# EPO SAP

*Science-based omega-6 fatty acid of exceptional purity*

Evening primrose oil (EPO) contains essential fatty acids that have several beneficial effects in the body. EPO is a source of γ-linolenic acid (GLA) which, when used topically, has been demonstrated to aid in the management of atopic dermatitis. EPO also contains precursors of prostaglandin $E_1$, which when deficient can contribute to many female hormone–balancing concerns, including PMS symptoms such as depression, irritability, breast pain, and fluid retention. Deficiency of prostaglandin $E_1$ can also contribute to menopausal symptoms including hot flashes. EPO also inhibits leukotriene synthesis, which is an inflammatory mediator, and can therefore be used to reduce systemic inflammation in the body.

## ACTIVE INGREDIENTS

**Each softgel contains:**

Certified organic evening primrose (*Œnothera biennis*) oil . . . 1000 mg
Containing:
γ-Linolenic acid (GLA) (9–10%) *E.F.A. . . . . 90–100 mg
Linoleic acid (LA) . . . . . 680 mg
*Essential Fatty Acid

**Other ingredients:** Natural vitamin E (from sunflower) and rosemary leaf extract in a softgel made from bovine gelatin, glycerin, and purified water.

**This product is non-GMO.**

**Contains no:** Gluten, soy, wheat, corn, dairy, yeast, preservatives, artificial flavour or colour, solvents, starch, or sugar. **Solvent-free.**

**EPO SAP** contains 90 softgels per bottle.

## DIRECTIONS FOR USE

**Adults: Take 1 softgel after every meal** or as directed by your healthcare practitioner.

## INDICATIONS

**EPO SAP:**

- Is effective for the relief of symptoms associated with premenstrual syndrome and menopause.
- Can be used topically to treat atopic dermatitis in both children and adults, as well as for breast tenderness.
- Contains γ-linolenic acid, an essential fatty acid which can be used to treat conditions of EFA deficiency including inflammation and thrombosis.
- May provide a suitable alternative to fish oils in balancing prostaglandin synthesis and systemic inflammation in patients who have chosen vegetarian or vegan lifestyles.

## PURITY, CLEANLINESS, AND STABILITY

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


Scientific Advisory Panel (SAP): adding nutraceutical research to achieve optimum health

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## WHAT ARE OMEGA-6 FATTY ACIDS?

Omega-6 fatty acids (n–6) are polyunsaturated fatty acids and are considered essential fatty acids (EFAs) because they cannot be synthesized by humans, thus must be obtained from the diet. The n–6 fatty acids include arachidonic acid (AA), exclusively found in animal products, and γ-linolenic acid (GLA) and linoleic acid (LA), both almost exclusively available from plant sources. Plant sources of n–6 EFAs include nuts, seeds, grains, safflower, sunflower, sesame, corn and cottonseed. Due to the high content of animal products and AA in the standard Western diet, EFA imbalance is commonplace. High AA intake ultimately leads to a skewed formation of the prostaglandin-2 series ($PG_2$) and the hormones leukotrienes (LT; 4-series) via the phospholipase $A_2$ biochemical pathway. Both $PG_2$ and $LT_4$ are proinflammatory and have been linked to chronic inflammation, arthritis, cardiovascular disorders, asthma, mood disorders, obesity and cancer.

## WHY IS EVENING PRIMROSE OIL A SUPERIOR n–6 SOURCE?

Evening primrose oil (EPO) is a vegetable oil that is a rich source of n–6 EFA. EPO is unique as it is comprised of linoleic acid, 7–10% γ-linolenic acid (GLA), and vitamin E. GLA is considered to be the active ingredient in EPO that is responsible for health benefits. GLA, if not acquired in the diet, is typically derived from LA via the rate-limiting enzyme δ-6-desaturase, a process which is positively modulated by zinc, magnesium, vitamin $B_6$, vitamin $B_3$, and vitamin E. GLA is in turn metabolized to DGLA, and ultimately anti-inflammatory metabolites, including most notably the prostaglandin-1 series ($PG_1$). Supplementation of EPO provides GLA directly to the biochemical pathway, overcoming the rate-limiting δ-6-desaturase enzyme. Proper n–6 EFA balance and metabolism is critical for the maintenance of cellular health and a balanced inflammatory response. By increasing EPO intake, inflammation is decreased by increasing levels of $PG_1$.

