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# Milk Thistle *(Silybum marianum) seed*

## Common Indications:

- Anticancer
- Antioxidant; especially for the liver. Helps increase glutathione levels
- Cholesterol
- Diabetes
- Liver disorders such as hepatitis, cirrhosis and fatty liver
- Liver health; liver detoxification
- Liver support for chronic drug and/or alcohol abuse

**General Comments:**

Milk thistle is well known for its medicinal properties, particularly its benefits to gallbladder and liver health. Its hepatoprotective effects are accomplished via several mechanisms: as an antioxidant, inhibition of lipid peroxidation, enhanced Phase 2 liver detoxification, enhanced glucuronidation, and an increase in protein synthesis and glutathione levels in the liver.

**Benefits & Mechanism of Action:**

**Anticancer:**

- In human leukocytes, silymarin protects against DNA damage caused by hydrogen peroxide, and in a mouse skin model it reduces UVB and chemically induced carcinogenesis. These effects may be attributable to the antioxidant properties of silymarin.[1] Silymarin inhibits mitogenic signaling pathways involved in proliferation of androgen-independent and androgen-dependent prostate cancer cells.[2]

- Silybin A and silybin B, constituents of milk thistle, inhibit cell growth and induce apoptosis of K562 leukemia cells.[3]

**Cholesterol**:

- The liver plays an important role in regulation of metabolism of plasma lipoproteins, and liver injury is often reflected as a secondary dyslipoproteinaemia, which may lead to the development of atherosclerosis, particularly when associated with hypercholesterolaemia.

Due to the inhibition of lipid peroxidation by silymarin as reported in the literature, milk thistle has also been reported to be a possible new agent in hypercholesterolemia. A laboratory animal study found that the cholesterol lowering effect of silymarin was parallel to that of probucol (dose-dependent). Unlike probucol, however, silymarin caused an increase in high density lipoprotein (HDL)-cholesterol, a decrease in liver cholesterol content, and partially prevented the HCD-induced decrease in liver reduced glutathione, which are all of benefit in patients with hypercholesterolemia. Results suggest that silymarin's hypocholesterolemic activity could be due to an inhibition of cholesterol biosynthesis and/or by inhibiting of resorption of dietary cholesterol. Milk thistle's antioxidant activity has also been reported to decrease LDL oxidation in laboratory studies.[4]

**Diabetes:**

- Silymarin seems to decrease insulin resistance and have a protective effect on the pancreas in rats with experimentally induced diabetes mellitus. This is thought to be due to silymarin's antioxidant effects. Some research suggests that oxidative stress can contribute to pancreatic beta-cell dysfunction, reduced insulin secretion, and insulin resistance. Silibinin seems to reduce glycolysis from carbohydrates in a dose-dependent manner, via inhibition of pyruvate kinase activity, affecting oxidative phosphorylation, and reducing formation of reactive oxygen species (ROS) formation in vitro.[5]

- In a 4 month, randomized, double-blind placebo controlled human trial in 51 patients with Type 2 diabetes, milk thistle was reported to produce a significant decrease in HbA(1)c, FBS, total cholesterol, LDL, triglyceride, SGOT and SGPT levels compared with placebo.[6]

**Liver Actions/Antioxidant Effects:**

- The active constituents of milk thistle are a combination of three substances (see above) that are claimed to exert hepatoprotective activity. Silymarin's hepatoprotective effects are accomplished via several mechanisms including antioxidation, inhibition of lipid peroxidation, enhanced liver detoxification via increase in Phase 2 detoxification, enhanced glucuronidation, protection of glutathione depletion and hepato-regenerative effects through an increase in protein synthesis in the liver.

- Silymarin has been demonstrated to increase glutathione content in the liver by more than 35 percent, increasing its antioxidant capacity. Milk thistle is also reported to inhibit inflammatory enzymes, known as leukotrienes, which would normally lead to the destruction of liver tissue. Its most celebrated use currently is as an antidote for poisoning by the death cup mushroom. If administered before the poisoning, it is claimed to be 100 percent effective. In animal studies, even if given as much as 24 hours after the poison was ingested, it exerted hepatoprotective properties and prevented death. Because of its reported liver enzyme and cell protection capabilities, it is used in a wide variety of conditions, such as chemical-induced liver damage (including industrial chemicals, alcohol and pharmaceutical drugs), hepatitis, gallbladder dysfunctions and psoriasis. Studies have reported protective benefits in liver function in alcoholics. Another laboratory study reported that silymarin reduced the side effects of various classes of psychotropic drugs

through protection of the liver and reduction of liver enzyme induction.

- A 2008 systmatic review with meta-analysis for the clinical evidence of milk thistle extract found that enough evidence exists to employ silymarin as a supportive element in the therapy of *Amanita phalloides* poisoning and also (alcoholic and grade Child 'A') liver cirrhosis.[7] A 2007 Cochrane Database System Review looked at 18 human trials in 1008 patients and found liver-related mortality was significantly reduced by milk thistle in all trials, but not in high-quality trials.[9]

**Dose**: 80-160mg, 1-3 times a day, of a standardized extract.

**Standardization:** Milk thistle supplements should be standardized to contain 80% silymarin.

**Cautions & Side Effects:**

- Milk thistle has been reported to be safe in recommended doses.
- Milk thistle should not be used if there is an allergy to any component of this dietary supplement. Use with caution in individuals with severe ragweed allergy or allergy to members of the daily and chrysanthemum family (Compositae).
- Occasional pruritus, mild gastrointestinal symptoms, headache.

**References:**

**Benefits and Mechanism of Action**

***Anticancer***


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***Cholesterol***


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***Diabetes***


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***Liver Action/Antioxidant***


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**Other Resources**


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