



# Globe Artichoke

*Cynara scolymus*

## Common names

Artichoke, cynara

## Family

Asteraceae (Daisy)

## Part used

Leaf

## Background and traditional uses

Globe artichoke is a large, perennial, thistle-like herb with a large central flower that can grow up to 2.5m tall. It is native to Mediterranean Southern Europe and Northern Africa, where it has a tendency to invade disturbed grasslands particularly in coastal areas.

Its cultivation, mainly in subtropical regions, dates back to ancient Greek and Roman eras where it was used as a medicinal plant, garden ornamental and culinary delicacy.

The pharmacological and therapeutic effects of globe artichoke's leaves on the liver have been understood since the 17th century and it has been a popular medicine in many pharmacopoeias worldwide.

Modern studies have served to confirm the stimulating properties of artichoke leaf preparations on both the liver and gallbladder.<sup>1</sup>

## Actions

### Primary:<sup>2-4,6,7</sup>

- Choleric
- Cholagogue
- Antioxidant
- Hypocholesterolaemic
- Bitter tonic
- Hepatoprotective
- Hepatotrophorestorative
- Mild diuretic

### Secondary:<sup>3</sup>

- Prebiotic
- Carminative
- Spasmolytic
- Antiemetic

## Applications and indications

- Useful in the treatment of dyspepsia and irritable bowel syndrome (IBS).<sup>8,9</sup>
- The German Commission E has approved the use of globe artichoke for dyspeptic problems.<sup>10</sup>
- The African Pharmacopoeia indicates its use for the treatment of liver dysfunction.<sup>10</sup>
- The EMA has approved the use of globe artichoke for the symptomatic relief of digestive disorders associated with bloating, flatulence and the sensation of fullness.<sup>5</sup>
- Health Canada recommends the use of globe artichoke to help increase bile flow and to help relieve digestive disturbances, including dyspepsia.<sup>11</sup>

## Active constituents and pharmacodynamics

Globe artichoke leaves contain a variety of phenolic acids (mainly caffeic acid derivatives like cynarin and chlorogenic acid), sesquiterpenes, lactones (like cynaropicrin) and flavonoids (including cynaroside, luteolin derivatives and anthocyanin), which are thought to be the most pharmacologically active constituents of the plant. Cynara is also rich in phytosterols, luteolin and a range of antioxidant compounds.<sup>3</sup>

The dicaffeoylquinic acid, **cynarin**, and its precursor, **chlorogenic acid**, are considered to be the major contributors to the choleric and hepatoprotective actions of globe artichoke. They appear to be bile stimulating compounds that facilitate the elimination of toxin-laden bile into the digestive tract where it can be eliminated in the faeces.<sup>12</sup> In one study, the hepatoprotective activity of cynarin against carbon tetrachloride (CCl<sub>4</sub>) induced toxicity in isolated rat hepatocytes was compared with other phenolic compounds. Only cynarin and, to a lesser extent, caffeic acid, showed a cytoprotective effect.<sup>13</sup>

Several *in vitro* and *in vivo* studies have confirmed the antioxidant and hepatoprotective properties of globe artichoke leaves and their active components against hepatic cell damage caused by various hepatotoxins.<sup>14</sup>

In a rat model study, glutathione peroxidase activity was elevated in the artichoke group compared to the control group. A protein oxidation biomarker, 2-amino adipic semialdehyde, was decreased in plasma proteins and haemoglobin in the artichoke-fed group versus the control group. The trial concluded that the protective antioxidative activity of globe artichoke was confirmed *in vivo*.<sup>4</sup>

The presence of the prebiotic substance inulin and a range of vitamins and minerals have given globe artichoke a solid reputation as a 'functional food'.<sup>15</sup>

