CLINICAL BENEFITS OF MILK THISTLE (SILYBUM MARIANUM): A RECENT REVIEW

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ABSTRACT

Milk thistle (Silybum marianum) has been used for 2,000 years as an herbal remedy for a variety of ailments, particularly liver, kidney, and gall bladder problems. Milk thistle is widely used in Europe for hepatic and biliary disorders, and is beginning to be used to protect against nephrotoxicity as well. It protects the liver from several hepatotoxins, including Amanita mushrooms, acetaminophen and alcohol. Its primary active ingredient is silymarin, which has antioxidant and anti-inflammatory properties, and it may help the liver repair itself by growing new cells. Several scientific studies suggest that substances in milk thistle (especially a flavonoid called silymarin) protect the liver from toxins, including certain drugs such as acetaminophen (Tylenol), which can cause liver damage in high doses. Its leaves, flowers and roots have historically been considered a vegetable in European diets, and its fruits (achenes), which resemble seeds, have been roasted for use as a coffee substitute. The leaves of the plant are eaten in fresh salads and as spinach substitute, the stalks eaten like asparagus, and the flower heads served as one would an artichoke.

KEYWORDS: Milk thistle, Silybum marianum, Antioxidant, Hepatoprotectant, Silymarin

INTRODUCTION:

Milk Thistle, also known as Silymarin has enjoyed a long history of use in European folk medicine. Centuries ago, Romans recognized the value of this herb for liver impairments. They routinely used the seeds and roots of the plant to restore and rejuvenate a diseased liver. Pliny the Elder, an ancient Roman, recorded how the juice of Milk Thistle, when mixed with honey was used for carrying off bile. Dioscorides extolled the virtues of Milk Thistle as an effective protectant against snake bites. The genus silybum is a member of the thistle tribe of the daisy family. Two species of the plant exist and both are native to southern Europe and Eurasia. Plants which grow in the Southern United States actually have more potent seeds than their European and Asian counterparts (1).

In Traditional Chinese Medicine, milk thistle seeds are known as Shui Fei Ji; in China milk thistle is used to protect the liver, increase bile secretion and protect against oxidative injuries such as radiation (2).

Milk thistle is native to the Mediterranean region. It is now found throughout the world. This stout thistle usually grows in dry, sunny areas. The spiny stems branch at the top, and reach a height of five to ten feet. The leaves are wide, with white blotches or veins. Milk thistle gets its name from the milky white sap that comes from the leaves when they are crushed. The flowers are red purple. The small, hard skinned fruit is brown, spotted, and shiny. Milk thistle spreads quickly (it is considered a weed in some parts of the world), and it matures quickly, in less than a year (3, 4).

MEDICINAL SPECIES: Silybum marianum L. Gaertn., Cardus marianus L.
BOTANICAL FAMILY: Compositae/Asteraceae
COMMON NAMES: Mary Thistle, Wild Artichoke, Christ’s Crown, Our Lady’s Thistle, Holy Thistle, Venus Thistle, Heal Thistle, Wand of God’s Grace, Marian Thistle (1, 2).
ACTIVE COMPOUNDS:
Milk Thistle seed (Fig 1) extract contains a complex of three flavan lignans which are collectively referred to as silymarin. These flavonoid-like compounds are silibin, silychristin and silydianin (1). Flavonoids/flavonolignans: Silymarin (which includes silybin [silibinin], silidianin, silychristin and isosilybin), apigenin, dehydroisilybin, deoxysilycristin, deoxysildianin, siliandrin, silybinome, silyhermin, neosilyhermin. Other: Silybonol; myristic, oleic, palmitic and stearic acids; betaine hydrochloride (2).

