

## Established and Emerging Health Benefits of Dietary Phytosterols

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Functional foods enriched with plant sterol and stanolesters are well-known for lowering serum LDL-cholesterol concentrations, which is due to a reduced intestinal cholesterol absorption. In line with this mechanism, effects of sterol and stanolesters are additive in patients on stable statin treatment since statins and sterol or stanolesters aim at different targets. In a recent long-term follow up study we have shown that both sterol and stanolesters lowered LDL cholesterol concentrations in statin treated patients in which reductions were larger than could be expected by doubling the statin dose. This illustrates the suitability of sterol and stanolesters in more aggressive combination treatment strategies. In addition, we evaluated effects of plant sterol and stanolesters on flexibility of the carotid arteries. We found an improvement in the carotid compliance, the Peterson's elastic modulus and the stiffness index  $\beta$ , but only in those subjects with disturbed carotid characteristics at baseline. This suggests that effects of plant sterol and stanolesters on serum cholesterol concentrations are functional which in the long-term seems to favourably change arterial stiffness in patients at risk for CVD. Till now it was assumed that plant sterol and stanolesters did not affect other serum lipids or lipoproteins besides LDL. However, based on a recent meta-analysis using data from all our intervention studies with plant stanolesters, we found that especially in subjects with high baseline serum TAG concentrations, plant stanolesters were associated with a larger reduction in serum TAG concentrations. In an additional 9-weeks placebo-controlled intervention study with a plant stanolester yogurt drink (2.0 g plant stanols / day) in 18 patients with the metabolic syndrome we indeed found a 28% reduction in serum TAG concentrations ( $P=0.044$ ) in the plant stanolester group as compared to the control group. Whether these effects are also evident for plant sterol esters was not evaluated, but seems likely. The combination of lowering serum LDL cholesterol concentrations together with a reduction in serum triacylglycerol concentrations opens a new possibility for these compounds in CHD risk-management in metabolic syndrome subjects.