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Review:Medical Benefits Of Stearic Acid For Skin And Its Role In Treatment Of Some Diseases

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Abstract *:Stearic acid is one of the most common fatty acids. It is a glycerol ester found in most lipids from plants and animals. Being an emollient, stearic acid acts by smoothing and softening the skin. It has been consistently shown that, in comparison to other saturated fats, stearic acid either has no effect on low blood cholesterol or has a neutral effect. A diet high in stearic acid was found to reduce fasting levels of coagulation factor VII that causes blood clotting. There doesn't seem to be any connection between stearic acid and a higher incidence of heart attacks or ischemic heart disease. Stearic acid preferentially stimulates apoptosis, or programmed cell death, in malignant vs non-cancerous breast cancer cells and suppresses important cell cycle checkpoints, preventing breast cancer cells from proliferating. In neurodegenerative illnesses such as Parkinson's disease, stearic acid might be protective.*

Keywords: *Stearic acid, fatty acids, characteristics, skin treatment*

INTRODUCTION

Stearic acid is one kind of long-chain saturated fatty acid. It's also known as octadecanoic acid or stearophanic acid. An 18-carbon chain makes up stearic acid. Stearic acid is a common fatty acid found in both vegetable and animal fats. Nonetheless, animal fat frequently has a higher stearic acid content (1).

Like its ester, the most common saturated fatty acid in food and the natural world is stearic acid, which is only surpassed by palmitic acid. Rich fat sources of stearic acid include lard, butterfat, cocoa butter, and shea butter. Stearic acid can be found in food items such meat, poultry, fish, eggs, dairy, and recipes that contain fat (2,3).

Characteristics of stearic acid

That's stearic acid. It is a substance that resembles wax, either colorless or white, with a strong odor. It can be dissolved in oil, but because it is waxy, it is more challenging to dissolve in water. If you mix it with water, you will find it floating atop the water because it is only partially soluble in it. It carries out four distinct metabolite functions: Daphnia magna, plant, algal, and human. It comes from an octadecane (2).

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But not all stearic acid comes from animals; plant-based stearic acid is also readily available these days. It is also found in the fatty sections of plants, which makes it perfect for use in cosmetics like cocoa or shea butter(1).

Although there are other plant sources as well, palm oil is the most often used. When compared to toiletries and cosmetics with an excessive amount of chemicals, this natural ingredient makes them safer to use (3). Stearic acid makes up about 30% of animal fat on average. The overall amount of stearic acid in plant-based oils, such as palm or coconut oil, is 5%; in contrast, shea and cocoa butters have between 40 and 50 percent stearic acid (4).

Since most consumers prefer to utilize plant-based stearic acid over products containing animal ingredients, stearic acid suppliers mostly deal with plant-based stearic acid. The majority of commercially available stearic acid actually contains minimal levels of oleic and palmitic and oleric acids in almost equal proportions (1).

The main uses of stearic acid are in the production of stearic acid triple pressed salt, which includes sodium, magnesium, calcium, lead, aluminum, cadmium, iron, and potassium stearates (5). Ideal for use in the production of metal soaps, polymer plastic agents, release agents, surfactants, polishers, rubber vulcanization accelerators, metal soaps, medicines, and any other organic compounds often employed in the manufacturing of cosmetics (6).

Production of streaic acid

The process of saponification of triglycerides using hot water at a temperature range of around 100 degrees Celsius yields stearic acid from oils and fats. The resultant mixture is distilled. Octadecanoic acid that is obtained commercially is typically a blend of stearic and palmitic acids (2).

When compared to vegetable fat, the oil and fat content of sterophanic acid is higher in animal fat. There are a few exceptions, such as foods with a 28–45% stearic acid content like cocoa and shea butter. Moreover, The fatty acid apparatus is used to biosynthesize stearic acid from carbohydrates (2,7).

Role of stearic acid in skin care

1-**Enhancing moisture retention**

Stearic acid forms a barrier of protection on the skin's surface by acting as an emollient. This barrier promotes improved moisture retention by lowering water loss. This benefit is especially beneficial for people who have dry or dehydrated skin because it helps reduce flakiness and dryness (4).