## Summary of clinical evidence

### Dyspepsia and IBS

In a double-blind, randomised placebo-controlled trial, 247 patients with functional dyspepsia were split into two groups and treated with either a placebo or a commercial globe artichoke dried plant extract, Hepar-SL, determined to be between a 3.8-5.5:1 drug to extract ratio, taken at 640 mg three times daily.<sup>8</sup> Patient experience was measured using weekly ratings of dyspeptic symptoms (fullness, flatulence, early satiety, nausea, vomiting and epigastric pain) and a quality of life survey, the Nepean Dyspepsia Index (NDI). Over six weeks of treatment, the alleviation experienced by the study group was consistently and significantly greater than the placebo group.<sup>8</sup>

A post-marketing open label study, included 516 media-recruited participants with self-reported dyspepsia, and subjects were given either a 320mg or 640mg daily dose of a standardised (1:5) aqueous full-spectrum extract of globe artichoke leaves.<sup>9</sup> The NDI and the State-Trait Anxiety Inventory (STIA) were completed at baseline and following two months of treatment. At the conclusion of the study, participants in both groups reported a 40% reduction in dyspeptic symptoms. Quality of life was significantly improved in both groups, with the higher dosage group reporting a greater relief of symptoms of anxiety.<sup>9</sup> A subsequent analysis on this study focusing on reported bowel patterns concluded that the treatment additionally alleviated irritable bowel syndrome incidence in both groups.<sup>6</sup>

### Hypercholesterolaemia and hyperlipidaemia

In a double-blind, randomised, placebo-controlled study, 75 otherwise healthy patients with hypercholesterolaemia were administered a daily dose of 1.28g of standardised globe artichoke extract or placebo over 12 weeks.<sup>16</sup> At the conclusion of the trial, total plasma cholesterol had lowered by an average of 4.2%, compared to the control group who had an increase of 1.9%. Although the results were modest, they are considered clinically significant.<sup>16</sup>

An additional double-blind, randomised, placebo-controlled trial, with 143 patients who had a baseline total cholesterol level of > 7.3 mmol/l (> 280 mg/dl) were administered either 1.8g of a 25-35:1 concentrated globe artichoke extract or placebo.<sup>17</sup> After six weeks of treatment, changes in total cholesterol and LDL-cholesterol from baseline to the end of treatment showed a statistically significant superiority ( $p=0.0001$ ) in the study group compared to placebo.<sup>17</sup>

### Hyperglycaemia

A clinical trial involving 30 participants with type 2 diabetes divided into two groups to test the effect of globe artichoke on blood glucose levels.<sup>18</sup> The control group received plain wheat crackers to eat, while the study group received crackers that contained 6g of whole, dried globe artichoke powder. The study group measured an average of 1% reduction in fasting and post prandial blood glucose after 90 days, which was significant when compared to placebo.<sup>18</sup>

### Hepatoprotective

Although no human trials have measured the hepatoprotective actions of globe artichoke, there is substantial preclinical evidence to support these properties.

In one *in vitro* study on isolated rat hepatocytes, isolated cynarin was shown to protect the liver against induced carbon-tetrachloride toxicity, which mimics the pathology of several liver diseases.<sup>13</sup> Another study on isolated rat hepatocytes linked the antioxidant and hepatoprotective actions of globe artichoke.<sup>14</sup>

## Dosage summary

**Liquid extract (1:1):** 20–55 mL weekly<sup>19</sup>

**Dried herb equivalent:** 6 g daily<sup>3</sup>

## Safety information

- Not to be prescribed to individuals with a known allergy to artichokes or to other plants in the *Asteracea* family.<sup>3</sup>
- To be used with caution for patients with known bile duct obstructions.<sup>12</sup>
- To be used with caution in patients with liver diseases, septic cholecystitis, intestinal spasm or any diseases linked with hyperbilirubinaemia.<sup>7</sup>

