

## SIGNIFICANCE OF PRODUCING OENOTHERA BIENNIS IN THE DEVELOPING COUNTRIES

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### ABSTRACT

The seeds of the medicinal plant evening primrose (*Oenothera biennis* L.), which has the status of invasive in many countries of the world, are a source of pharmacologically valuable oil with a high content of polyunsaturated fatty acids (PUFA), including  $\gamma$ -linolenic acid. The authors have established for the first time that the oil from the seeds of *O. biennis*, collected in various regions of the republic, is not inferior in quality to world analogues and is balanced in PUFA composition; it is characterized by a pronounced hypolipidemic and immunomodulatory effect. It is assumed that the development of strategies for the use of this species as a basis for import-substituting herbal preparations for various purposes will help to limit its expansion in our Republic.

**Keywords:** pharmaceuticals, flowers, seeds, stem, oils, useful properties, production, yield, productivity.

### АННОТАЦИЯ

Семена лекарственного растения энотеры двулетней (*Oenothera biennis* L.), имеющего статус инвазионного во многих странах мира, являются источником получения фармакологически ценного масла с высоким содержанием полиненасыщенных жирных кислот (ПНЖК), в том числе  $\gamma$ -линоленовой кислоты. Авторами впервые установлено, что масло из семян энотеры двулетней, собранных в различных районах республики, по качеству не уступает мировым аналогам и сбалансировано по составу ПНЖК, характеризуется выраженным гипополипидемическим и иммуномодулирующим действием. Предполагается, что разработка стратегий использования этого вида в качестве основы для импортозамещающих фитопрепаратов различного назначения будет способствовать ограничению его экспансии в нашей республике.

**Ключевые слова:** фармацевтика, цветы, семена, ствол, масла, полезные свойства, производство, урожайность, продуктивность.



## INTRODUCTION

A biennial plant with a thick taproot and an erect stem up to 1.5 m high. The stem is usually simple, sometimes branching in the upper part; sparsely pubescent (like the calyx and capsule) with short glandular and longer simple light hairs, densely foliated, sometimes turning red in the lower part or having red matte spots. Basal leaves are 10-20 cm long, 2-6 cm wide, long-petiolate, oblong-ovate or elliptical, weakly emarginate-dentate, almost entire, ending in a point. Stem leaves are alternate, on short petioles, the upper ones are almost sessile, oblong-lanceolate, wedge-shaped at the base, finely dentate, covered with pressed small hairs on the upper and lower sides. The midrib is red. The length of the stem leaves is 5-7 cm, width ~2 cm.

Oenothera, or Night Candle is a genus of plants in the family Onagraceae. A large genus that includes plants of very diverse appearance: herbs and subshrubs, branched or unbranched, with simple, entire, serrated, lobed or pinnately dissected leaves. The plant, well-known and decorative, has led to the emergence of many beautifully flowering varieties; In horticulture, the plant is known under the transcriptional Latin name "oenothera". Adapted to its native temperate steppe lands, primrose thrives in well-drained soils with moderate moisture. This species prefers consistent moisture but can tolerate short periods of drought. Watering weekly maintains optimum moisture balance. Commonly found outdoors, primrose is a herbaceous plant that benefits from periods of rainfall during the growing season, providing it with sufficient water without the risk of overwatering. Evening primrose grows best in full sun, where it can receive at least 6-8 hours of direct sunlight per day. This optimal light exposure is essential for its growth, promoting robust health and abundant blooms. Although evening primrose exhibits some tolerance to partial sun, reduced light levels can result in leggy stems and fewer flowers, which can negatively impact the overall health of the plant. The plant generally exhibits resilience by adapting to varying light conditions, adjusting the orientation of its leaves to maximize light absorption. Ideal for planting outdoors, evening primrose should be placed in open areas that receive adequate sunlight to reach its full growth potential.