The dried seeds of *Silybum marianum* contain 1-4% silymarin flavonoids. It is the primary active ingredient in milk thistle, and is also found in related species such as artichokes. The bioavailability of internally administered silymarin is limited; the compound is poorly soluble in water, and only 20-50% is absorbed from the gastrointestinal tract after ingestion. Absorption is significantly enhanced if silybin is administered in a complex with phosphatidylcholine (5, 6). There is rapid absorption after an oral dose with the peak plasma concentration reached after two to four hours and an elimination half-life of six hours (7); it undergoes extensive enterohepatic circulation. Three to eight percent is excreted in the urine, and 80% is excreted in the bile as glucuronide and sulfate conjugates (8). Silybin is the most biologically active component with regard to antioxidant and hepatoprotective properties (9).

Other flavonolignans identified in *S. marianum* include dehydrisosilybin, deoxysilycistin, deoxysildianin, siliandrin, silybinome, silyhermin and neosilyhermin. In addition, milk thistle contains apigenin; silybonol; myristic, oleic, palmitic and stearic acids; and betaine hydrochloride, which may have a hepatoprotective effect (10).

**DIFFERENT ACTIVITIES AND BENEFITS OF MILK THISTLE:**

- Antioxidant
- Antineoplastic: Chemoprevention
- Hepatoprotectant
- Hepato- tonic: Helps to strengthen the liver and improve function
- Immune modulation: Anti-inflammatory
- Endocrine: Antidiabetic and pancreatic protectant.
- Demulcent: Soothes and lubricates membranes, which helps reduce inflammation and redness both inside and outside the body.
- Gentle Laxative: Increases bile secretion and flow, thus improving bowel regularity (1, 2, 12).
- Milk thistle seeds have also been used to treatment of different disease like hepatitis, cirrhosis of the liver, to lower cholesterol and reduce the effects of a hangover.

1. LIVER DISEASE FROM ALCOHOL:

Milk thistle is often suggested as a treatment for alcoholic hepatitis and alcoholic cirrhosis. But scientific studies show mixed results. Most studies show milk thistle improves liver function and increases survival in people with cirrhosis or chronic hepatitis. But problems in the design of the studies (such as small numbers of participants and differences in dosing and duration of milk thistle therapy) make it hard to draw any real conclusions.

2. CANCER:

Early laboratory studies also suggest that silymarin and other active substances in milk thistle may have anticancer effects. These substances appear to stop cancer cells from dividing and reproducing, shorten their lifespan, and reduce blood supply to tumors. Some studies suggest silymarin may favorably supplement sunscreen protection and may help reduce the risk of skin cancer. More studies are needed, however, to show whether milk thistle has any effects in the body (not just in test tubes).

3. VIRAL HEPATITIS:

Milk thistle is widely used in the treatment of viral hepatitis (particularly hepatitis C). However, studies show mixed results. Some found improvements in liver function, while others did not. In one study of 16 patients who didn't respond to interferon and ribavirin therapy, milk thistle significantly reduced the viral load of hepatitis C. In 7 of the subjects the virus decreased to undetectable levels after 14 days of therapy.

4. MUSHROOM POISONING:
Based on traditional use, milk thistle has been used as an emergency antidote to poisoning by deathcap mushroom (*Amanita phalloides*). Animal studies have found that milk thistle extract completely counteracts the toxic effects of the mushroom when given within 10 minutes of ingestion. If given within 24 hours, it significantly reduces the risk of liver damage and death (3).

**ACTION OF Silymarin ON THE LIVER:**

The liver is responsible for detoxifying the body. Anytime we ingest potentially harmful chemicals, which include drugs or alcohol, liver cells must filter out these compounds. Michael Moore, author of Medicinal Plants of the Desert and Canyon West says: “When the liver is overworked, or unequal to the task our brain gives it, its blood vessels enlarge, the fluids move more slowly through it as it tries to increase its working area; it gets enlarged and congested.” He goes on to say that Milk Thistle improves the quality of blood proteins which help move toxins out of the blood. The chemical components of Silymarin are referred to as true hepato-protective or “liver friendly.” The capability of Milk Thistle to protect the liver and enhance its function is due largely to its ability to inhibit certain factors, which result in liver damage. The most significant of these are leukotrienes or free radicals. What makes the silymarin compounds in Milk Thistle even more impressive is that while they protect, they also stimulate liver protein synthesis. This explains why even an injured liver can regenerate tissue more rapidly when Silymarin is present. Leukotrienes, which harm liver tissue, are compounds which are created when oxygen transfers to a polyunsaturated fatty acid. Silybum compounds can help to inhibit the formation of these molecules. The flavonoid-like compounds which comprise silymarin have two specific actions on the liver:

