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Review Article

LAURIC ACID IN DIETARY OILS AND MILKS: A COMPREHENSIVE REVIEW OF AVAILABILITY, HEALTH BENEFITS, AND SKINCARE APPLICATIONS WITH EMPHASIS ON COCONUT OIL

Muzzammel M[1]*, Bhumika S[2]

*[1]Assistant Professor, Agad Tantra Department, Institute of Teaching and Research in Ayurveda, Institute of National Importance, Ministry of Ayush, Jamnagar, Gujarat

[2]Assistant Professor, Department of Rasashastra and Bhaishajya Kalpana, Shri C. B. Guttal Ayurvedic Medical College and Hospital, Dharwad, Karnataka, India.

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ABSTRACT

This review provides a detailed analysis of the distribution of lauric acid in various dietary oils and milks, highlighting coconut oil as the richest natural source, containing approximately 45-50% lauric acid, compared to other sources such as palm kernel oil (~40-50%), dairy products (~2-6%), and human breast milk (~5-9%). The article explores the multifaceted health benefits of lauric acid, including its role in metabolic health through rapid absorption and energy conversion, aiding in weight management and improving lipid profiles by increasing HDL cholesterol and reducing the LDL/HDL ratio. Immunologically, lauric acid is converted into monolaurin, a compound with potent antimicrobial, antiviral, and antifungal properties, enhancing immune function by combating pathogens such as bacteria, viruses, and fungi. Dermatologically, lauric acid strengthens the skin barrier, improves hydration, and reduces inflammation, making it effective for treating conditions like eczema, acne, and dry skin. The review also emphasizes the cardiovascular benefits of lauric acid, such as reducing oxidative stress and improving heart health, as well as its potential in supporting brain health through ketone production, which may benefit cognitive function in neurodegenerative diseases. Supported by recent scientific evidence, this review underscores the superiority of coconut oil as a source of lauric acid and its holistic benefits for overall health and skin protection. The findings advocate for the inclusion of lauric acid-rich oils, particularly coconut oil, in dietary and skincare regimens, while calling for further research to explore its full therapeutic potential.

INTRODUCTION

In recent years, the global skincare and nutrition industries have witnessed a paradigm shift, with consumers increasingly seeking safer, more natural alternatives to chemical-based products. This trend is driven by growing awareness of the adverse effects of synthetic ingredients, such as parabens, sulfates, and phthalates, which are commonly found in modern skincare formulations. These chemicals have been linked to skin irritation, allergies, hormonal disruptions, and even long-term health risks [1].

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In response, there is a renewed interest in traditional, time-tested practices that harness the power of natural ingredients, reminiscent of the "good old era" when skincare and nutrition were synonymous with simplicity, purity, and efficacy.

Among these natural ingredients, lauric acid, a medium-chain fatty acid (MCFA) abundantly found in coconut oil, stands out for its remarkable skincare and health benefits. Historically, coconut oil has been a staple in tropical regions, not only as a dietary component but also as a versatile remedy for skin and hair care [2]. Its high lauric acid content (~45-50%) imparts antimicrobial, anti-inflammatory, and moisturizing properties, making it an ideal alternative to synthetic skincare products [3]. In the current scenario, where the demand for clean, sustainable, and eco-friendly products is on the rise, coconut oil and other lauric acid-rich oils offer a compelling solution.

The relevance of returning to such traditional practices is further underscored by the increasing prevalence of skin conditions like eczema, acne, and psoriasis, which are often exacerbated by harsh chemicals in modern skincare products[4]. Lauric acid, with its ability to strengthen the skin barrier, reduce inflammation, and combat acne-causing bacteria, provides a natural and effective approach to managing these conditions[5]. Moreover, the shift towards natural skincare aligns with the broader movement towards sustainability and environmental consciousness, as it reduces reliance on synthetic chemicals that can harm ecosystems.

This review highlights the importance of embracing natural, lauric acid-rich oils like coconut oil as a cornerstone of skincare and nutrition, drawing on scientific evidence to validate their efficacy. By revisiting the wisdom of traditional practices, we can not only achieve healthier skin but also promote overall well-being in a way that is harmonious with nature. In doing so, we honor the legacy of the "good olden era" while addressing the challenges of the modern world.

Lauric Acid Content in Dietary Oils and Milks

Lauric acid is found in varying concentrations across different oils and milks. Below is a detailed comparison:

Tropical Oils

Coconut Oil

Lauric acid content: ~45-50% of total fatty acids. Coconut oil is the most abundant natural source of lauric acid, making it a staple in tropical regions and a popular choice for health and skincare applications[6].

