

SUAEDA MARITIMA: A REVIEW OF PHARMACOLOGICAL STUDIES

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ABSTRACT

The *Amaranthaceae* family classifies *Suaeda maritima* as a mangrove herbaceous species. *S. maritima* thrives in alkaline environments, including mangrove forests and swamps. Reports indicate that this plant is rich in calcium, beta-carotene, and fiber, with relatively low levels of carbohydrates and fat. At present, an abundance of research has demonstrated that *S. maritima* possesses medicinal properties and is capable of a wide range of pharmacological actions. Traditional medicine has documented a range of pharmacological activities of this plant. These include anti-toxoplasma, anti-diabetic, anti-hyperlipidemic, analgesic, anti-inflammatory, and anti-cancer properties. Therefore, this review article is expected to discuss the potential various pharmacological activities of *S. maritima*.

KEYWORDS: *Suaeda maritima*, Mangrove plants, *Amaranthaceae*, Traditional medicine, Pharmacological activity.

INTRODUCTION

Medicinal plants are defined as plants used to maintain health or treat certain diseases and are used in various ways in both allopathic and traditional systems of medicine throughout the world. Even people who only use allopathic medicines throughout their lives tend to rely on herbal medicines because 20–25% of prescribed medicines come from plants.^[1] Research to obtain new alternative medicines derived from natural ingredients continues to be carried out, one of which is exploring active compounds from natural ingredients, especially medicinal plants, which have traditionally been used by people to treat various diseases in various countries.^[2,3] *Suaeda maritima* is a species of flowering plant in the *Amaranthaceae* family known by the common name herbaceous seep weed. This plant has fleshy, fresh leaves and green flowers. Grows to about 35 cm in salt marshes. This plant is edible as a vegetable and uses its high salt content as a seasoning in combination with other foods. This plant lives in aquatic, terrestrial, and wetland habitats. But mainly in salt marshes and sea beaches, usually below high water levels. In addition, *Suaeda maritima* is able to capture mud and help build swamps.^[4] This plant is reported to have various pharmacological activities, including anti-toxoplasma, anti-diabetes, anti-hyperlipidemia, analgesic, anti-inflammatory, and anti-cancer.^[5] Apart from that, this

plant is also reported to have high calcium, beta-carotene, and fiber content and is low in carbohydrates and fat. Currently, there are no detailed evaluation reports regarding the potential to show the effectiveness of *S. maritima*; therefore, this review article is expected to discuss the potential various pharmacological activities of *S. maritima*.

PHARMACOLOGICAL STUDIES

Anti-toxoplasma

Toxoplasma gondii is an obligate intracellular protozoan that is a unicellular eukaryote and survives in host cells.^[6] The effects of toxoplasma are classically associated with schizophrenia, stress, and emotional disorders.^[7] *In vitro* administration of *Suaeda maritima* was reported to inhibit the growth of *Toxoplasma gondii*, with an EC₅₀ value of 408,219 g/mL.^[8]

Antidiabetic

Diabetes mellitus is a metabolic disease that has symptoms of hyperglycemia. This occurs due to abnormalities in insulin secretion, insulin action, or both.^[9] Researchers reported that administering *Suaeda maritima* at doses of 200 and 400 mg/kg significantly reduced blood glucose levels in a streptozotocin-induced rat model.^[10]

Antihyperlipidemic

Hyperlipidemia is an important risk factor in the initiation and progression of atherosclerosis. The main manifestations of this disorder include increased plasma concentrations of total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), and low concentrations of high-density lipoprotein cholesterol (HDL-C).^[11] Administration of *Suaeda maritima* at doses of 150 and 300 mg/kg was reported to reduce levels of total cholesterol, triglycerides, and LDL and increase HDL significantly in a mouse model of hyperlipidemia.^[12]

Analgesic

Pain is a condition that indicates the body is experiencing tissue damage and inflammation. Analgesics can manage pain. Analgesics are defined as drugs that can reduce the sensation of pain.^[13] Administration of *Suaeda maritima* at doses of 250 and 500 mg/kg was reported to reduce the pain response in a rat model induced by acetic acid.^[14]

Anti-inflammatory

Inflammation is a response that is usually triggered by damage to living tissue due to bacterial, viral, or fungal infections, a physical agent, or a defective immune response. The fundamental goal of the inflammatory response is to localize and eliminate harmful agents and to eliminate damaged tissue components, leading to healing of the affected tissue, organ, or system.^[15-17] The inflammatory response involves macrophages and neutrophils, which are known to secrete different mediators that are responsible for the initiation, progression, persistence, regulation, and final resolution of the inflammatory state.^[17] In vitro administration of *Suaeda maritima* was reported to reduce nitric oxide production from LPS-induced macrophage cells with an IC₅₀ value > 1000 mg/mL.^[18]

Anticancer

Cancer is a medical condition in the form of the growth of abnormal and malignant cells in the body. The growth of cancer cells can occur in all parts of the body, from the skin, eyes, and lungs to intimate organs.^[19] The main cause of cancer is genetic mutations in cells in the body. However, it is still not known for certain what triggers this genetic mutation. However, there are a number of factors that can increase a person's risk of developing cancer, namely internal factors and external factors.^[20] Administration of *Suaeda maritima* at concentrations of 1, 5, 10, 50, and 500 g/mL was reported to significantly reduce MCF-7 breast cancer cells.^[21]

CONCLUSION

Suaeda maritima has been scientifically proven to have anti-toxoplasma, anti-diabetic, anti-hyperlipidemic, analgesic, anti-inflammatory, and anti-cancer activities. This plant has different mechanisms of action for each disease tested. However, further research must be carried out to see the effectiveness of *S. maritima* in managing

various diseases so that it can be developed as an alternative treatment to replace synthetic drugs, which have now shown adverse side effects.

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