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PROPERTIES OF EGG OIL

A SUMMARY OF EGG OIL TOPICAL APPLICATIONS

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Executive Summary

Ecovatec's revolutionary technology has unlocked the amazing potential of egg oil. Egg oil, which is also known as egg yolk lipids have a long history of being used in traditional medicine for various ailments in many cultures. Ecovatec's egg oil can be used as a topical ointment to promote healing of the skin, cosmetically for hair and skin conditioning, and as a carrier oil for essential oils.

Background

Egg oil is a "traditional medicine" that has been used by several ancient societies. Ecovatec's egg oil is isolated from commercial chicken egg yolk, contains triglycerides with traces of cholesterol, biotin, and zanthophylls (lutein and zeaxanthin). The triglycerides include many types of essential fatty acids, including oleic and linoleic fatty acid[1]. Cholesterol is known for being beneficial for the skin and hair and is easily absorbed in the absence of proteins[2]. The zanthophylls are known to be good antioxidants, supporting general health.

The outer structure of the skin is like a brick wall of cells with lipids in between holding them together like mortar. The skin's barrier function depends on lots of cells and lipids. The permeability barrier (keeping good things in and bad things out) is composed of fatty acids, ceramides, and cholesterol. Some of the fatty acids (like linoleic fatty acid) can't be produced by the body, so they must be added topically.

A major concern in skin care is eczema and psoriasis. These conditions are characterized by disturbance to the skin's barrier function and inflammation. It can be improved with increased hydration and reinforcing the barrier with oils. However, not all oils are created equal, some have a better ability to reinforce this barrier and they should have anti-inflammatory properties. Ecovatec has seen amazing results in customers' symptoms when eczema and psoriasis are treated with egg oil.

Another major skin concern is wound healing, specifically in relation to burns, cuts, and scarring. Many of the studies discussed below show egg oil's efficacy in speeding the healing process, which can reduce scarring.

Lastly, consumers are increasingly concerned with ageing. The appearance of skin ageing can be caused by environmental damage (UV rays, air pollution, smoking, humidity, etc) or by a decrease in cell replacement (which just happens over time). The best way to address this concern is to focus on environmental aging by providing the skin with nutrients, antioxidants, and moisture. Egg oil has all these components and should be further investigated for its ability to counter environmental aging.

Components of Egg Oil a Summary of their Skin Effects

Compound	% in Egg Oil	Skin Effect[1,2]
Omega 9 Fatty Acid (Oleic Acid)	51.3% (48.5% oleic)	- Disrupts the skin barrier to increase permeability, allowing fatty acids to moisturize deeper into the skin - Induced faster wound closure compared to Omega 3 and 6 fatty acids - Activates regeneration of the lipid barrier - Reduces inflammation - Excellent for skin softening and moisturizing
Omega 6 Fatty Acid (Linoleic Acid, Derivatives)	14.6%	- Reinforces the skin barrier, excellent when paired with oelic acid which disrupts the skin barrier. The combination allows the lipids to penetrate deep into the skin, but then re-seal itself keeping the moisture in and protecting the skin. - Anti-inflammatory - "Tricks" skin into producing less oil as it is a component of skin oil - Clears blocked pores and prevents acne - Used in the structure of cell membranes - May help with treatment of atopic eczema
Cholesterol	0.62%	- Helps skin regain elasticity and plumpness - Reinforces skin barrier and replaces lipid protection layer (which decreases with age) - Excellent for sensitive and dry skin
Omega 3 Fatty Acid (DHA, EPA)	2.1%	- Treats and prevents skin problems such as psoriasis and acne - Natural sunscreen properties - Decreases melanin synthesis - Stimulates the healing process
Antioxidants	Lutein and Zeaxanthin	- Reduces oxidative stress that leads to ageing (anti-ageing effects)

Egg Oil for Eczema Treatment

Wu *et al*[3] (2016) examined extraction methods of egg yolk oil using a mice model of eczema to compare the therapeutic effects. They noted that eczema is a common skin disease, especially in infants, and that egg yolk oil has shown good curative effects without side effects. In their assessment, they induced eczema in mice and applied an oil from one of the extraction methods. Many of the extraction methods, particularly those that did not use high temperatures (<100°C), were effective at curing the eczema and restoring the skin barrier. This is because high temperatures can change the structures of the fats in the egg oil, turning them into trans-fats which don't have the same effects on the skin. Therefore, Ecovatec ensures that we process at low temperatures, to maintain the integrity of the oil composition.

