



Benefits White Paper



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Contents

Introduction	3
1. Features, CholeFree ACE™ Artichoke Cynarin Extract (ACE)	3
2. Composition and Bioactive Compounds	4
3. Bioactivity Overview	6
4. Mechanisms of Action	7
5. Uses & Applications	8
Health Benefits (Research-Based Overview)	8
6. Cholesterol and Lipid Metabolism Support.....	8
7. Liver Health and Hepatocyte Protection.....	9
8. Digestive Health and Nutrient Absorption	9
9. Antioxidant and Cardiovascular Support	9
Summary.....	10
Research Citations	11

Introduction

The globe artichoke (*Cynara scolymus L.*) is a perennial herb in the Asteraceae family whose immature flower buds are widely consumed as a vegetable. Beyond its culinary value, artichoke has long been used in traditional medicine for digestive discomfort and liver ailments. Modern phytochemical analyses reveal that artichoke leaves and by-products are rich sources of phenolic acids, particularly caffeoylquinic acids such as Cynarin (1,3-O-dicaffeoylquinic acid) and chlorogenic acid (Llorach et al., 2002). The high concentration of these compounds has stimulated interest in standardized artichoke extracts as nutraceutical ingredients for supporting lipid metabolism, liver function and cardiovascular health.

Cynarin is the principal caffeoylquinic acid in artichoke and contributes to the plant's characteristic bitter taste. Standardized extracts ensure consistent levels of Cynarin and related polyphenols, enabling reproducible physiological effects in dietary supplements. The sections below summarize the composition, mechanisms of action and clinical evidence supporting CholeFree ACE™, a Cynarin-rich artichoke extract, for lipid modulation and hepatobiliary support.

1. Features, CholeFree ACE™ Artichoke Cynarin Extract (ACE)

CholeFree ACE™ is a standardized Artichoke Cynarin Extract (ACE) designed for dietary supplement and functional food applications. Key features include:

- Derived from *Cynara scolymus* (globe artichoke)
- Standardized for Cynarin and artichoke polyphenols
- Supports cholesterol metabolism and lipid balance
- Promotes liver and hepatocyte health
- Enhances bile production and fat digestion
- Provides antioxidant protection

Primary benefit areas associated with CholeFree ACE™ include:

- Cholesterol management
- Liver health and detoxification support
- Digestive comfort and nutrient absorption
- Cardiovascular and metabolic support
- Antioxidant activity

These features reflect both traditional use and modern clinical and biochemical findings on artichoke extracts (Llorach et al., 2002).

2. Composition and Bioactive Compounds

Artichoke plant tissues contain a diverse array of bioactive constituents. The phenolic profile is dominated by caffeoylquinic acids (CQAs), with Cynarin, chlorogenic acid and other caffeic acid derivatives being most abundant(Llorach et al., 2002). Flavonoids such as luteolin and apigenin and triterpenoids contribute additional pharmacological properties. CholeFree ACE™ is standardized to a minimum of 5 % Cynarin by high-performance liquid chromatography (HPLC), providing a potent concentration of this key choleric compound. Other polyphenols remain in their native ratios, preserving synergistic antioxidant and vasorelaxant activities.

Table 1 follows and summarizes key constituents of artichoke byproducts as described in published literature.

Table 1. *Main constituents of different parts of artichoke (Silva & Daia, 2025).*

Part	Compounds
Bracts	Fibers (cellulose, hemicellulose, lignin, and inulin)
	Proteins
	Phenolic acids—CQAs (e.g., chlorogenic acid) and diCQAs (e.g., cynarin)
	Flavones (e.g., luteolin, apigenin)
	Terpenoids—sesquiterpene lactones (e.g., cynaropicrin)
Stems	Fibers (cellulose, hemicellulose, lignin, inulin, pectin, gums, β -glucans)
	Peroxidase enzymes
	Proanthocyanidins
	Terpenoids (sesquiterpene lactones)
Residual leaves	Fibers (cellulose, hemicellulose, lignin, inulin, pectin, gums, β -glucans)
	Proteolytic enzymes (cardosins, cyprosins)
	Flavanols (proanthocyanidins)
	Terpenoids—sesquiterpene lactones
	Phenolic acids (CQAs, diCQAs)
Stalks	Complex carbohydrates (cellulose, hemicellulose, and lignin)
Roots	Fibers (e.g., inulin)
Seeds	Proteins
	Polyunsaturated and monounsaturated fatty acids (e.g., linoleic and linolenic acids)
	Phenolic acids (CQAs and diCQAs)
	Terpenoids (e.g., tocopherols)
	Phytosterols (e.g., β -sitosterol, campesterol, 5-stigmasterol)
	Minerals (calcium, potassium, magnesium, manganese, iron, sodium and zinc)

