

*Clindamycin, Tetracycline, Digoxin:* Concomitant use of a kaolin-pectin antidiarrheal suspension with clindamycin, tetracycline and digoxin has been reported to decrease the absorption of those drugs. However, it is unclear as to which component (kaolin or pectin or both) is responsible for this interaction. Kaolin (hydrated aluminum silicate) is known to adsorb a wide variety of drugs and other substances.

#### NUTRITIONAL SUPPLEMENTS

*Carotenoids:* Concomitant use of pectin and lycopene, lutein and beta-carotene has been reported to decrease the absorption of these carotenoids.

*Minerals:* Pectin may decrease the absorption of such minerals as zinc, copper, iron, calcium and magnesium if used concomitantly.

#### FOODS

Pectin may decrease the absorption of such minerals in foods as zinc, copper, iron and calcium.

Pectin, when used concomitantly with lovastatin, caused a paradoxical increase in LDL-cholesterol. It was thought that the pectin reduced the absorption of lovastatin.

#### DOSAGE AND ADMINISTRATION

There are no typical doses of pectin supplements. Doses of 10 to 15 grams daily have been used in studies showing cholesterol-lowering effects in hypercholesterolemic individuals. Pectin supplements should be used with plenty of fluid.

#### LITERATURE

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## Perilla Oil

#### DESCRIPTION

Perilla oil is derived from the seed of the plant *Perilla frutescens*. Perilla oil is a very rich source of alpha-linolenic acid. About 50 to 60% of perilla oil is alpha-linolenic acid. Alpha-linolenic acid is an n-3 (omega-3) all-cis polyunsaturated fatty acid containing 18 carbon atoms and three double bonds. It is also known as ALA; ALA, 18:3n-3; 9,12,15-octadecatrienoic acid and (Z,Z, Z)-9,12,15-octadecatrienoic acid. ALA has the following chemical formula:



Alpha-linolenic acid

Alpha-linolenic acid is found in perilla oil as a triacylglycerol or triglyceride. The Mediterranean diet, high in ALA, appears to lower the risk of coronary artery disease and certain types of cancer.

#### ACTIONS AND PHARMACOLOGY

##### ACTIONS

Perilla oil may have anti-inflammatory, antithrombotic and anti-proliferative activities.

##### MECHANISM OF ACTION

The possible actions of perilla oil are probably dependent on the presence of ALA. ALA is metabolized to eicosapentaen-

oic acid (EPA) and docosahexaenoic acid (DHA). EPA is a precursor of the series-3 prostaglandins, the series-5 leukotrienes and the series-3 thromboxanes. These eicosanoids have anti-inflammatory and anti-atherogenic properties. The incorporation of metabolites of ALA in cell membranes may play a role in anti-inflammatory activity, inhibition of platelet aggregation and possibly in anti-proliferative actions of ALA.

#### PHARMACOKINETICS

ALA-laden triacylglycerols (TAGs), following ingestion, undergo hydrolysis via lipases to form monoglycerides and free fatty acids. Once formed, the monoglycerides and the free fatty acids are absorbed by the enterocytes. In the enterocytes, reacylation takes place reforming TAGs, which are then reassembled with phospholipids, cholesterol and apolipoproteins into chylomicrons. The chylomicrons are released into the lymphatics from whence they are transported to the systemic circulation. In the circulation, the chylomicrons are degraded by lipoprotein lipase, and the fatty acids, including ALA, are taken up in part by the endothelial cells where ALA is metabolized to phospholipids. ALA is transported via the circulation to various tissues in the body where it is metabolized to EPA, DHA and series-3 prostaglandins, series-5 leukotrienes and series-3 thromboxanes. Most of this metabolism occurs in cell membrane phospholipids.

An intake of from 3 to 4 grams daily of ALA is estimated to be equivalent to an intake of 0.3 grams daily of EPA, which one would get from a diet rich in fish.

#### INDICATIONS AND USAGE

Perilla oil may be indicated as a cardioprotective supplement, to help prevent blood clots and to ameliorate some of the symptoms of inflammatory bowel disease. Animal studies suggest that perilla oil might eventually prove useful in the prevention or management of some cancers.

#### RESEARCH SUMMARY

Perilla oil is a rich source of alpha-linolenic acid (ALA). Perilla oil has cardio-protective effects. It decreases platelet-activating factor, helping to prevent arterial blood clots.

One group of researchers suggests that perilla oil may be superior to either eicosapentaenoic acid (EPA) or docosahexaenoic acid (DHA) in ameliorating the colitis of experimental Crohn's disease. Perilla oil may be a palatable alternative to those who find fish oils effective in colitis but cannot tolerate taking them for prolonged periods.

In animal experiments, perilla oil proved superior to either soybean or safflower oils in inhibiting mammary, colon and kidney cancers. In one animal study, a relatively small amount of perilla oil, constituting 25% of total dietary fat,

significantly protected against colon cancer. In another recent animal study, perilla oil suppressed the development of liver cell carcinoma.

#### CONTRAINDICATIONS, PRECAUTIONS, ADVERSE REACTIONS

##### CONTRAINDICATIONS

Known hypersensitivity to a perilla oil-containing product.

##### PRECAUTIONS

Infants, young children, pregnant women and nursing mothers should only use perilla oil if recommended and monitored by a physician. Because of perilla oil's possible antithrombotic activity, hemophiliacs and those taking warfarin should exercise caution in its use. Perilla oil intake should be stopped in those having surgical procedures.

##### ADVERSE REACTIONS

Perilla oil may cause some mild gastrointestinal symptoms such as diarrhea.

##### INTERACTIONS

Interactions may occur between ALA in perilla oil and aspirin, other NSAIDs or herbs, such as *Allium sativum* (garlic) and *Ginkgo biloba* (ginkgo). Such interactions, if they were to occur, might be manifested by nosebleeds and increased susceptibility to bruising. If this does occur, consideration should be given to lowering or stopping intake.

##### OVERDOSAGE

There are no reports of overdose.

##### DOSAGE AND ADMINISTRATION

One-gram capsules of perilla oil containing 55% ALA are available. A usual dose for any of the indications is about 6 grams daily in divided doses with meals. This provides an intake of 3.3 grams of ALA.

##### LITERATURE

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