**A.** Silymarin binds hepatocyte (liver cell) membranes which protects them from the potential damage of environmental toxins, (such as the death cap mushroom), foreign chemicals, endogenous poisons and free radicals.

**B.** Silymarin enters the liver cells and promotes their ability to produce certain enzymes which are vital to liver health. This action can speed the healing of liver cells from injury or disease. By enhancing the production of these enzymes, liver cell regeneration is also stimulated (1).

**HERBAL FORMS AND DOSE:**

Doses are given for single herb use and must be adjusted when using herbs in combinations. Doses may also vary according to the type and severity of the condition treated and individual patient conditions.

**ADULT DOSAGES:**

Reputable herbalists recommend a range of doses. Amounts used in studies range from 280 mg to 800 mg of silymarin daily. Most studies have used a concentrated, standardized product containing 70-80% silymarin. Studies using a silybin-phosphatidylcholine complex have used dosages of 100 mg three times daily because absorption is enhanced with this preparation. In Europe, silybin is given parenterally (20-50 mg/kg/day for three or four days) to treat acute hepatotoxicity including Amanita mushroom poisoning.

Standardized milk thistle extract: 100-200 mg p.o. three times daily, taken with meals.

Tea is not the preferred route of administration since silymarin is poorly soluble in water, but if the milk thistle seeds are roasted and broken open they can be used as tea. The usual dose is 12-15 grams of roasted, cracked seeds divided into three doses daily, taken with meals.

Tincture: 3-6 ml (about 1/2-1 tsp.) three times daily with meals.

Availability of standardized preparations: Extracts should be standardized to at least 70% silymarin. The German product Legalon® has been used in most studies (1, 2).

**INTERACTIONS OF MILK THISTLE WITH OTHER DRUGS:**

1. **BIRTH CONTROL PILLS OR HORMONE REPLACEMENT THERAPY:**
   Milk thistle may interfere with the following medications, because both milk thistle and these medications are broken down by the same liver enzymes.

2. **Antiplatelet and anticoagulant drugs (blood thinners):**
   Including clopidogrel (Plavix) and warfarin (Coumadin).

3. **Drugs broken down by the liver:**
   Because milk thistle works on the liver, it may affect drugs broken down by the liver, of which there are many. Speak with your health care provider.

4. **ANTIPSYCHOTICS:**
   Includes butyrophenones (such as haloperidol) and phenothiazines (such as chlorpromazine, fluphenazine, and promethazine)

5. **PHENYTOIN (DILANTIN):**
   A medication used for seizures

6. **Halothane:**
   A medication used during general anesthesia
7. ALLERGY DRUGS:
   Such as fexofenadine (Allegra)

8. DRUGS FOR HIGH CHOLESTEROL:
   Including statins such as lovastatin (Mevacor, Altocor)

9. ANTIANXIETY DRUGS:
   Including alprazolam (Xanax), diazepam (Valium), and lorazepam (Ativan)

10. SOME CANCER DRUGS (3).

DISCUSSION AND CONCLUSION:
   Milk Thistle has different activities like antioxidant, hepato-protective, anticancer and anti-inflammatory. Main active constituent responsible for all of these activities is mainly silymarin. The most important part of Milk Thistle which is mainly used is its seeds. Different dosage form like herbal extract, tincture, powder, liposomes and phytosomes are available in market. There are no known long-term risks to adults associated with milk thistle use.

REFERENCES: