GENESTRA BRANDS®

# PhosCholine Complex


## Delayed-release combination of phosphatidylcholine, curcumin and ApresFlex™ *Boswellia serrata* extract

- Enteric-coated for delayed release in the intestines
- Phosphatidylcholine, a source of choline, is a factor in the maintenance of good health
- Helps to relieve joint pain and swelling associated with mild to moderate osteoarthritis of the knee

PhosCholine Complex is a unique combination of phosphatidylcholine, curcumin and ApresFlex™ *Boswellia serrata* extract in a delayed-release tablet format. Phosphatidylcholine is an important source of choline that helps to maintain good health. This phospholipid is present in cell membranes throughout the body, as well as in lipoproteins, bile and surfactants.[1] Specifically, it is the primary phospholipid in mucus and is particularly critical to the intestines.[2] Through its involvement in the formation and secretion of very low density lipoprotein (VLDL) from the liver, phosphatidylcholine also helps to support liver function.[1] Turmeric has a long history of use in Ayurvedic medicine and contains curcumin, the primary bioactive compound responsible for a variety of beneficial health effects.[3] PhosCholine Complex also contains ApresFlex™ *Boswellia serrata* extract, which has been shown in clinical studies to temporarily relieve the pain of mild to moderate osteoarthritis of the knee in as little as five days. Additionally, this formula is enteric-coated to promote targeted release in the intestines.

**EACH TABLET CONTAINS:**

| | |
|---|---|
| Phosphatidylcholine (from *Glycine max* seed) | 187.5 mg |
| Curcumin (from *Curcuma longa* rhizome) | 50 mg |
| ApresFlex™ Boswellia (*Boswellia serrata*) | |
| Gum Oleoresin Extract (16:1) | 25 mg |
| (400 mg Dried Equivalent, 20 % 3-Acetyl-11-keto-beta-boswellic acid) | |

Non-Medicinal Ingredients: Cellulose, hyprolose, croscarmellose sodium, silica, delayed-release tablet coating (ethylcellulose, ammonium hydroxide, medium-chain triglycerides, oleic acid, sodium alginate, stearic acid), ascorbyl palmitate
Contains: Soy

ApresFlex™ is a trademark of Laila Nutraceuticals. US Patent #8,551,496 and other patents pending.

**Recommended Dose**
Adults: Take two tablets two times daily or as recommended by your healthcare practitioner.

**Product Size**
60 Delayed-Release Tablets

**Product Code**
10355

NPN 80080523

Non GMO · Gluten Free · Dairy Free · Vegan

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# PhosCholine Complex

## Scientific Rationale:

Phosphatidylcholine is the primary phospholipid in cell membranes.[1] It provides important structural support to cells and helps to regulate membrane fluidity, signalling and transport.[1-3] It is also the main phospholipid in blood lipoproteins and bile, a fluid involved in the emulsification, absorption and transport of fat.[1,2] Phosphatidylcholine further helps to maintain good health as the body's main reservoir of the essential nutrient choline.[2] In addition to its important role in methylation reactions, choline is required for the production of the neurotransmitter acetylcholine.[1]

As the primary phospholipid in surfactants, phosphatidylcholine plays an important role in the lungs and gastrointestinal tract.[2] It is especially critical as a component of the intestinal barrier.[4,5] This barrier, comprised of a single layer of epithelial cells and two protective layers of mucus, separates the microbiota from intestinal tissue.[5] Its integrity can be impacted by genetics or environmental factors, such as smoking, medication, stress and lifestyle habits.[4] Dysregulation of the barrier may lead to the recruitment of leukocytes, which produce a range of compounds that can impact intestinal health.[4] Preclinical research suggests that phosphatidylcholine may help regulate signalling pathways in the intestines, such as the reduction of TNF-α secretion and NFκB activation.[6] When taken orally, most phosphatidylcholine is absorbed in the jejunum; however, encapsulation of phosphatidylcholine promotes its pH-dependent release in the terminal ileum.[6]

Phosphatidylcholine is also involved in the synthesis and secretion of very low density lipoprotein (VLDL) from the liver.[3] During times of decreased phosphatidylcholine availability, triglycerides may not be exported from the liver, leading to their accumulation in the cytosol.[1] Adequate phosphatidylcholine levels are therefore required to help support liver health and function.[1]

Boswellia is one of the oldest and most prized herbs in Ayurvedic medicine.[7] It contains boswellic acids such as acetyl-11-keto-β-boswellic acid (AKBA), which may be the compound primarily responsible for relieving joint pain and improving function in individuals with osteoarthritis.[8] AKBA may help improve joint function by promoting healthy joint metabolism.[8] Preclinical research demonstrates that boswellia resin and its bioactive compounds, especially AKBA, can promote healthy 5-lipoxygenase (5-LOX) activity, an enzyme involved in the synthesis of lipid mediators known as leukotrienes.[8] Similarly, AKBA has been shown to promote healthy matrix metalloproteinase (MMP) activity in TNF-α-induced human chondrocytes, offering support for healthy cartilage matrix composition.[8] AKBA may also promote healthy joint structure by inhibiting NFκB signaling and supporting healthy cytokine reactions.[8,9]

ApresFlex™ is a novel boswellia extract containing 20% AKBA and the non-volatile oil fraction of boswellia. *In vitro* experiments have demonstrated that ApresFlex™ was more efficacious in inhibiting 5-LOX activity and MMP-3 secretion than a boswellia extract standardized to 30% AKBA.[8,10] Animal research also reported that ApresFlex™ was more bioavailable than the other extract, which may result from the presence of its oil fraction.[8]

Randomized, double-blind, placebo-controlled trials have reported that ApresFlex™ helps to relieve joint pain and swelling associated with mild to moderate osteoarthritis of the knee.[10,11] In one trial, supplementation with 50 mg of ApresFlex™ twice daily significantly improved joint pain and function scores within five days.[10] Similarly, daily ApresFlex™ supplementation for 90 days demonstrated a superior ability to support joint health when compared to a boswellia extract standardized to 30% AKBA, as measured by greater and more rapid improvements in pain, stiffness and functional ability scores.[11]

Turmeric is a plant native to India and Southeast Asia that has long been used in Ayurvedic medicine.[12] Its primary constituent is curcumin, which is responsible for turmeric's bright yellow colour.[12] Curcumin has been well researched for the many pharmacological effects it can have on different systems throughout the body.[12]


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