



# Liver Support & Detoxification\*

DIETARY SUPPLEMENT



## Supports healthy liver function and detoxification\*

- Milk thistle seed extract and curcumin promote antioxidant support by increasing levels of the endogenous antioxidant glutathione (GSH) and decreasing lipid peroxidation\*
- Provides standardized extracts from milk thistle seed, turmeric rhizome and licorice root
- Includes lipotropes choline and L-methionine

GENESTRA BRANDS Liver Support and Detoxification\* provides a combination of nutrients and herbs that promote a healthy liver, the primary site for the detoxification of metabolic waste products.<sup>1-6\*</sup> Research demonstrates that milk thistle increases the activity of detoxifying enzymes in the liver.<sup>1\*</sup> Along with active ingredients in turmeric and licorice, milk thistle supports and enhances the body's antioxidant defense system.<sup>2-4\*</sup> Milk thistle and licorice also promote a healthy cytokine balance to further maintain liver health.<sup>2,4\*</sup> In a randomized, placebo-controlled trial, daily supplementation with 140 mg of silymarin (the primary bioactive in milk thistle) for two months significantly promoted healthy levels of the liver enzymes alanine transaminase (ALT) and aspartate transaminase (AST), two important clinical markers of healthy liver function.<sup>6,7\*</sup> Lipotropic compounds, including choline and L-methionine, are also included to support healthy lipid metabolism in the liver.<sup>5\*</sup>

## Supplement Facts

Serving Size 1 Capsule  
Servings per Container 60

Each Capsule Contains		%DV
Biotin	50 mcg	17%
Choline Bitartrate	200 mg	†
Inositol	25 mg	†
Calcium-D-Glucarate	50 mg	†
Indole-3-Carbinol	25 mg	†
L-Methionine	25 mg	†
L-Glycine	25 mg	†
Milk Thistle ( <i>Silybum marianum</i> ) Seed Std. Extract (80% silymarin)	100 mg	†
Turmeric ( <i>Curcuma longa</i> ) Rhizome Std. Extract (95% curcuminoids)	80 mg	†
Licorice ( <i>Glycyrrhiza glabra</i> ) Root Std. Extract (20% glycyrrhizin)	50 mg	†
Limonene (from <i>Citrus sinensis</i> peel oil)	25 mg	†

† Daily Value (DV) not established

Other ingredients: Hypromellose, silica, magnesium stearate

**Recommended Adult Dose:** Take one capsule two times daily with a meal or as recommended by your healthcare practitioner.

**Product Size:** 60 Vegetable Capsules **Product Code:** 06368



## REFERENCES

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## Scientific Rationale:

The liver is the primary organ responsible for cleaning and detoxifying the blood.<sup>1</sup> In recent years, studies have extensively investigated the ability of milk thistle to maintain liver health.<sup>1</sup> Milk thistle contains silymarin, a flavonoid and flavonolignan complex.<sup>1</sup> The primary flavonolignan in silymarin is silybin, which has been shown in animal research to promote liver function through its influence on phase II detoxifying enzymes.<sup>2\*</sup> In vitro and clinical trials demonstrate that silybin further supports liver health and function by effectively scavenging free radicals, promoting a healthy cytokine balance and maintaining healthy liver cell structure.<sup>3-6\*</sup>

The formation of reactive oxygen species (ROS) can impair liver cell health, and silybin has shown to decrease free radical formation and lipid peroxidation.<sup>1</sup> Increases in the generation of ROS are also associated with the activation of NFκB, a DNA-binding protein that acts as a gene transcription factor.<sup>1</sup> After a period of oxidative stress, NFκB dissociates from its inhibitor protein in the cytoplasm and translocates into the nucleus, where it can stimulate the activity of cytokines and chemoattractants (which mediate the migration of cells).<sup>1</sup> In vitro research demonstrates that silybin decreases the activation of NFκB and directly reduces the production of various chemoattractants.<sup>1,3\*</sup> Collectively, this decreases the migration of white blood cells into the liver and helps to maintain a healthy liver cytokine balance.<sup>1,3\*</sup> The production of type I collagen, a component of the extracellular matrix, also increases during higher levels of ROS formation.<sup>3\*</sup> Due to its strong antioxidant effects, silybin has been shown to decrease the chemically-induced production of type I collagen fibers, which helps to maintain proper liver structure.<sup>3\*</sup>

In a randomized, double-blind, placebo-controlled trial involving 49 adults, silymarin supplementation significantly mediated intracellular antioxidant status and lipid peroxidation.<sup>4\*</sup> Participants were randomly assigned to consume either a placebo or silymarin supplement (150 mg of silymarin three times daily) for six months.<sup>4</sup> Glutathione (GSH, an intracellular antioxidant) content in erythrocytes and malondialdehyde (MDA, a marker of lipid peroxidation) levels in platelets were measured at baseline and after the completion of the supplementation period.<sup>4</sup> Silymarin supplementation significantly increased GSH and decreased MDA levels, demonstrating its ability to support the antioxidant defense system.<sup>4\*</sup>

Silymarin supplementation also significantly supported liver health in a randomized, double blind, placebo-controlled trial involving 74 adults.<sup>5\*</sup> Participants were randomized to consume a placebo or silymarin treatment (140 mg of silymarin) three times daily for eight weeks.<sup>5</sup> Liver function was measured at baseline, on days 2, 4 and 7, and at weeks 2, 4 and 8.<sup>5</sup> Outcome measures included biliary excretion (measured by normal urine and skin color) and liver cell health (measured by indirect bilirubin levels).<sup>5</sup> Bile contains bile salts and bilirubin, and flows from the liver to the gallbladder and small intestine.<sup>6</sup> Approximately 95% of bile salts are reabsorbed in the small intestine, while 5% are excreted in the feces.<sup>6</sup> Decreased bile flow can result in the accumulation of bilirubin, a yellow pigment that is produced from the breakdown of hemoglobin and is removed by the liver.<sup>6</sup> When compared to the placebo group, silymarin helped promote both healthy biliary excretion (normal urine and skin color) and liver cell health (healthy indirect bilirubin levels), further indicating its beneficial effect on the liver.<sup>5\*</sup>

Similarly, in a randomized trial involving 50 adults, silymarin supplementation promoted healthy levels of liver enzymes.<sup>7\*</sup> Participants were randomized to either a placebo or silymarin group (where they consumed 140 mg of silymarin daily for two months).<sup>7</sup> Blood samples were taken at baseline and after the two-month treatment period, they were analyzed for alanine transaminase (ALT) and aspartate transaminase (AST) levels, two enzymes clinically used to indicate liver health.<sup>7,8</sup> Although no significant effects were observed in the placebo group, silymarin supplementation significantly promoted healthy serum levels of both enzymes, demonstrating the ability of silymarin to maintain liver health.<sup>7\*</sup>

## Curcumin

Curcumin is the primary bioactive ingredient in turmeric and is responsible for its yellow pigmentation.<sup>9</sup> Animal research demonstrates that curcumin exerts beneficial effects on liver health, its mechanism of action being similar to that of milk thistle.<sup>10\*</sup> Curcumin has strong antioxidant properties and has been shown to increase levels of the intracellular antioxidant GSH.<sup>10\*</sup> Curcumin also promotes healthy levels of ALT and decreases the activity of NFκB.<sup>10\*</sup> Animal studies have also found that supplementation with turmeric helps to promote bile canalliculi health, promoting bile flow through the body.<sup>11,12\*</sup>

## Glycyrrhizin

Licorice has been used in traditional medicine since ancient times.<sup>13</sup> The health benefits of licorice stem from glycyrrhizin, a bioactive compound present in its roots.<sup>13</sup> Animal research has demonstrated that like silymarin and curcumin, glycyrrhizin supports liver health by mediating GSH levels, decreasing lipid peroxidation, maintaining healthy liver enzyme levels and promoting a healthy cytokine balance.<sup>14\*</sup>

## Liver Metabolism:

Lipotropic compounds, including choline and L-methionine, support healthy lipid metabolism in the liver by promoting the proper transport of fatty acids, improving the formation of triglyceride-rich lipoproteins and mediating the synthesis of lipids.<sup>15,16\*</sup> Choline is reversibly metabolized into phosphatidylcholine, which constitutes 70-95% of the phospholipid content of lipoproteins.<sup>17</sup> Specifically, phosphatidylcholine is required for the production of very low density lipoproteins (VLDL), which secrete fat from the liver.<sup>17</sup> Normal levels of choline are therefore necessary for adequate levels of phosphatidylcholine for lipoprotein synthesis.<sup>16</sup> In turn, this promotes the healthy secretion of lipoproteins and triglycerides from the liver into the plasma.<sup>16,17\*</sup> Clinical trials have found that supplementing with choline after consuming a low-choline diet promotes liver health in adults, in part, by mediating hepatic lipid accumulation.<sup>18-19</sup> Similarly, L-methionine promotes healthy lipid metabolism as a precursor to phosphatidylcholine and choline.<sup>16\*</sup> L-Methionine may also help promote liver function through its role as a precursor to the universal methyl donor S-Adenosyl-L-methionine (SAM).<sup>20</sup> After donating a methyl group, SAM is involved in the hepatic production of the potent antioxidant glutathione.<sup>21\*</sup> SAM may also mediate the proliferation of hepatocytes, liver TNF-α levels and membrane fluidity to further maintain liver health and function.<sup>22\*</sup>

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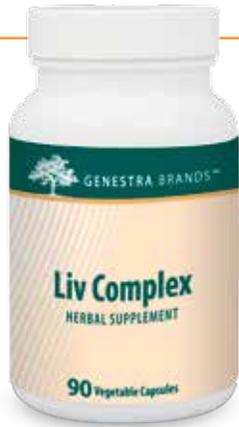
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## Companion products



### Liv Complex

- Helps support liver health and function\*
- Provides antioxidant support\*
- Includes extracts from globe artichoke, dandelion, milk thistle, bupleurum and fringetree



### Phos Choline

- Supports optimal liver health\*
- Provides 2880 mg of phosphatides per day



### Dtx-gen

- Phytoembryotherapy formula that captures the power of the meristem and growth cycle\*
- Synergistic combination of silver birch sap, black currant bud extract and silver birch bud extract

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