Silybum marianum: Milk Thistle

Common names: Holy thistle, Marian Thistle, Our Lady's thistle, Mary thistle, St. Mary's thistle, Wild Artichoke, Mariendistel (Germany), Chardon-Marie (French). Legalon® (Germany), and Thisilyn (U.S.) and Marin® (US) are trade names. In Chinese, Milk thistle is known as Shui Fei Ji.

Similar plants: Milk thistle should not be confused with blessed thistle, Cnicus benedictus.

What It Is: The ripe seeds of the milk thistle plant. One of the most important constituents of milk thistle is silymarin, which itself consists of several constituents, the most prominent of which is silybinin (silybin).

What It Does:

Milk thistle is used by herbalists to nourish the liver, stomach, intestines, and kidneys. It is used also for liver disease, congestion of the liver or spleen, varicose veins, uterine hemorrhage and menstrual problems. It is used by some herbalists to increase lactation.

Milk thistle is used by conventional medical professionals for liver disease due to toxic insult, inflammatory liver disorders and cirrhosis. Milk thistle may be appropriate in the treatment of ketosis in cattle, increasing milk yield.

Silymarin is thought to:
- Act as an antioxidant
- Inhibit damage to liver cell membranes, thereby protecting against many toxins
- Protect against DNA injury
- Increase protein production by liver cells (one of the major functions of the liver)
- Decrease glutathione destruction (glutathione is crucial to normal immune system function)
- Stabilize mast cells (when these cells degranulate from a tumor, animals can have a shock reaction)
- Decrease activity of tumor promoters

Diabetes: The silymarin component of milk thistle may decrease blood sugar, hemoglobin A1c, and LDL cholesterol levels when used with conventional therapy in people with type 2 diabetes. It has also been shown to reduce insulin resistance in people with coexisting diabetes and alcoholic cirrhosis. It can sometimes reduce insulin need in diabetics.

Liver: Silymarin is thought to act as a liver-protectant. One preliminary study of a specific silibinin preparation improved liver function in people with chronic active hepatitis. However, most studies in patients with hepatitis B or C have generally not shown an improvement in mortality or liver function using...
milk thistle or preparations of milk thistle. Similarly, in liver cirrhosis (alcoholic and non-alcoholic), some preliminary clinical studies suggested that milk thistle might improve liver function and mortality.

Preliminary evidence suggests that milk thistle extract standardized to 70% - 80% silymarin may protect the liver against damage from certain toxins, including drugs such as acetaminophen (Tylenol) and phenytoin (Dilantin).

Administered intravenously (IV), silybinin may lessen liver damage due to poisoning by Amanita phalloides mushroom (death cap) — although this IV preparation is not readily available in the U.S.

In one study of cattle given milk thistle seeds, milk production was increased and ketones in the urine reduced, as compared to controls.

Kidneys: silybin reduces oxidative damage to kidney cells in experiments. In rats, silybin prevented kidney toxicity due to one cancer chemotherapy drug (cisplatin), but did not prevent kidney damage by another chemotherapy drug (cyclosporine).

Blood lipids(cholesterol and triglycerides): silymarin may inhibit synthesis of cholesterol by the liver and reduce blood lipids.

Pancreas: As an antioxidant, silymarin can protect the pancreas against certain forms of damage. In a controlled trial of human diabetics, patients experienced decreases in blood glucose and insulin requirements.

Cancer: Silybinin is under investigation for use in preventing or treating various forms of cancer, especially prostate cancer.

**Milk Thistle’s Different forms:**

Whole dried seed (powder, tablets or capsules): this is the most natural form, but may contain less consistent ingredients than the 70-80% concentrated extract discussed below. Dry milk thistle seed powder contains only 1.5% to about 3.0% silymarin. Consequently, pills made from seed powder contain about 9 to 15 mg of silymarin, while pills made from dry extracts contain approximately 112 mg to 240 mg of silymarin, depending on the size of the pill. People who prefer to use whole herb products as opposed to concentrated extracts should be aware that much larger doses of milk thistle will be necessary to get the same amount silymarin.