## ATOPIC DERMATITIS/ECZEMA

Atopic dermatitis (AD) is a chronic, inflammatory and pruritic condition. Defective metabolism of n–6 EFAs leading to relative dominance of proinflammatory prostaglandins ($PG_2$) has been reported as an important factor in the pathogenesis of AD.[1] Studies of AD show sufficient levels of LA and deficient levels of GLA, DGLA, AA, and docosapentaenoic acid.[2] This suggests a reduced conversion of linoleic acid to GLA[2] via δ-6-desaturase. Supplementation of EPO overcomes δ-6-desaturase load by supplying GLA directly, increasing $PGE_1$ production.

- Daily supplementation of 500 mg EPO over 5 months improved symptoms (extent, intensity, itchiness and dryness) in 96% of subjects with AD (only 32% of the placebo group showed improvement).[3]
- Double-blind studies show that supplementing with 500 mg EPO showed an increase in metabolites of GLA, and significant improvement of eczema symptoms.[4]

## PMS

Premenstrual syndrome, a common disorder in women of reproductive age, is characterized by emotional and physical symptoms that occur cyclically during the luteal phase of the menstrual cycle. The disorders can manifest with a wide variety of symptoms, including depression, mood lability, abdominal pain, breast tenderness, headache, and fatigue. It is suggested that altered prostaglandin metabolism leads to pathophysiologic levels of $PG_2$ (in brain, breast, gastrointestinal tract, kidneys, and reproductive tract), promoting many PMS symptoms.[5] EPO helps to regulate hormones and improve nerve functions, thereby aiding in the symptom management of PMS. Neuroinflammation caused by inflammatory prostaglandin and cytokine production can lead to depression and other neurodegenerative diseases.[6] EPO has been shown to be effective as treatment for depression and irritability, breast pain and tenderness, and the fluid retention associated with the premenstrual syndrome.[5, 7]

- Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used to treat symptoms of PMS. NSAIDs produce an analgesic effect, and at high doses inhibit production of inflammatory prostaglandins. Supplementation with EPO aids in the balance of prostaglandins via an increase in the anti-inflammatory $PG_1$ series. Studies show that 64% of women suffering from mastalgia may exhibit improvement of symptoms after three months of supplementation with EPO.[8]
- Symptoms of mastalgia can range from minor to debilitating, and be cyclical or persistent. Clinical studies implementing 500 mg EPO twice daily show a 97% positive response within six months in women suffering from persistent mastalgia, and may be recommended as first-line therapy.[9]
- Daily doses of 1200 IU vitamin E, 3000 mg EPO, or vitamin E and EPO in combination at these same dosages, taken for six months proved to be more effective at reducing the severity of cyclical mastalgia compared to placebo.[10]
- Studies have compared EPO to pharmaceutical interventions (bromocriptine and danazol) for the treatment of mastalgia. Results indicated that EPO is as effective as bromocriptine in relieving pain (60% of subjects), with fewer reported adverse effects.[11]

## MENOPAUSE

Vasomotor disturbances, including flushing and sweating, are the most characteristic and noticeable symptoms experienced during the climacteric, associated with falling estrogen concentrations. Research suggests that EPO helps to decrease the occurrence of hot flashes, as its metabolites provide high concentrations of prostaglandins which decrease the affinity of ligands such as estrogens and other hormones for their receptors.[12] 440 mg EPO with isoflavones and vitamin E showed a dramatic reduction of menopausal complaints within the first three months of treatment.[13]

## THROMBOSIS AND CARDIOVASCULAR HEALTH

Thrombosis is the aggregation of platelets and fibrin forming a blood clot. Studies suggest that EPO shows considerable anticoagulant and antiplatelet activity in animals and has potential to reduce cardiovascular morbidity and mortality.[14] Outside of direct vessel injury, those at risk to thrombosis are people who have cardiovascular disease and/or diabetics. Human studies show that 4000 mg EPO contributes to normalizing lipid metabolism and decreases chances of the occurrence of thrombosis.[15]

## SIDE EFFECTS AND SAFETY

EPO is generally well tolerated and few side effects are reported. Minor gastrointestinal complaints include nausea, abdominal discomfort, increased bowel movements, diarrhea, and headaches have been sparingly reported.[16] Caution is advised in combining interventions that are antihypertensive, anticoagulant, antiplatelet, or include NSAIDs, anticonvulsants or neuroleptics.[15] Historically, EPO was considered to be contraindicated for those experiencing seizures or diagnosed with epilepsy, and when taking anticonvulsants such as phenothiazine. Studies suggest that EPO has anticonvulsant effects due to increasing levels of $PG_1$.[17]

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