2- Strengthen the skin barrier

Stearic acid not only provides the skin with much-needed moisture, but it also serves as a barrier. The skin doesn't lose moisture or hydration because stearic acid creates a moisture barrier. Because a robust barrier is necessary to hold onto moisture and protect against outside aggressors (such as cold, dry air, and pollution), adding stearic acid to your routine can have additional benefits in the winter (6).

3- Enhancing of formula texture and stabilization

The emulsifying qualities of stearic acid are essential for stabilizing formulations and maintaining the proper mixing of constituents based on water and oil. This stability keeps skin care products from separating or changing texture over time, extending their useful life (2).

4- **Reducing Inflammation**

It's possible that stearic acid has anti-inflammatory qualities that can help calm sensitive skin and lessen redness (4).

5-Treatment of Skin Conditions

Although the substance isn't the only treatment for skin conditions like eczema, when combined with other therapies, its moisturizing and anti-inflammatory qualities can help relieve and improve symptom management (5).

6- Mild Surfactant

Stearic acid, a gentle surfactant, can assist in cleaning the skin without depriving it of its organic oils (5).

Therapeutic Uses of stearic acid

1-Stearic Acid and Blood Lipids

Stearic acid affects blood lipids, which is one of its most notable effects, despite the generalization that saturated fats raise LDL cholesterol. Studies have repeatedly demonstrated that stearic acid has either no effect on blood cholesterol or a modest reduction in low-density lipoprotein (LDL) when compared to other saturated fats (8).

This could be because it inhibits the intestine's secondary bile acid synthesis, which lowers cholesterol's solubility and hinders its absorption. Some possibilities include the fact that stearic acid is significantly less absorbed in the colon than other saturated fats (9,10). Due to the substantial variations in the ways that dietary fats, stearic acid and palmitic acid, impact blood cholesterol and their relative abundance, numerous research have been conducted expressly to compare their impacts (11).

According to human experiments, fasting low-density lipoprotein (LDL) levels increase when dietary palmitic acid takes the place of stearic acid, but fasting LDL levels decrease when stearic acid takes the place of dietary palmitic acid. In a trial involving postmenopausal women, the results of oleic acid, palmitic acid, or stearic acid-enriched diets were investigated. The results showed that stearic acid had comparable effects to oleic acid on fasting low-density lipoprotein (LDL) levels, while palmitic acid had less favorable effects on LDL-raising than the other two fatty acids (12,8).

According to some research, stearic acid may also help with other cardiovascular risk factors. For instance, in contrast to diets rich in lauric, myristic, and palmitic acids, the three long-chain saturated fats, three weeks of a high stearic acid diet was found to reduce fasting levels of coagulation factor VII (a protein that stimulates blood clotting) by as much as 18% in healthy young men (8).

The idea that stearic acid is unlikely to cause cardiovascular disease by increasing thrombosis—a risk associated with other forms of saturated fat—is further supported by the fact that meals high in stearic acid did not immediately increase factor VII as much as meals high in monounsaturated fatty acids did (10).

Stearic Acid and Cardiovascular Disease

Despite the wealth of positive information regarding cardiovascular risk factors, there is a dearth of human studies on the connection between stearic acid intake and actual cardiovascular outcomes, and the evidence that is accessible has been fragmented (13).

Consuming stearic acid doesn't seem that stearic acid increases the risk of heart attacks or ischemic heart disease, according to multiple studies. Based on how it affects blood lipids, stearic acid would be expected to be benign or favorable for cardiovascular health; however, it is unclear how this affects real disease risk in humans (12).

Stearic Acid and Cancer

Additionally, stearic acid may have some anti-cancer effects. Studies reveal that stearic acid inhibits critical checkpoints in the cell cycle, which prevents breast cancer cells from multiplying, and selectively promotes apoptosis (programmed cell death) in malignant vs non-cancerous breast cancer cells (14). Although there are some strong mechanisms by which stearic acid may be cancer-protective, much more human study is required to see how this actually works in practice (10, 15).

Stearic Acid and Neurodegenerative Disease

When it comes to neurodegenerative conditions like Parkinson's disease, stearic acid might be protective. Stearic acid promotes mitochondrial fusion through its function as a signaling molecule, which helps avoid mitochondrial malfunction. Similarly, stearic acid may enhance mitochondrial respiration and function by attaching to leaky mitochondrial membranes and enhancing cell health through its partial conversion to oleic acid (16).

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