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Plant stanol ester - chemistry and health benefits

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Plant sterols (phytosterols) are a group of compounds structurally very similar to cholesterol. The plants sterols occurring most frequently in the nature are sitosterol, campesterol and stigmasterol. Saturated plant sterols such as sitostanol and campestanol are present in nature in trace amounts. When plant sterols or plant stanols are present in the diet in sufficient quantities, they reduce cholesterol absorption from the gastrointestinal tract, which leads to a reductions in serum total and LDL cholesterol levels.

Benecol margarine, launched in Finland in 1995, was the first commercial food product to utilise the cholesterol-lowering effect of plant sterols. The active ingredient of Benecol margarine is plant stanol ester obtained by saturation of commercially available plant sterols and by subsequent esterification of the obtained plant stanol with food grade fatty acids derived from vegetable oils.

Currently foods enriched with plant sterol are commercially available in Europe, USA, South America, Australia, and Asia. These foods are based mainly on so-called 4-desmethyl sterols obtained either from tall oil (wood, mainly pine derived sterols) or vegetable oils. In most of the applications plant sterols and stanols are used in their fatty acid ester forms.

The cholesterol lowering effect of plant stanol esters have been verified in over 40 published clinical trials. The cholesterol-lowering efficacy of plant stanol ester is independent of the food matrix used. The cholesterol lowering effect of plant stanol esters complements the beneficial effects of a healthy diet and cholesterol medication.

The cholesterol lowering effect can be measured with 1-2 weeks and lasts as long as daily use of plant stanol ester continues. It was recently shown that dietary plant stanol ester reduced both serum blood cholesterol and triglycerides in subjects with metabolic syndrome.

Numerous clinical and safety studies show that plant stanols esters are safe, without adverse effects, including gastrointestinal effects. Plant stanols are virtually un-absorbable and chemically stable against oxidation and enzymatic conversions by colon bacteria. Currently various plant stanol ester enriched foods such as spreads, yoghurts, milk, pasta, are sold under the Benecol brand in 22 countries all over the world.