1) **Name of Herb**: Artichoke

2) **Scientific and Common names**: Cynara scolymus (Latin name), Cynarae folium (Pharmacopeial name), Globe artichoke (other names).[i]
Family: Asteraceae or Compositae.[ii]

3) **Active ingredients**: The active constituents are phenolic acids, which is mostly chlorogenic acid that has anti-hyperlipidemic effects by having a cholesterol lowering effect. Other active constituents include phenolic alcohols, such as cynarin, which stimulates bile production.[iii] Cynaroside and luteolin may indirectly inhibit HMG-CoA reductase. Flavonoids including caffeic acid, and scolymoside are other active ingredients found in artichoke that are said to have hepatoprotective activity. [ii]

4) **MOA**: Artichoke has shown to have lipid-lowering effects by inhibiting cholesterol biosynthesis in animal models. Artichoke also may inhibit HMG-Co-A- reductase, but this inhibition was not found to be direct. [iv] Artichoke is thought to have hepatoprotective effects because in animal studies they found improved hepatic regeneration, improved hepatic blood flow, and increased hepatocyte counts.[v] The flavonoids in artichoke have shown to have antioxidative effects, and GI benefits such as improved dyspepsia.[ii]

5) **Current indications and efficacy**: Artichoke is used for dyspepsia, dyslipidemia, as a diuretic, and as a choleretic.[i,ii] Throughout history artichoke has been used for treating snakebites, renal insufficiency, anemia, edema, and arthritis. Now extracts are used in indigestion remedies, as cholesterol lowering medications, and as a source of antioxidants. [ii]

   A human study looking at 553 patients showed that artichoke extract is efficacious in the treatment of non-ulcer dyspepsia caused by dyskinesia of the bile duct.[v] Artichoke significantly decreased the symptoms of nausea (82.4%), vomiting (88.3%), flatulence (68.2%), and abdominal pain (76.2%), with a total adverse effects rates of 1.3%. These improvements of symptoms were seen after 2 to 6 weeks of treatment.[ii] This study was published in German; therefore the primary literature was not used to report the results found in the study.

   In a study looking at the protective properties of artichoke they found that artichokes do have protective properties against oxidative stress induced by inflammatory mediators, and oxidative LDL in preventing atherogenesis on cultured endothelial cells and monocytes.[vi] They studied aqueous and ethanolic extracts from artichoke and found that in a 24 hour preincubation period 50μg/ml aqueous extract caused an inhibition of oxidative LDL by 15% while the 50μg/ml ethanolic extract caused an inhibition of oxidative LDL by 29% with a $p=0.05$ therefore these results were statistically significant.[vi] From these results they concluded that artichoke extract can be used for the treatment of atherosclerosis by lowering oxidation of LDL.[vi] A separate study of the effect of artichoke extract

showed a partial inhibition of serum levels of cholesterol by 20% in rat hepatocytes at low levels of extract and 60% at high levels of extract, with minimal toxicity and a p=0.05 which was statistically significant.[iv] Therefore artichoke extract may reduce hepatic cholesterol biosynthesis. Although this study was not a head to head comparison with that of station's which are direct inhibitors of the HMGCoA-reductase enzyme, the authors do claim that artichoke extracts, which are indirect inhibitors of the enzyme have less toxicity to the hepatic cells than the statin's.[iv] Due to the statistical significance of the values given in these studies as well as being published in reputable journals these studies are reliable, but their results were not in human subjects, they were in vitro and in vivo studies.

Due to the demand of natural antioxidants vs. synthetics, artichoke extract has been studied as a source of natural antioxidant.[vii] It has been found to contain large amounts of caffeic acids, which are the main phenolic compounds in artichoke heads.[vii] A study compared three types of artichoke looking at their antioxidant properties. The Imperial Star artichoke leaves contained the highest antioxidant levels of 7.2%, the Violet artichoke contained 4.1% antioxidant level, and the Green Globe artichoke had a 6.4% antioxidant level.[viii] They also found that a 60% solution of methanol gives the best yield of antioxidants from artichokes.[viii] This study was from a journal of the American Chemical Society which is a reputable journal, therefore this is a reliable study.

6) **Contraindications/allergies**: Patients that have hypersensitivity to artichoke, or allergic reactions to Asteraceae/Compositae family plants, which include ragweed, chrysanthemums, marigolds, and daisies may have allergies to artichoke. Artichoke is contraindicated in patients that have biliary obstruction.[ii]

7) **Dosage forms, recommended doses, duration**:

Leaf: 2 grams TID.[i]
Dry extract: 12:1 (w/w) → 0.5 grams single daily dose. [i]
Fluidextract 1:1 (g/ml) → 2ml TID.[i]
Tincture: 1:5 (g/ml) → 6ml TID.[i]

Recommended doses for dyslipidemia is 60 to 1000 mg of the cynarin component given in two to three divided doses. For dyspepsia oral extract dose is 300 to 400 mg of dried artichoke extract three times a day. The maximum daily dose of artichoke leaf is 6 grams.[vi] The pharmacokinetics of artichoke is that there is an initial response noticed with in 30 to 60 minutes of administration both in the dyspeptic effects, and in the choleretic effect The duration of action of artichoke in treating dyspepsia and dyslipidemia is 1 to 3 hours for a single dose, with a peak response about 30 to 60 minutes after artichoke administration.

8) **Drug interactions and Drug-Disease interactions**: No drug interactions have been found with artichoke extract. Patients with gallstones should use artichoke

extract with caution because it increases bile flow, which may worsen gallstones. [ii]

9) **Other safety issues**: There is no data available regarding the use of artichoke in children under the age of 12, therefore there is no pediatric dose specified in literature. The use of artichoke in pregnancy has not been evaluated. Some side effects of artichoke may include: weakness, diarrhea, hunger and there has been a case report of hypercholesterolemia.[ix]

10) **Other comments**: I was not able to find efficacy of artichoke use in treatment of snakebites other than what was listed as historical usage. Monitoring parameters include bilirubin, liver enzymes, uric acid (decrease in levels has been noticed), and body weight (possible decrease).[ix]

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[iii] Bruneton J. Pharmacognosy phytochemistry medicinal plants. 2nd ed. Secaucus (NJ): Lavoisier Publishing:1999.

[iv] Gebhardt R: Inhibition of cholesterol biosynthesis in primary cultured rat hepatocytes by artichoke (Cynara scolymus L) extracts. J Pharmacol Exp Ther 1998; 286(3):1122-1128.

[v] Fachinformation: Hepar-POS(R), Artichoke extract. Ursapharm Arzneimittel GmbH, Saarbrucken, Germany, 1998.

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[ix] AltMedDex® System:
Abt L & Hammerly M (Eds): AltMedDex® System. MICROMEDEX, Greenwood Village, Colorado (Edition expires [3/2003]).

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