervision; the product may not be nutritionally appropriate for pregnant and breastfeeding women and children under the age of five years).

**References**

2. European Commission (2002) General view of the Scientific Committee on Food on the long-term effects of the intake of elevated levels of phytosterols from multiple dietary sources, with particular attention to the effects of beta-carotene