

The Longwood Herbal Task Force  
(<http://www.mcp.edu/herbal/default.htm>) and  
The Center for Holistic Pediatric Education and Research  
(<http://www.childrenshospital.org/holistic/>)

### Clinician Information Summary

# MILK THISTLE

( *Silybum marianum* )

## SUMMARY

Milk thistle is widely used in Europe for hepatic and biliary disorders and is starting to be used to protect against nephrotoxic medications. *In vitro*, in animal studies and in randomized controlled trials in humans, it protects against diverse hepatotoxins, including *Amanita* mushrooms, acetaminophen and alcohol. Its primary active ingredient is silymarin which is a potent antioxidant composed of several flavonoid compounds. Further studies are needed to evaluate its renal protectant effects, such as prevention of cisplatin toxicity, its effectiveness in treating severe alcoholic liver disease, and its role as a complementary therapy for cancer. There are no known long-term risks to adults associated with milk thistle use. Safety in pediatrics, pregnancy, or during lactation have not been systematically investigated.

**POPULAR USES:** Hepatoprotectant, renal protectant, dyspepsia, biliary disease

**CHEMICAL CONSTITUENTS:** Multiple flavonoids and flavanolignans, particularly silymarin

## SCIENTIFIC DATA

*In vitro:* Silymarin and its components, particularly silybin, have antioxidant effects in both the kidney and liver. Silymarin protects hepatocytes by enhancing DNA polymerase, increasing RNA synthesis, stabilizing cell membranes, scavenging free radicals and reducing leukotriene formation. In numerous animal and human cell lines, both silymarin and silybin exert significant cytoprotective effects against known carcinogens. Silybin has synergistic cytotoxic effects when given with cisplatin and doxorubicin to ovarian and breast cancer cell lines.

*In animals:* In rats, silybin protects against cisplatin-induced nephrotoxicity. In rats, mice and dogs,

(continued)

silymarin protects against hepatotoxicity from *Amanita* mushrooms, alcohol, acetaminophen and numerous chemicals. It also protects against hepatic fibrosis in animals with bile duct occlusion. Silymarin reduces biliary excretion of cholesterol salts in animals given high fat diets. In different mouse models of epithelial tumors, silymarin protects against carcinogens such as UVB radiation.

*In humans:* Milk thistle extracts are widely used in Europe to treat *Amanita* mushroom poisoning and appear to lower mortality rates by 60-80%. Randomized trials have reported mixed effectiveness in treating alcoholic hepatitis and acute viral hepatitis. A case series of cholecystectomy patients and another series of hyperlipidemic patients given silymarin both reported substantial decreases in total serum cholesterol concentrations. In patients with severe hepatic cirrhosis and insulin dependent diabetes, silymarin improved fasting blood sugar levels, glucosuria, glycosylated hemoglobin and insulin requirements. There is one case report of a 52-year-old man with inoperable hepatocellular carcinoma that resolved “spontaneously” following self-medication with silymarin.

#### **TOXICITY AND SIDE EFFECTS**

*Side effects:* Allergic reactions to products containing milk thistle have been reported. Some herbalists caution that milk thistle may cause mild laxative effects, but in randomized trials, side effects from milk thistle have occurred in fewer than 2% of patients.

*Interactions with other medications:* None known. Milk thistle could decrease insulin requirements in patients with severe hepatic cirrhosis and insulin-dependent diabetes, but is not known to affect blood sugar levels in other diabetic patients.

*Contraindications:* None known.

*Pregnancy and lactation:* No clinical studies.

*Pediatric use:* No clinical studies or systematic surveillance.

#### **ADDITIONAL RESOURCES**

- Milk Thistle Complete Monograph:  
<http://www.mcp.edu/herbal/milkthistle/milkthistle.pdf>
- Milk Thistle Patient Fact Sheet:  
<http://www.mcp.edu/herbal/milkthistle/milkthistle.ph.pdf>