70-80% concentrated silymarin extract (powder, tablets or capsules): Most clinical studies of milk thistle's effectiveness have used specific dry extracts standardized to approximately 70 - 80% silymarin on a weight basis, so this is the form of milk thistle that has been studied the most. **At this time, this is the type of milk thistle that we prefer to use.**

Alcohol based liquid extract: components of milk thistle are not very water soluble, so liquid extracts must be alcohol based. Be aware, however, that "liquid extracts" are not necessarily concentrated extracts. One liquid extract product tested in this Review indicated that it was made from milk thistle "seed" as opposed to a "seed extract.” People who prefer to use whole herb products as opposed to concentrated extracts should be aware that much larger doses of milk thistle will be necessary to get the same amount silymarin. Cats often don't like the taste of alcohol based extracts, and may salivate profusely as a result.
Dosage:

Milk thistle should be used for at least 8 weeks before expecting results such as improvement in bloodwork.

- Dried whole seed: 15-20mg/lb once daily
- 70-80% silymarin extract: 2-5 mg/lb 2-3 times daily
- Alcohol extract: 2-5 mg/lb 2-3 times daily

Cautions and Concerns:

Milk thistle and its extracts are generally well-tolerated but, infrequently, can have a laxative effect and cause other gastrointestinal side-effects.

Some patients may have allergic reactions to milk thistle including itching, rash, hives, eczema, and anaphylaxis. Allergic reactions may be more likely to occur in patients sensitive to plants such as ragweed, chrysanthemums, marigolds, and daisies.

Although drug interactions have not been reported, milk thistle might reduce the effectiveness of oral contraceptives and it might inhibit certain liver enzymes (cytochrome P450 2C9), increasing the levels of certain drugs metabolized by it such as amitriptyline, diazepam, verapamil, and warfarin. Milk thistle may cause need for decreased insulin doses in diabetics.

When milk thistle should not be used (contraindications): No known contraindications have been reported. Milk thistle has been recommended for problems associated with the gallbladder during pregnancy, and so is likely to be safe even for pregnant and lactating animals.

Toxicology and Adverse effects: Milk thistle is relatively nontoxic, and in one study, mice tolerated a dose of 20g/kg, 1000x the usual dose. Allergic reactions have been reported.

ConsumerLabs Testing:

ConsumerLab.com has purchased and tested milk thistle products to determine which extracts on the market contained the level of silymarin on the label. All products were also tested for lead contamination, as this can occur in herbal supplements. Tablet and caplet products were additionally tested for their ability to properly break apart for absorption. Liquid products and standard capsules do not undergo this testing, as they will quickly release their contents.

To further assist consumers, ConsumerLab.com licenses its flask-shaped CL Seal of Approved Quality to manufacturers for use on labels of products that have passed its testing. ConsumerLab.com will periodically re-evaluate these products to ensure their compliance with ConsumerLab.com's standards. You can get more information about ConsumerLabs at http://consumerlabs.com.

As you can see in the test results table below, all milk thistle products are not equal, and consumers need to take care when buying these products. Those products which did not pass ConsumerLabs testing, or are for some other reason not recommended by us, are listed below as NOT APPROVED. Note that many of the recommended doses are for people, not animals. Only the Nutramax products are made for specifically for dogs and cats.
<table>
<thead>
<tr>
<th>Product Name, Claimed Amount and Type of Milk Thistle per Unit</th>
<th>Company</th>
<th>Claimed (C) or Minimum Expected (E) Silymarin Per Daily Serving (mg)</th>
<th>RESULTS</th>
<th>Contained Amount of Silymarin on Label</th>
<th>Purity (Lack of Lead)</th>
<th>DisinTEGRATED Properly (applies only to tablets and caplets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNCA Milk Thistle Pro 250 mg (250 mg 80% silymarin extract per capsule, 3 per day)</td>
<td>Dist. By CNCA Health</td>
<td>600 mg (C)</td>
<td>APPROVED</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Designs for health® Milk Thistle (140 mg 80% silymarin extract per capsule, 1 per day)</td>
<td>Dist. by Designs for Health, Inc</td>
<td>112 mg (C)</td>
<td>NOT APPROVED</td>
<td>Did not list plant part **</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Enzymatic Therapy™ Milk Thistle X™ (150 mg 80% silymarin extract per ultracap, 6 per day)</td>
<td>Mfd. by Enzymatic Therapy, Inc</td>
<td>720 mg (C)</td>
<td>NOT APPROVED</td>
<td>Found only 59.2% of claimed silymarin</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Gaia Herbs Liquid Phyto-Caps Milk Thistle Seed (150 mg 80% silymarin extract per capsule, 3 per day)</td>
<td>Dist. by Gaia Herbs</td>
<td>360 mg (C)</td>
<td>APPROVED</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
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<tr>
<td>Nature's Apothecary® Milk Thistle (500 mg seed per mL of liquid, 1-3 mL per day)</td>
<td>Mfd. by Nature's Apothecary</td>
<td>7.5 mg - 22.5 mg (E)†</td>
<td>NOT APPROVED</td>
<td>Found only 19.5% of expected silymarin</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Nature's Way® Thisilyn® Standardized Milk Thistle Extract Maximum Absorption Formula 2X (175 mg 80% silymarin extract per capsule, 3 per day)</td>
<td>Dist. by Nature's Way</td>
<td>420 mg (C)</td>
<td>APPROVED</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Nutramax Marin for cats (silybin A+B 9 mg per tablet with phosphatidyl choline, 1-2 daily)</td>
<td>Mfd. By Nutramax</td>
<td>9-18 mg (C)</td>
<td>APPROVED</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
</tr>
<tr>
<td>Nutramax Marin for small to medium dogs (silybin A+B 24 mg per tablet with phosphatidylcholine and zinc, 1/4-1 daily)</td>
<td>Mfd. By Nutramax</td>
<td>6-24 mg (C)</td>
<td>APPROVED</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
</tr>
</tbody>
</table>
# MILK THISTLE SUPPLEMENTS