Egg Oil for Burn Wounds

Burn injury is a worldwide cause of death and disability and scientists are still looking for new and better treatments to promote wound healing while reducing infection and scarring. Rastegar *et al.* (2011)[4] investigated the effect of egg yolk oil in healing 3rd degree burn wounds in rats. The researchers compared a common topical burn treatment, which has unfavorable side effects, with an egg oil treatment, and a control (no treatment). The treatments were applied twice daily. The size of the wounds was measured after 1, 2, and 3 weeks and it was found that the average size of the wound after 7 days was smallest with egg oil. Unlike the comparators, the egg oil group had no evidence of "crusting" or scar formation at day 30 after burn injury.

Yenilmez *et al.* (2015)[5], did a similar burn study in rats. They compared several formulations, including: chitosan (common burn gel without an active ingredient), Silverdin (common pharmaceutical burn drug + chitosan), plain egg yolk oil, an egg yolk oil + epidermal growth factor + chitosan formulation, an egg yolk oil + chitosan formulation, and a no-treatment control. They found that all the formulations that contained egg oil (including plain egg oil) performed significantly better than the pharmaceutical drug or controls, especially by day 21. The authors note that the healing ability of egg yolk oil is due to the fatty acids, especially linoleic and oleic acid which control inflammation and enhance healing by causing the skin to release certain cytokines (a type of protein that facilitates immune system responses).

Egg Oil for Diabetic Wound Healing

Ili (2019) [6] published a study that showed the effect of egg yolk oil on the speed of wound healing in diabetic rats. Diabetes is known to impair wound healing, which can have a significant effect ton morbidity and mortality. The researcher looked at the presence of mast cells (a type of cell present in the first 3 phases of wound healing) to see if egg oil could reduce the concentration or clumping of those cells during healing. Mast cells are known to promote scarring in normal wound healing and can lead to excessive inflammation of the wound, especially in chronic wounds. The results of the study showed that egg oil helps de-clump the mast cells which allows them to be removed more easily, which helps the wound heal more quickly. It is also notable that this study used egg oil created from burning egg yolks, which Wu *et al.* found to be less effective, so even heat-treated egg oil seems to be making a difference!

Egg Oil Anti-Inflammatory and Pain-Reduction (Analgesic) Effects

Mahmoudi et al. (2013)[7] compared the anti-inflammatory and analgesic effects of various egg oils (prepared by heating or harsh solvent extraction), a standard inflammation drug, and olive oil on a mice model. All egg oil samples prepared by heating showed significant anti-inflammatory activity compared to olive oil. The harsh solvent extracted oils had this activity only at higher concentrations (>100 mg/kg). The activity of the egg oils was similar to the anti-inflammatory drug, with the egg oil from hen eggs showing greater activity than the drug. This same egg oil (dosage 300 mg/kg) showed analgesic (pain relief) effects similar to 5 mg/kg of morphine!

Mechanism of Action

Yenilmez *et al* (2015) referenced a 2008 paper by Pereira *et al*[8]. which investigated the effect oleic and linoleic acids on the inflammatory phase of wound healing in rats. They were looking to understand how applying either oleic or linoleic acid to a wound can affect the speed of wound healing. It was found that both fatty acids caused more neutrophils (a type of immune system cell) to go to the area, which regulate the initial phase of wound healing. This finding is important because neutrophils can be dysfunctional in a number of diseases, including diabetes.

Sources

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