Chol SAP-15

*Science-based plant sterols for cholesterol management and immune support**

Chol SAP-15 contains plant sterols in a natural non-esterified form that helps in lowering total and LDL-cholesterol levels and maintenance of healthy blood lipid levels.* Evidence shows that LDL-cholesterol and total cholesterol concentrations can be decreased between 8 and 15% with intakes of plant sterols of 1.05 g/d.* Plant sterol intake has been suggested to support immune function and elicit healthy inflammatory responses.* In addition, plant sterol supplementation improves antioxidant status and mitigates the effects of carcinogens.* Plant sterols are lipophilic, and Chol SAP 15 is formulated using an organic flax seed oil base, ensuring optimal absorption and efficacy, also serving as a source of omega-3 fatty acids and alpha-linolenic acid (ALA) for the maintenance of good health.*

SUPPLEMENT FACTS

Serving Size: 1 Softgel — **Servings:** 120

	Amount Per Serving	% Daily Value
Calories	5	
Calories from fat	5	
Total Fat	0.5 g	<1%
Organic flax (*Linum usitatissimum*) seed oil	666 mg	**
Free plant sterols (non-GMO, from soy)	350 mg	**
β-Sitosterols	151 mg	**
Stigmasterols	84 mg	**
Campesterols	60 mg	**

‡ Percent Daily Values are based on a 2,000-calorie diet.
**Daily Value not established

Other ingredients: Lecithin and beeswax in a softgel made of sunflower oil, annatto extract, glycerin, bovine gelatin, and purified water. **Contains soy.**

Contains no: Gluten, wheat, corn, eggs, dairy, yeast, citrus, preservatives, artificial flavor or color, starch, or sugar.

This product is non-GMO.

Chol SAP-15 contains 120 softgels per bottle.

DIRECTIONS FOR USE

Adults: Take 1 softgel three times daily with food or as directed by your healthcare practitioner.

1 softgel provides 350 mg plant sterols.

INDICATIONS

Chol SAP-15:

- Helps lower total and LDL-cholesterol levels.*
- Can be used to support immune health.*
- Can be used to promote cardiovascular health.*
- Can be used to enhance healthy inflammatory responses and antioxidant status.*

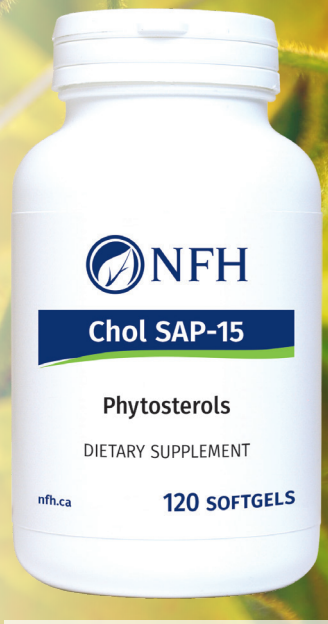
CAUTIONS AND WARNINGS

Consult a healthcare practitioner prior to use if you are pregnant or breast-feeding. Do not use if seal is broken. Keep out of reach of children.

PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for all **Chol SAP-15** lot numbers have been tested by a third-party laboratory for identity, potency, and purity.

*** These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.**



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WHAT ARE PLANT STEROLS?

Plant sterols are natural components of plants that play an important role in cell-membrane integrity.[1][2] Structurally, plant sterols are similar to cholesterol, except for the substitutions on the sterol side chain at the C-24 position.[1] Plant sterols are not synthesized in humans, are poorly absorbed, and are excreted faster from the liver than cholesterol, which explains their low abundance in human blood and tissues.[2][3][4] More than 40 plant sterols have been identified in nature, but β-sitosterol, campesterol, and stigmasterol are the most abundant.[1][2]

Stanols are saturated sterols, produced by hydrogenating sterols.[4] The typical intake of plant sterols in the North-American diet ranges between 300 and 400 mg/d.[1] Epidemiological evidence indicates a reduced incidence of cardiovascular disease (CVD), benign prostatic hyperplasia, and other chronic conditions in populations consuming diets rich in plant sterols.[1][2][3][4][5]

PLANT STEROLS: MECHANISM OF ACTION

Cholesterol absorption is a very important physiological mechanism that is not limited to dietary cholesterol intake.[5] Both dietary cholesterol (~300 mg/d) and recirculating biliary cholesterol (~1000 mg/d) mix in the intestine and are partially absorbed.[4][5] Failure to reabsorb intestinal cholesterol is the principal means of cholesterol elimination from the body.