Evening primrose is very cold tolerant and can survive temperatures as low as -4°F. Optimum growth temperatures are 64-75°F. Temperatures above 81°F are not favorable, as evening primrose does not do well in prolonged and intense heat. Evening primrose prefers dry to moderately moist conditions and is drought tolerant. Soil should not be allowed to dry out during cultivation, especially if the goal is to encourage vigorous plant growth and abundant flowering. Evening primrose does not tolerate flooding well, so a well-drained substrate is essential.

Evening primrose can grow in a variety of soil types, but prefers light, loamy, sandy soil with moderate moisture and good drainage. If planted in clay, improve the nutrients and drainage of the soil by adding sand,

peat, a little organic fertilizer and crushed coal residue. The soil should be neutral, slightly acidic or slightly alkaline (pH 5.5-7.5).

For optimal growth, evening primrose thrives with a balanced nutrient fertilizer. Begin fertilizing in early spring to support foliage development, applying a high-nitrogen formula monthly. When evening primrose enters bloom, switch to a balanced nutrient to increase bloom production, reducing frequency to every other month. Use a dilute solution to avoid burning the roots. Adjust for increased growth in summer and reduce in fall to prepare evening primrose for winter dormancy. Always moisten the soil before fertilizing to improve nutrient uptake and protect the roots.

Evening primrose is a biennial with tall, upright stems and yellow flowers. Prune in early or late spring to promote healthy growth and blooms. Remove any dead or damaged stems and deadhead spent flowers to prevent self-reproduction. Thinning out crowded stems allows for better air circulation, which reduces the risk of disease. Prune before the blooming season for best results. These steps help maintain the plant's health, vigor, and aesthetic appeal.

The ideal season for propagating the biennial primrose is spring, mainly by sowing. It has an average difficulty of propagation. Successful propagation is confirmed by healthy roots and shoot growth. Provide well-drained soil and sufficient sunlight for optimal results.

For the biennial evening primrose, the best time to replant is from mid-spring to early summer, when the plants are growing most vigorously. To maintain optimal plant health, choose a sunny location with well-drained soil. Remember that careful handling of the plants during replanting will ensure their successful replanting.

Until recently, evening primrose was not held in high esteem. It was not used in official medicine, only in folk medicine were the leaves used in the form of tea against diarrhea. Recently, researchers (D. Horrobin et al.) discovered a high content of  $\gamma$ -linolenic acid in the fatty oil of the seeds, and evening primrose immediately became a desired dietary remedy and a well-known medicinal plant. Because  $\gamma$ -linolenic acid, unlike other unsaturated fatty acids, facilitates the formation of prostaglandins in our body, which are very important for the normal functioning of many organs. Until now, no plant has been known that would contain  $\gamma$ -linolenic acid in such large quantities. Application in folk medicine. In folk medicine, tea from evening primrose leaves was only occasionally used as a remedy for diarrhea. Its action is based on tannins, which are abundant in evening primrose. The roots are used as a tonic. They are dug up in the fall when they reach 5 cm in thickness and 10 cm in length, cut into circles and cooked with vinegar and oil or stewed in meat broth. This dish is said to contain extraordinary power, which quickly puts the patient back on his feet. I even came across a report that one pound of evening primrose root gives more strength

than a hundredweight of beef. This is undoubtedly a great exaggeration, but it shows how much this root is valued.

## CONCLUSION

The seeds of the medicinal plant evening primrose (*Oenothera biennis* L.), which has the status of invasive in many countries of the world, are a source of pharmacologically valuable oil with a high content of polyunsaturated fatty acids (PUFA), including  $\gamma$ -linolenic acid. The authors have established for the first time that the oil from the seeds of *O. biennis*, collected in various regions of the republic, is not inferior in quality to world analogues and is balanced in PUFA composition; it is characterized by a pronounced hypolipidemic and immunomodulatory effect. It is assumed that the development of strategies for the use of this species as a basis for import-substituting herbal preparations for various purposes will help to limit its expansion in our Republic.

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