

Medical Attributes of *Oenothera biennis* - Evening primrose

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Oenothera biennis is commonly called the evening primrose and belongs to the Onagraceae (evening primrose family). The young evening primrose plant consists of a green rosette, while older plants have an erect stem measuring approximately 1m tall and bearing green lobed leaves that are alternately arranged. The top of the stem has a spike of yellow flowers and elongated capsules. Evening primrose is native to temperate regions of North America, and is distributed throughout the United States and lower Canada (plants.usda.gov, Singh et al. 2012).

Traditionally, evening primrose was used as an anti-inflammatory agent in the treatments of rheumatoid arthritis and premenopausal pain (Singh et al. 2012). Native Americans were the first recorded culture to use this herb's seeds medicinally for healing bruises. Also the seeds were eaten for their perceived nutritional value (umm.edu).

Sterols are the main therapeutic constituents found in this species. They are used as inflammation mediators and serve to decrease nitric oxide production in experimental macrophages (Montserrat-de la Paz et al. 2012). Gamolenic acid, which is needed in the human body to undergo normal chemical and hormone production, is also found in this herb. That compound aids in treating hot flushes and sweating associated with menopause (Chenoy et al. 1994). Polyphenols in seed extracts of the evening primrose have antioxidant activity (Matsumoto-Nakano et al. 2011).

Most studies investigated its effects on inflammatory diseases found some positive results. *In vitro* experiments conducted by Montserrat-de la Paz et al. (2012) and Singh et al. (2012) found that the oils reduced inflammatory mediators like nitrous oxide. Additional *in vitro* tests further indicated that primrose oil suppressed inflammation via activity on lipoxygenase (Granica et al. 2013). Primrose oil is used to treat various inflammatory diseases of the skin such as eczema atopic dermatitis. However, there is little support for the efficacy of primrose oil in successfully treating these conditions (Stonemetz 2008 and Bamford et al. 2013). A clinical study conducted by Gehring (1999) found that primrose was effective against dermatitis but only when used with water-in-oil emulsion. Primrose oil has cancer treating effects, the effect of which is based either through radical scavenging or inflammation inhibition or increase of white blood cells and activation of tumor suppressor genes (Hamburger et al. 2002, Granica et al. 2013, Zeg et al. 2013). The anti-inflammatory properties of primrose were seen to improve multiple sclerosis by inhibiting cytokines (Rezapour-Firouzi 2013).

Primrose is also used to treat mastalgia premenstrual and pregnancy problems, though the effectiveness is not established. A clinical study by Dove and Johnson (2012) not show any effective results on pregnancy and labor time in women. However, the drug synthesized from evening primrose *Femicomfort* was shown to relieve PMS symptoms in a clinical study of forty-two women lasting six months (Kashani et al. 2010). An increase in the dose of another drug derived from evening primrose, IOVE, did not cause an increase in menstrual symptom relief suggesting possibly that the other active ingredients in *Femicomfort* may have caused its success (Cancelo et al. 2006).

Riaz et al. (2009) found benefits to cardiovascular health with evening primrose oil in which an *in vivo* experiment determined it anti-platelet anti-coagulant properties. Another study found that primrose oil lowered LDL cholesterol in patients suffering from hypercholesterolemia (Gupta et al. 2012). Controlled studies show this herb effectively treats multiple sclerosis and dermatitis inflammation (Stonemetz 2008 and Bamford et al. 2013).

Taking excess primrose oil can lead to a few adverse effects. Taking it longer than a year, increases the risk of inflammation, thrombosis and immunosuppression. Additionally taking primrose oil with coumadin may increase bleeding (Bamford et al., 2013).

Evening primrose is found to be most effective when used for treating individuals dealing with inflammation. The herb also relieves PMS symptoms for women (Kashani et al. 2010). As with any medication, herbal or synthetic, extracts of *Oenothera biennis* present a few drawbacks to those individuals interested in taking those compounds. Although numerous sources indicate the beneficial uses of anti-inflammatory compounds within *O. biennis*, extended dosages (more than a year) can lead to severe side effects (Bamford et al., 2013). Interactions between all medications need to be taken into consideration when prescribing. In conclusion, *Oenothera biennis* is found to be somewhat helpful medicinally. While some controlled studies have found positive effects, others show no difference between the herbal extract and the placebo given to individuals.

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