3. Bioactivity Overview

1. Enhancement of Bile Flow (Choleretic Activity)

Cynarin stimulates bile production and secretion by the liver, a choleretic effect consistently described in clinical monographs and biochemical reviews (Association for the Advancement of Restorative Medicine, n.d.; Lattanzio et al., 2009). Increased bile flow improves emulsification and digestion of dietary fats, supports nutrient absorption, and facilitates cholesterol excretion via bile.

2. Modulation of Cholesterol Metabolism

Artichoke polyphenols influence hepatic cholesterol synthesis and clearance. Human clinical trials and meta-analytic evidence demonstrate reductions in total cholesterol and low-density lipoprotein (LDL) cholesterol following supplementation with artichoke extracts (Sahebkar et al., 2018). More recent nutraceutical interventions further support improvements in lipid patterns among individuals with sub-optimal cholesterol levels (Vitulano et al., 2025).

3. Hepatoprotective and Detoxification Support

Artichoke extracts demonstrate protective effects on hepatocytes by reducing oxidative stress and supporting normal liver enzyme activity. In individuals with non-alcoholic fatty liver disease (NAFLD), supplementation with artichoke leaf extract has been shown to improve hepatic markers in a randomized controlled setting (Panahi et al., 2018). These effects align with traditional and clinical descriptions of artichoke as a liver-supportive botanical (Association for the Advancement of Restorative Medicine, n.d.).

4. Antioxidant and Anti-Inflammatory Activity

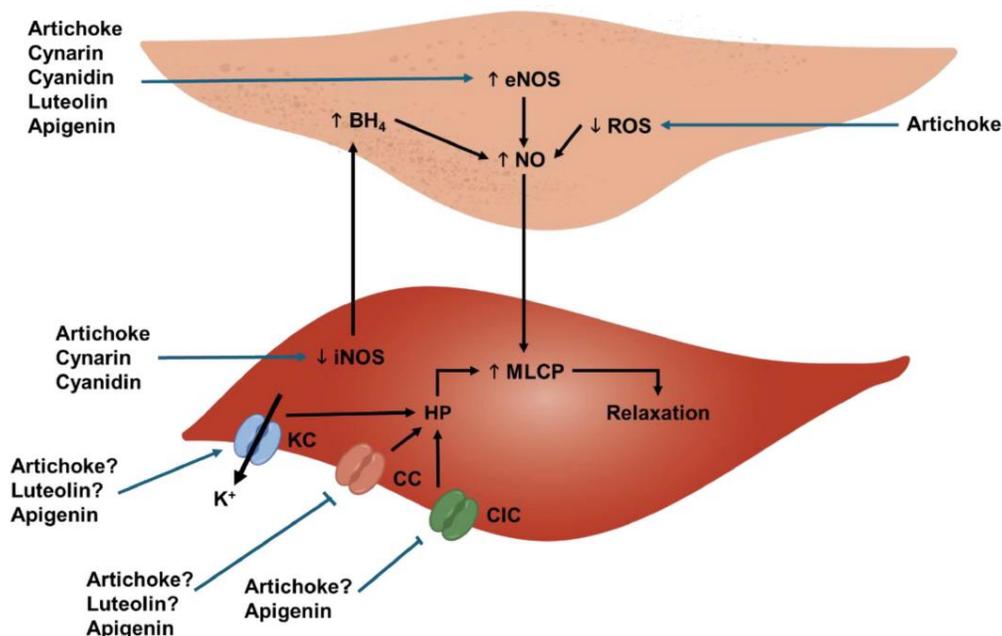
Artichoke is rich in phenolic antioxidants that neutralize reactive oxygen species and protect lipids, proteins, and cellular membranes from oxidative damage (Llorach et al., 2002). This antioxidant activity contributes to reduced LDL oxidation and supports cardiovascular and hepatic health (Silva & Daia, 2025).