## References

1. Rondanelli M, Monteferrario F, Perna S, et al. Health-promoting properties of artichoke in preventing cardiovascular disease by its lipidic and glycemic-reducing action. *Monaldi Arch Chest Dis* 2013;80:17–26.
2. Kirchoff R, Beckers C, Kirchoff GM, et al. Increase in cholerisis by means of artichoke extract. *Phytomedicine* 1994;1(2):107–153.
3. Braun L, Cohen M. *Herbs and natural supplements: an evidence-based guide*, 4th ed. Sydney: Churchill Livingstone/Elsevier, 2014.
4. Jiménez-Escrig A, Dragsted LO, Daneshvar B, et al. *In vitro* antioxidant activities of edible artichoke (*Cynara scolymus* L.) and effect on biomarkers of antioxidants in rats. *J Agric Food Chem* 2003;51(18):5540–5545.
5. European Medicines Agency. Assessment report on *Cynara scolymus* L. *folium*, 2011. Viewed 3 Apr 2017, [http://www.ema.europa.eu/docs/en\\_GB/document\\_library/Herbal\\_-\\_HMPC\\_assessment\\_report/2011/12/WC500119940.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/Herbal_-_HMPC_assessment_report/2011/12/WC500119940.pdf)
6. Bundy R, Walker AF, Middleton RW, et al. Artichoke leaf extract (*Cynara scolymus*) reduces plasma cholesterol in otherwise healthy hypercholesterolemic adults: a randomized, double blind placebo controlled trial. *Phytomed* 2008;15(9):668–675.
7. Bone K, Mills S. *Principles and practice of phytotherapy*, 2<sup>nd</sup> ed. Sydney: Churchill Livingstone, 2013.
8. Holtmann G, Adam B, Haag S, et al. Efficacy of artichoke leaf extract in the treatment of patients with functional dyspepsia: a six-week placebo-controlled, double-blind, multicenter trial. *Aliment Pharmacol Ther* 2003;18:1099–1105.
9. Marakis G, Walker AF, Middleton RW, et al. Artichoke leaf extract reduces mild dyspepsia in an open study. *Phytomed* 2001;9(8):694–699.
10. Blumenthal M, Goldberg A, Brinckmann J (eds.) *Herbal medicine: expanded commission E monographs*. Austin: American Botanical Council, 1998.
11. Monograph: globe artichoke. Health Canada 2008. Viewed 3 Apr 2017, <http://webprod.hc-sc.gc.ca/>
12. Aku O, Altinterim B. Hepatoprotective effects of artichoke (*Cynara scolymus*). *Bilim V Genclik Dergisi* 2013;1(2):46–50.
13. Adzet T, Camarasa J, Laguna JC. Hepatoprotective activity of polyphenolic compounds from *Cynara scolymus* against CCl<sub>4</sub> toxicity in isolated rat hepatocytes. *J Nat Prod* 1987;50(4):612–617.
14. Gebhardt R. Prevention of taurolithate-induced hepatic bile canaliculi distortions by HPLC-characterized extracts of artichoke (*Cynara scolymus*) leaves. *Planta Med* 2002;68(9):776–779.
15. Ceccarelli N, Curadi M, Picciarelli P, et al. Globe artichoke as a functional food. *Mediterr J Nutr Metab* 2010;3:197–201.
16. Bundy R, Walker AF, Middleton RW, et al. Artichoke leaf extract reduces symptoms of irritable bowel syndrome and improves quality of life in otherwise healthy volunteers suffering from concomitant dyspepsia: a subset analysis. *J Altern Complement Med* 2004;10(4):667–669.
17. Englisch W, Beckers C, Unkauf M, et al. Efficacy of artichoke dry extract in patients with hyperlipoproteinemia. *Arzneimittelforschung* 2000;50(3):260–265.
18. Nazni P, Vijayakumar TP, Alagianambi P, et al. Hypoglycemic and hypolipidemic effect of *Cynara scolymus* among selected type 2 diabetic individuals. *Pakistan Journal of Nutrition* 2006;(2):147–151.
19. European scientific cooperative on phytotherapy (ESCOP). *ESCOP Monographs*, 2<sup>nd</sup> ed. Stuttgart: ESCOP Thieme, 2003.



