

AC Cinnamon Liposome



brighten skin naturally
 even skin tone for a flawless complexion
 antioxidant benefits
 spice up your cosmetics with cinnamon
 liposomal encapsulation for
 enhanced delivery

BACKGROUND

Cinnamon, one of the oldest known spices, is obtained from the inner bark of several trees that are native to Sri Lanka. This spice was highly prized among ancient nations and regarded as a gift. *Cinnamomum aromaticum*, called cassia or Chinese cinnamon, is an evergreen tree that is primarily known for its aromatic bark, which is used as a spice. The bark of this type of tree is thick with a much rougher texture than other types. Cassia is used in traditional Chinese medicine to cure the common cold and is considered one of the most fundamental herbal prescriptions. This type of cinnamon has a slight, distinct odor and taste that has led to its widespread use in commercial baking.

SCIENCE

Several laboratories have found *Cinnamomum cassia* to be a safe, natural skin lightening agent¹. Traditionally used skin lighteners such as, hydroquinone and corticosteroids, have effectively been used to reduce hyperpigmentation. However, these synthetic products have been associated with negative effects, such as cell toxicity, which is the reason they are tightly regulated or banned. This has led to the search for more natural and safe plant based skin solutions. *Cinnamomum cassia* bark was found to have natural skin lightening properties relating to its capacity to inhibit tyrosinase activity.

Tyrosinase is a copper containing enzyme that plays a key role in melanin production. Copper is the essential cofactor of tyrosinase and is required for it to carry out catalytic activity². The copper atoms in tyrosinase interact with oxygen to form a highly reactive intermediate in the initial oxidation reaction of melanogenesis. At the beginning of the melanogenesis pathway, tyrosine is converted to dihydroxyphenylalanine (DOPA) with tyrosinase acting as the catalyst². DOPA is then converted to DOPA-quinone and eventually melanin is produced through a combination of polymerization and oxidation. *Cinnamomum cassia* bark has natural tyrosinase inhibiting components that restrict the process of melanogenesis through an unusual mechanism. These natural components, linderanolide B and subamolide A, have been shown to exhibit effective anti-pigmentation abilities.

Code Number: 16098

INCI Name: Water & Cinnamomum Cassia Bark Extract & Phospholipids
INCI Status: Conforms
REACH Status: Compliant
CAS Number: 7732-18-5 & 84961-46-6 & 123465-35-0
EINECS Number: 231-791-2 & 284-635-0 & N/A

Origin: Botanical
Processing:
 GMO Free
 No Ethoxylation
 No Irradiation
 No Sulphonation
Additives:
 Preservatives: None
 Antioxidants: None
 Other additives: None

Solvents Used: Water
Appearance: Yellow/Tan to Amber Viscous Liposomal Dispersion
Soluble/ Miscible: Dispersible in Water
Ecological Information:
 88.45% Biodegradability
Microbial Count: < 100opg, No Pathogens

Suggested Use Levels: 1.0 - 10.0%
Suggested Applications:
 Evens Skin Tone, Skin Lightening, Antioxidant, Enhanced Delivery

Benefits of AC Cinnamon Liposome:

- Safe, Natural Skin Lightening
- Sequesters Copper to Down-Regulate Tyrosinase Activity
- Balances Skin Tone For a Flawless Glow
- Antioxidant Protection
- Enhanced Delivery

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The carbonyl group of linderanotide B and subamolide A interact with copper, which is located at the active sites of tyrosinase. The oxygen atoms of the carbonyl group act as an electric sink enabling these components to bind with the copper ions, thereby, deactivating tyrosinase. Effective inhibition of pigmentation requires a multifaceted approach, and *Cinnamomum cassia* provides just that. In addition to its ability to inhibit tyrosinase activity, it also demonstrates strong antioxidant properties.