Phytosterols have been shown to inhibit the uptake of both dietary and endogenously produced (biliary) cholesterol from the intestine.[3][5][6] There are several proposed mechanisms by which plant sterols decrease serum cholesterol levels.[1][5] One of them suggests that cholesterol in the intestine, already marginally soluble, is precipitated into a nonabsorbable state in the presence of added plant sterols.[1][6] The main theory is based upon the fact that cholesterol must enter bile-salt and phospholipid-containing mixed micelles in order to pass through intestinal cells and be absorbed into the bloodstream.[6]

Studies show that plant sterols compete with and displace cholesterol from mixed micelles, which ultimately inhibits cholesterol absorption from 25 to 50%.[1][5]

HEALTH BENEFITS OF PLANT-STEROL SUPPLEMENTATION

Lipid Management and Alleviation of CVD Risks

Plant sterols supplementation may reduce CVD risk primarily through its ability to significantly lower serum LDL and total cholesterol levels.[3][4] Scientific evidence shows that consuming 1.4–2.0 g/d of plant sterols decreases LDL-cholesterol levels by 8–15% and, based on epidemiological data and trials with cholesterol-lowering drugs, long-term use could be expected to reduce the incidence of ischemic heart disease by about 12 to 20% over 5 years, and by 20% over a lifetime.[3][4][5]

Immunomodulatory and Anti-inflammatory Effects

Several studies have reported the beneficial effects of plant sterols in immune function and inflammation.[7][8][9] Desai et al (2009) compared the immunomodulatory effects of β-sitosterol versus simvastatin on the proliferation and release of key cytokines from peripheral blood mononuclear cells (PBMC) of multiple sclerosis (MS) patients.[8] Results of this study showed that β-sitosterol was effective in modulating pro- and anti-inflammatory cytokines in the PBMC cells of MS patients, and suggested potential application of β-sitosterol in MS management without the side effects of statin therapy.[8] Similarly, in another in vitro study, sitostanol administration was found to positively modulate immune responses in PBMC cells obtained from asthma patients compared to those from controls.[9] The study strongly suggests that sitostanol therapy may attenuate immune function and confer beneficial effects in mitigating asthmatic symptoms in asthma patients. β-Sitosterol was also found to exhibit anti-inflammatory properties in human aortic endothelial cells.[10] Recently, De Smet et al (2015), in a double-blind crossover designed study powered by transcriptome analysis, reported that an acute supplementation of plant stanol esters altered immune-related pathways in the jejunum of healthy individuals.[11] However, the physiological relevance of the altered pathways linked to T-cell functions warrants more research investigation to corroborate the beneficial immunomodulatory effects of plant sterols/stanols.

Reduction of Cancer Risk

Several studies suggest a protective role of plant sterols, especially β-sitosterol, in the development of colon, prostate, and breast cancer.[12] The possible mechanisms by which plant sterols may offer this protection include regulatory effects on membrane structure and function of tumour and host tissue, reduced production of carcinogens, decreased angiogenesis and metastasis, and promotion of cancer-cell apoptosis.[12] In addition, plant sterols have been suggested to increase antioxidant capacity, increase activity of synergistic antioxidant enzymes, and reduce oxidative stress in humans,[10][12] with anti–lipid-peroxidation effects, and lipid-membrane antioxidant and free-radical–scavenging capabilities comparable to those of α-tocopherol.[13][14] All these antioxidant and anti-inflammatory effects exerted by plant sterol consumption could potentially contribute to their protective role against cancer risk.

SIGNIFICANCE OF PLANT-STEROL FORMULATION IN EFFICACY

When supplementing plant sterols, the physical form is an important factor.[1][15] The efficacy of plant sterols in lowering circulating lipid concentrations has been scientifically shown for both unsaturated and saturated plant sterols.[3] However, with respect to free (i.e. unesterified) versus esterified plant sterols, the matrix and emulsification are important in order to observe an effect.[3][15] Previous research has revealed that for optimal efficacy, supplemented plant sterols must be dissolved in a lipid matrix.[15] Plant sterols are lipophilic, and are best transported and absorbed in a lipid base.[15] If supplemented in a nonfat matrix, plant sterols may not fully disperse or solubilize in the gut digesta before absorption, limiting their ability to reduce cholesterol absorption.[5][15]

SAFETY OF PLANT-STEROL SUPPLEMENTATION

In 2000, the US Food and Drug Administration granted generally recognized as safe (GRAS) status to plant sterols and authorized a health claim that foods containing plant sterol/stanol may reduce the risk of coronary heart disease.[3] Plant sterols are safe and well tolerated, and can be taken with a wide variety of other supplements. There have also been no reported adverse interactions of plant sterols/stanol intakes with other medications.[3][5][17]

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