# Cholestolief

VitaAiD® Professional Therapeutics

## Support Healthy Cholesterol Metabolism

### Key Features:

- Soy-Free Plant Sterols from Pine Tree Resins
- Contains 800 mg of Free Plant Sterols (~80% sterols and 20% stanols) per serving

### Indications:

- Lowering cholesterol (LDL-C) levels
- Improving glucose metabolism
- Lowering fasting glucose, insulin, and HbA1C levels

**Serving Size 2 capsules**
**63 servings per container**

**Ingredients (per 2 capsules):**
Free Plant Sterols (from *Pinus spp.*).....800 mg
(80% combined beta-Sitosterol, Campesterol and Stigmasterol)

**Other Ingredients:** L-leucine, microcrystalline cellulose, hypromellose (capsule)

**Suggested Use:** Adults - Take 2 capsules with meal, 2-3 times per day, or as directed by a health care practitioner.

### Description:

Cholesterol management is a critical aspect of cardiovascular health, and elevated blood cholesterol levels, particularly low-density lipoprotein cholesterol (LDL-C), are a major risk factor for heart disease.

For the past 30+ years, statin drugs have been the first-line conventional therapy for high cholesterol and the most prescribed group of medications in the US. However, a number of meta-analyses have revealed inconsistent findings on statin drugs' benefits in reducing cardiovascular, cerebrovascular , and all-cause mortality.[1-3] Statin drugs are also associated a number of adverse side effects, such as myopathy, higher rates of hemorrhagic stroke, and diabetes. [4,5] The increased risk of diabetes is considered one of the major double-edge-sword properties of statins as many diabetic patients are also on statin drugs for their elevated cholesterol levels.

Plant sterols, also known as phytosterols, are naturally occurring compounds found in plants. They structurally resemble cholesterol and have been shown to competitively inhibit the absorption of dietary cholesterol in the intestines. **Intake of 2g/day of plant sterols/ stanols has been shown to safely and effectively decrease LDL-C levels by an average of 10%.**

### Mechanism of Action

Plant sterols have been shown to reduce cholesterol levels via several mechanisms. The first and most direct mechanism is **competitive inhibition of cholesterol absorption** from the intestinal lumen. Plant sterols have also been shown to **prevent translocation and esterification of cholesterol esters,** as well as **suppressing de novo synthesis of cholesterol by down-regulating HMG-CoA reductase gene expression** in the intestines. Lastly, plant sterols up-regulate bile acid synthesis and enhance cholesterol clearance through the biliary excretion pathway.

### Human Clinical Trials & Meta-Analysis

Numerous clinical trials have investigated the cholesterol-lowering effects of plant sterols. A large meta-analysis [6] looked at 124 studies on the effects of plant sterols/stanols in humans, and found a dose-dependent effect on lowering LDL-C levels. The average dose was 2.1g/day, which provided a reduction in LDL-C levels by an average of 6-12%.

Another meta-analysis of 113 clinical trials [7] found that plant sterols and stanols significantly reduced LDL-C levels by 8.3% to 17.1%, with an average dose of 2-3g/ day.

A recent double-blind, placebo-controlled, cross-over study [8] looked at the effects of plant sterols on atherosclerosis beyond the reduction in LDL-C. Thirty-eight volunteers with moderate hypercholesterolemia were randomly assigned soy milk or soy milk plus plant sterols (1.6g/day) for 4 weeks. The results showed that the addition of plant sterols reduced

endothelin-1 plasma concentration by 11%, and in addition reduced total cholesterol (5.5%), LDL-C (6.4%), triglycerides (8.3%), and apo B (5.3%).

### *Combination with Statins*

Plant sterols appear to have an additive effect when combined with statins, and may be more effective than doubling the statin dose. In a trial of 167 adults on statin therapy [9], the addition of plant sterols lowered LDL-C 10% more than the addition of a placebo. Other trials on individuals taking statins found that supplementing with sterols/stanols reduced LDL-C by 14-20%.

### *Effects in Adolescents with Familial Hypercholesterolemia (FH)*

Plant sterols are a safe and effective treatment for children and adolescents with familial hypercholesterolemia (FH). In a placebo-controlled clinical trial of children and adolescents aged 5–12 years old with FH [10], consumption of 2.3g/day of plant sterols/stanols resulted in a 14% reduction in LDL-C and 11% reduction in total cholesterol compared to placebo.

## Dosing

The dosing of plant sterols in clinical trials and meta-analyses varies, bu**t typical doses range from 1.6 to 2.4 grams per day, with an average dose of 2g/day.** Those with higher baseline cholesterol levels (i.e. familiar hypercholesterolemia) may see a more significant decrease in LDL levels with higher doses (2-3g/day), however, the **LDL-lowering effects of plant sterols may taper off at doses above 3g/day** as the inhibition of cholesterol absorption may be a saturable process.

## Additional Indications

### *Lowering Triglycerides*

A review article by Derdemezis et al. [11] indicated that consumption of 1.5-2g/day of plant sterols/stanols reduces triglycerides by 6-20% and increases HDL-C by 5-11%, but mainly in individuals with atherogenic dyslipidemia.

### *Glucose Metabolism & Insulin*

Plants sterols/stanols have been shown to have a beneficial effect on glucose metabolism. A recent meta-analysis [12] that included 20 RCTS demonstrated that supplementation with 1-2g/day of plant sterols decreases insulin levels, fasting plasma glucose levels, and HbA1C.

## Reference:


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7. Musa-Veloso et al. (2011). A comparison of the LDL-cholesterol lowering efficacy of plant stanols and plant sterols over a continuous dose range: results of a meta-analysis of randomized, placebo-controlled trials. Prostaglandins, Leukotrienes and Essential Fatty Acids, 85(1), 9-28.
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12. Salehi-Sahlabadi et al. (2020). Effects of Phytosterols supplementation on blood glucose, glycosylated hemoglobin (HbA1c) and insulin levels in humans: a systematic review and meta-analysis of randomized controlled trials. Journal of Diabetes & Metabolic Disorders, 19, 625-632.





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