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Review Article

Benefits of milk thistle plant for diabetes and liver health

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Key Words: Milk thistle, Diabetes, liver health, silymarin

Milk thistle properties

The dried seed extract of the remarkable milk thistle plant, Silybum marianum, is a powerhouse of health benefits, containing 1% to 4% silymarin—a potent compound known for its strong antioxidant and liver-protective properties. This extract consists of 65% to 80% silymarin (a complex of flavonolignans) and 20% to 35% beneficial fatty acids, including linoleic acid. Milk thistle has a long history of use in traditional medicine, but recent statements from Cancer Research UK emphasize the need for further rigorous scientific trials to fully understand its potential role in cancer treatment and prevention. Nevertheless, this exceptional herb has garnered attention for its impressive ability to address gastrointestinal disorders, diabetes, hyperlipidemia, toxicity, and liver irritation. Silymarin is particularly effective for lowering LDL cholesterol levels in those with hypercholesterolemia and is a valuable ally in reducing blood sugar levels for individuals with type 2 diabetes. Additionally, its neuroprotective qualities prevent brain damage caused by blood clotting by combating molecular inflammation in the brain. Silymarin also stimulates liver regeneration and serves as a vital protector of liver health. Notably, milk thistle has demonstrated effectiveness against cancerous tissues, including various prostate cancers. With its extensive medicinal properties, both the seeds and the entire plant of milk thistle present an extraordinary natural solution for enhancing overall health.

Keywords: Milk thistle, medicinal herb, liver protection, diabetes.

Introduction

The development of milk thistle stems begins in April, with flowering occurring around mid-May. This herb is recommended for various gastrointestinal disorders, toxicity, cirrhosis, and hepatitis. The flavonoids found in thistle possess effective antioxidant, antiviral, and immune-regulating properties. Silymarin, the active compound in milk thistle, has been shown to have medicinal effects in treating conditions such as fatty liver syndrome, diabetes, hyperlipidemia, atherosclerosis, cataracts, osteoporosis, cancer, and radiation protection, Yoshikava et al [1]. The dry extract from milk thistle seeds and the entire plant contains 1% to 4% silymarin, composed of 50% to 60% flavonoids including silybin and silychristine, along with 20% dihydrosilybin, and flavonolignans like deoxysilychristine and dioxysilychristine. These compounds exhibit strong antioxidant effects and provide liver protection. Additionally, the leaves contain sour compounds, such as cinnarizine, which promote bile secretion and protect liver cells. Flavonoids like luteolin, apigenin, quercetin, and hesperidin found in milk thistle

also contribute to lowering LDL cholesterol (Lea et al., 2001). The oil extracted from the seeds consists of about 25% of fatty acids, including palmitic acid (8.25%), oleic acid (31.58%), arachidonic acid (4.11%), linolenic acid (0.9%), and linoleic acid (45.36%). The concentrations of oleic, linoleic, and palmitic acids in milk thistle oil account for approximately 85%, comparable to olive, peanut, and soybean oils [2].

Liver Health

Silymarin has been reported to affect liver cells and overall body metabolism in several ways. It binds to the membrane receptors of liver cells responsible for toxin uptake, altering the phospholipid composition of these membrane receptors, which helps prevent the absorption of pollutants. Numerous studies on animals suggest that silymarin protects liver cells from various harms, including damage caused by viruses, chemicals, environmental toxins, fungal contamination, and alcohol [3]. Silymarin also stimulates protein synthesis to promote the regeneration of liver cells. It reduces molecular degradation caused by aflatoxins in rats and may mitigate gossypol poisoning when included in their diet [4]. The beneficial effects of silymarin on dairy cows experiencing fatty liver disease during prenatal development have also been demonstrated [5].

Blood Sugar and Lipids

Thistle extract (silymarin) has been shown to reduce blood glucose by inhibiting glucose-6-phosphatase and blocking gluconeogenesis. Patients with liver cirrhosis and insulin-dependent diabetes have been treated with silymarin, showing significant reductions in fasting blood sugar levels, daily blood sugar averages, and insulin requirements over six months. In a long-term study on diabetic mice, silymarin not only had a hypoglycemic effect but also decreased LDL, triglycerides, and total cholesterol, while increasing HDL [6]. Additionally, silymarin lowers oxygen free radicals and inhibits oxidative stress, which may protect vital organs like the kidneys, liver, heart, and brain; its effectiveness has been observed in tissue ischemia models. Silymarin reduces the synthesis of LDL cholesterol in liver cells, thereby preventing headaches associated with high LDL levels and reducing the risk of atherosclerosis in hypercholesterolemic mice and rabbits. A daily dosage of 420 mg of silymarin has been suggested as a viable LDL-lowering agent for hypercholesterolemia patients, resulting in decreased LDL synthesis in the liver [7], Other studies have also indicated that silymarin lowers blood sugar by reducing insulin secretion, which is especially beneficial for managing hyperglycemia in type 2 diabetes [8]. Additionally, milk thistle flowers have been shown to lower blood glucose levels in Najdi goats [9].

Cancer

Research indicates that silybin has anti-cancer properties against numerous epithelial cancers, including prostate cancer. Furthermore, silybin has been observed to have anti-cancer effects on cells associated with colon, bladder, and cervical cancers [10]. A study examining the mechanism of silymarin's anti-inflammatory action in mice with ulcerative colitis demonstrated that silymarin can inhibit lipopolysaccharide-activated macrophages. The compounds in silymarin (silybin, silydianin, and silycristine) inhibit prostaglandin formation, especially by targeting the cyclooxygenase pathway and reducing inflammation [11].

Brain Cells

Inflammation of nerve cells is a significant factor in exacerbating brain cell damage. By inhibiting inflammation, silymarin effectively protects against such injuries [12]. Additionally, silymarin has been shown to guard against brain damage caused by cerebral artery blockages. Its effects on improving nerve conduction in diabetic patients have also been confirmed [13]. Furthermore [14] demonstrated that silymarin protects nerve cells from damage, highlighting its potential as a therapeutic agent for brain health.

Conclusion

This plant thrives along roadsides, in barren landscapes, and near agricultural fields. Each year, a significant amount of its seeds goes to waste in these growing areas. Given the extensive medicinal benefits of milk thistle seeds and the entire plant for both human and animal health, it is essential to find solutions for seed collection to prevent this valuable resource from being squandered. Furthermore,

considering the high oil content in the seeds, cultivating and developing this medicinal oilseed can be highly beneficial.

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