4. Mechanisms of Action

The benefits of Cynarin-rich artichoke extract stem from complementary mechanisms acting on bile secretion, lipid metabolism and oxidative stress. Cynarin and related CQAs stimulate hepatic bile production (a choleric effect), leading to improved emulsification and digestion of dietary fats (Llorach et al., 2002). Enhanced bile flow facilitates excretion of cholesterol and bile acids through the intestine, thereby reducing circulating low-density lipoprotein (LDL) cholesterol (Llorach et al., 2002). In parallel, artichoke polyphenols exhibit potent antioxidant activity: luteolin and artichoke extracts retard lipid peroxidation and protect LDL from oxidative modification (Llorach et al., 2002). These antioxidant effects decrease hepatic oxidative stress and may reduce inflammation (Llorach et al., 2002).

Figure 1 illustrates these dual pathways. Increased bile secretion leads to improved fat digestion and subsequent cholesterol excretion, while antioxidant protection lowers hepatic oxidative stress and LDL oxidation. Together, these actions underpin the lipid-lowering and hepatoprotective properties of Cynarin-rich artichoke extract.

Figure 1. *Vasorelaxation mechanisms of artichoke bioactive compounds (Silva & Daia, 2025).*



5. Uses & Applications

CholeFree ACE™ is suitable for a wide range of nutraceutical and functional food applications, including:

Snack bars	Sport drinks
Teas	Yogurt
Cereal	Gummies
Trail Mixes	Chocolate
Dietary supplements & food nutrients	Soups, ready-meals, freeze-dried products
Healthy infusions and natural inclusions	

In addition, many of the formats below could be used for HempSeedHero™.

Capsules	Tablets	Chews
Fine Chemicals	Dry Mixes	Gummies & Pectin
Drinks/Juices	Cosmetics	Bars

Health Benefits (Research-Based Overview)

6. Cholesterol and Lipid Metabolism Support

A systematic review and meta-analysis of randomized controlled trials concluded that artichoke extract supplementation significantly reduces total cholesterol and LDL cholesterol compared with placebo (Sahebkar et al., 2018). These lipid-lowering effects are attributed to altered hepatic lipid metabolism and increased bile-mediated cholesterol elimination. Additional nutraceutical studies confirm improvements in lipid patterns in subjects with sub-optimal cholesterol levels (Vitulano et al., 2025).

7. Liver Health and Hepatocyte Protection

In a pilot double-blind randomized controlled trial, artichoke leaf extract supplementation improved liver enzyme markers and hepatic status in individuals with NAFLD (Panahi et al., 2018). These findings support artichoke's hepatoprotective role and are consistent with long-standing clinical monographs describing its use for liver detoxification and metabolic support (Association for the Advancement of Restorative Medicine, n.d.).

8. Digestive Health and Nutrient Absorption

By stimulating bile flow, Cynarin improves digestion of dietary fats and supports overall digestive comfort. Enhanced bile availability facilitates nutrient absorption and may reduce abdominal discomfort and dyspeptic symptoms, consistent with traditional Mediterranean dietary use of artichoke (Lattanzio et al., 2009; Olas, 2024).

9. Antioxidant and Cardiovascular Support

Artichoke polyphenols exhibit strong antioxidant activity, helping to protect LDL cholesterol from oxidative modification—a key contributor to atherosclerotic processes (Llorach et al., 2002). Emerging cardiovascular research further suggests benefits related to endothelial function and blood pressure regulation (Silva & Daia, 2025).

Potential Benefits of CholeFree ACE™

- Supports healthy cholesterol metabolism
- Helps lower LDL cholesterol
- Promotes bile production and fat digestion
- Supports liver and hepatocyte health
- Enhances nutrient absorption
- Provides antioxidant protection
- Supports cardiovascular and metabolic health

Summary

Artichoke Cynarin Extract (CholeFree ACE™) is a scientifically supported botanical ingredient with a long history of traditional use and a robust body of modern research. Derived from *Cynara scolymus*, it delivers standardized levels of Cynarin and polyphenols that support cholesterol metabolism, liver health, digestion, and antioxidant defense.

Through its combined choleric, lipid-modulating, hepatoprotective, and antioxidant mechanisms, CholeFree ACE™ represents a valuable ingredient for dietary supplements and functional foods targeting metabolic and cardiovascular wellness. Ongoing research continues to refine understanding of artichoke's role in long-term health support.

For further information, contact Vesta below.



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Research Citations

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