A water soluble *Cinnamomum cassia* bark extract was applied to the skin of volunteers to evaluate its lightening capacity. However, the extract did not significantly reduce melanin production. Incorporating it into a liposome allowed the active components of *Cinnamomum cassia* bark to improve their compatibility with the skin. This heightened epidermal compatibility with increased effective anti-tyrosinase activity, thus, preventing the production of melanin. Liposomes are a small unilamellar vesicle (SUV) that are exceptionally stable delivery systems formed by a high shear processing method.

BENEFITS

Incorporate **AC Cinnamon Liposome** into finished formulas to lighten and even skin tone while allowing the skin to readily absorb potent antioxidant properties for increased functionality. Reveal the natural glow of your skin with the purifying properties of cinnamon. This sweet, savory spice, which is often associated with the warmth of the holidays and exotic locales, is now being used to balance skin tone and leave you with a flawless complexion. **AC Cinnamon Liposome** is an innovative ingredient that effectively delivers antioxidants to the skin while sequestering copper to down-regulate tyrosinase activity.

EFFICACY

An Oxygen Radical Absorbance Capacity (ORAC) assay was conducted to assess the antioxidant capacity of **AC Cinnamon Liposome**. The results showed very potent antioxidant activity, even at low concentrations (Figure 1). **AC Cinnamon Liposome's** ability to intercept Reactive Oxygen Species (ROS) before they can activate melanogenesis is a key proactive method to promote an even skin tone. Downstream tyrosinase inhibition is achieved through a combination of copper sequestration and competitive inhibition of the later non-enzymatic oxidative steps of melanogenesis. This provides a novel cosmetic solution to a common problem.

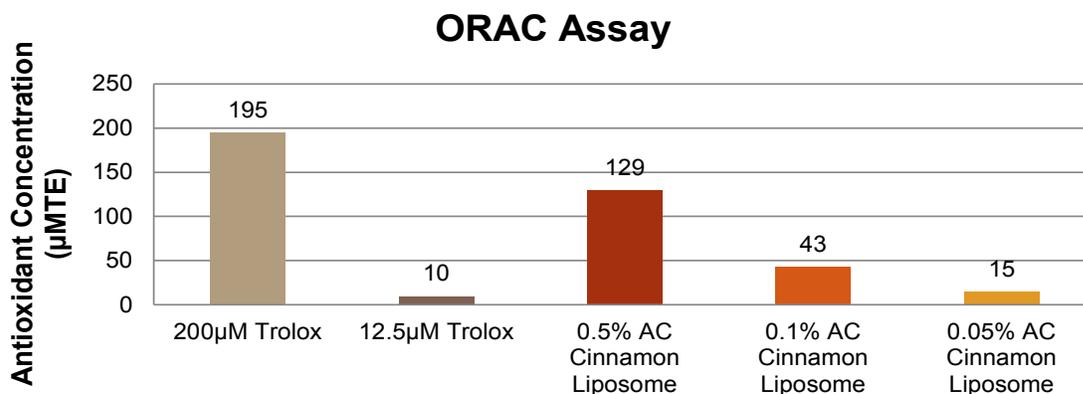


Figure 1. Antioxidant capacity of **AC Cinnamon Liposome** at different usage levels.

An *in-vitro* study was also conducted to determine the effects of **AC Cinnamon Liposome** on tyrosinase inhibition. Studies were conducted on isolated mushroom tyrosinase utilizing UV-Visible Spectrophotometry. The absorbance was measured after treatment with **AC Cinnamon Liposome** and Kojic Acid, which was used as a positive control. The results indicate that 2.0% **AC Cinnamon Liposome** inhibits tyrosinase activity by 40.6% and 5.0% **AC Cinnamon Liposome** inhibits tyrosinase activity by 65.4%, as shown in Figure 2.