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Manufacturer/Supplier</th>
<th>Dosage/Composition</th>
<th>Approval Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutramax Marin for large dogs (silybin A+B 70 mg per tablet with phosphatidylcholine and zinc, ½ to 1½ daily)</td>
<td>Mfd. By Nutramax</td>
<td>35-135 mg (C)</td>
<td>APPROVED</td>
<td>?</td>
</tr>
</tbody>
</table>
| Planetary Herbals™ Full Spectrum™ Silymarin 80 ™ 260 mg (210 mg 80% silymarin extract and 50 mg organic seed per tablet, 1-2 per day) | Dist. by Planetary Formulas | 168.7 mg - 337.5 mg (E)
|                                                                   |                        | NOT APPROVED       | Found only 64% of expected silymarin | NA                                                                  |
| Puritan's Pride® Silymarin Milk Thistle 1000 mg (250 mg of a 4:1 extract equivalent to 1,000 mg seed per softgel, 1-2 per day)*** | Mfd. By Puritan's Pride  | 15 mg - 30 mg (E)  | APPROVED       | ?                                                                    |
| Rainbow Light® Milk Thistle Plus™, (500 mg of 4:1 extract providing 50 mg silymarin per tablet, 3 per day) | Dist. By Rainbow Light Nutritional Systems | 150 mg (C)          | NOT APPROVED   | Found only 83.8% of claimed silymarin Found 1.1 mcg lead per daily serving | |
| Rite Aid Milk Thistle 200 mg (200 mg 80% silymarin extract per capsule, 1-3 per day) | Dist. by Rite Aid Corporation | 160 mg - 480 mg (C) | NOT APPROVED   | Found only 65.8% of claimed silymarin | |
| Trader Darwin's™ Milk thistle 250 (250 mg 80% silymarin extract per capsule, 1-6 per day) | Dist. By Trader Joe's | 200 mg - 1200 mg (C) | APPROVED       | ?                                                                    |
| Vitamin World® Silymarin Milk Thistle 1000 mg (250 mg of a 4:1 extract equivalent to 1,000 mg seed per softgel, 1-2 per day) | Dist. By Vitamin World, Inc | 15 mg - 30 mg (E)  | APPROVED       | ?                                                                    |
| Whole Foods™ Standardized Milk Thistle 100 mg (100 mg 80% silymarin extract per capsule, 4-6 per day) | Dist. By Whole Foods   | 320 - 480 mg (C)   | NOT APPROVED   | Found only 64% of claimed silymarin | |

** Does not meet FDA label requirements. Disqualified from further testing.

*** Product identical in formulation and manufacture to a product that has passed testing but sold under a different brand.

1 Expected minimum silymarin in seed powder is 1.5% but may contain up to twice that amount.

2 Includes expected minimum silymarin in seed plus claimed 168 mg silymarin from extract per tablet

Manufacturers may change ingredients and label information at any time. So be sure to check labels carefully when evaluating the products you use or buy. If a product's ingredients differ from what is listed above, it may not necessarily be the same as what was tested.

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References:

103. Cavalieri S. [Controlled clinical trial of silymarin in 40 patients]. [Ita]. Gazz Med Ital 1974;133:628-35.