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Tyrosinase Inhibition

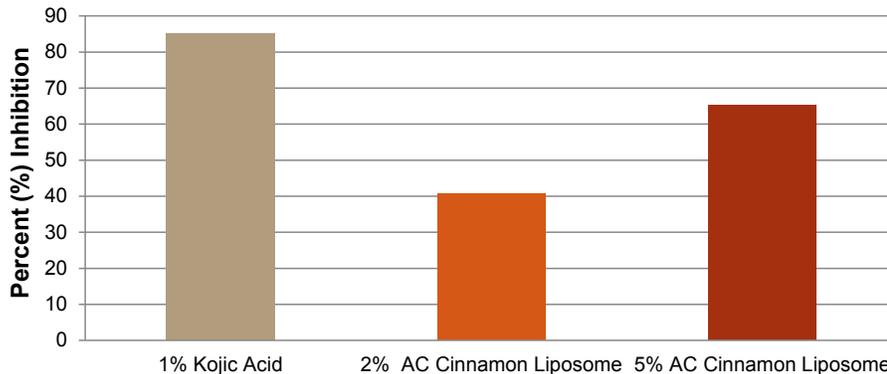


Figure 2. Tyrosinase Inhibition of 2.0% and 5.0% **AC Cinnamon Liposome** compared to 1.0% kojic acid.

An *in-vivo* study was conducted with five volunteers (M/F) between the ages of 24-33. Volunteers were asked to apply 2 mg of a base lotion containing 2.0% **AC Cinnamon Liposome** to their volar forearms, twice daily for 14 days. To provide more perspective, an area was left untreated as a control and another area was treated with the base lotion (Vaseline Aloe Fresh Hydrating) containing no additives.

The test areas were analyzed for melanin values 3 days, 8 days and 14 days after the start of the study using a DermaLab Combo Skin Lab equipped with a pigmentation probe. Melanin was calculated and measured as an index. When compared to the base cream, **AC Cinnamon Liposome** reduced the concentration of melanin by 10.0% after a period of 14 days, and when compared to the untreated control, it was capable of reducing melanin by 12.0% (Figure 3).

Incorporating **AC Cinnamon Liposome** into a finished formula has a significant impact on melanin levels. Please note that skin lightening products can be used in over the counter applications; however, they cannot be claimed as the active ingredient. Combine **AC Cinnamon Liposome** into finished formulas to lighten and even skin tone while absorbing potent antioxidant properties for increased functionality.

Changes in Melanin

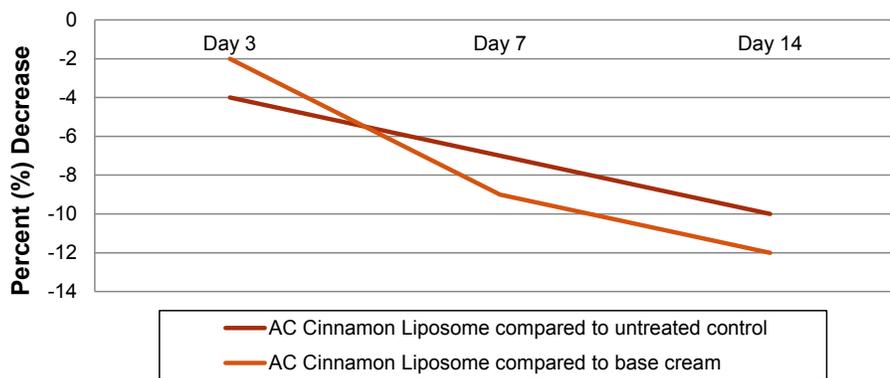


Figure 3. *In-vivo* changes in melanin concentration of test materials over a period of 14 days.

References:

- 1) Nyugen, H, Nguyen M, Lianhua L, Yang SH, Lee HB, Kim HG, Shin JH, Kim DM, Kim EK. Depigmenting effect of Cinnamomum Cassia in B16F10 Melanoma cells. Department of Dermatology, Inha University School of Medicine. 2007 Jan 15.
- 2) Chen TS. An Updated Review of Tyrosinase Inhibitors. International Journal of Molecular Science. 2009 June; (10) 6:20440-2474.