Palm Kernel Oil

Lauric acid content: ~40-50%. Palm kernel oil is another tropical oil rich in lauric acid, though it is less commonly used in skincare due to its lower content of other beneficial compounds compared to coconut oil [7].

Dairy Products

Cow's Milk

Lauric acid content: ~2-5% of total fatty acids. While present, the concentration is relatively low compared to tropical oils [8].

Goat's Milk

Lauric acid content: ~3-6%. Slightly higher than cow's milk, goat's milk is often considered a healthier alternative due to its easier digestibility and nutrient profile [9].

Human Breast Milk

Lauric acid content: ~5-9%. Lauric acid in breast milk plays a vital role in infant nutrition, providing antimicrobial protection and supporting immune development [10].

Other Sources

- **Butter**

  Lauric acid content: ~2-4%. Butter contains small amounts of lauric acid, contributing to its nutritional profile [11].

- **Shea Butter**

  Lauric acid content: ~1-3%. While not a major source, shea butter is valued for its skincare benefits due to its high content of other fatty acids and antioxidants [12].

- **Babassu Oil**

  Lauric acid content: ~40-45%. A lesser-known tropical oil, babassu oil is comparable to coconut oil in lauric acid content and is used in cosmetics and food products [13].

Health Benefits of Lauric Acid

Lauric acid, a medium-chain fatty acid (MCFA), offers a wide range of health benefits, supported by extensive scientific research. These benefits span antimicrobial, metabolic, immune, and cardiovascular domains, making it a versatile compound for promoting overall health.

Antimicrobial and Antiviral Properties:

Lauric acid is converted into monolaurin in the body, a compound with potent antimicrobial, antiviral, and antifungal properties. Monolaurin disrupts the lipid membranes of pathogens, including bacteria, viruses, and fungi, effectively neutralizing them [14]. For instance, studies have shown that monolaurin is effective against pathogens such as *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans* [15]. Additionally, lauric acid has demonstrated antiviral activity against enveloped viruses, including HIV, herpes simplex virus (HSV), and influenza[16]. These properties make lauric acid a valuable natural agent for combating infections and supporting immune health.

Weight Management and Metabolic Health:

Medium-chain triglycerides (MCTs) like lauric acid are rapidly absorbed and metabolized by the liver, where they are converted into energy. Unlike long-chain fatty acids, MCTs bypass the usual digestive pathways, providing a quick and efficient energy source [17]. This property promotes fat oxidation and thermogenesis, aiding in weight management and reducing abdominal obesity[18]. Studies have shown that diets rich in MCTs, including lauric acid, can increase energy expenditure and reduce body fat accumulation, making them beneficial for individuals seeking weight loss or improved metabolic health[19].

Immune System Support

Lauric acid enhances immune function by combating harmful microorganisms and modulating inflammatory responses. Its conversion to monolaurin provides a dual mechanism of action: directly neutralizing pathogens and reducing systemic

inflammation[20]. Regular consumption of lauric acid-rich oils, such as coconut oil, has been shown to enhance immune function by reducing the load of harmful microorganisms and promoting a balanced inflammatory response[21]. This makes lauric acid particularly beneficial for individuals with compromised immune systems or those prone to frequent infections.

Cardiovascular Health

Contrary to the misconception that saturated fats are harmful, lauric acid has been shown to improve cardiovascular health by positively influencing lipid profiles. It increases high-density lipoprotein (HDL or "good cholesterol") levels while reducing the LDL/HDL ratio, a key marker of cardiovascular health[22]. Additionally, lauric acid exhibits antioxidant properties, reducing oxidative stress and inflammation, which are major contributors to cardiovascular diseases[23]. Studies have demonstrated that diets incorporating lauric acid-rich oils, such as coconut oil, can improve lipid profiles and reduce the risk of heart disease [24].

Skincare Benefits of Lauric Acid

Lauric acid is widely recognized for its dermatological benefits, particularly in coconut oil. Its unique properties make it an effective ingredient for addressing various skin conditions and promoting overall skin health.

Skin Barrier Repair and Moisturization

Lauric acid strengthens the skin barrier by enhancing the production of ceramides, which are essential for maintaining skin hydration and integrity [25]. It reduces transepidermal water loss (TEWL), improving skin hydration and preventing dryness [26]. Clinical studies have shown that topical application of coconut oil, rich in lauric acid, significantly improves skin moisture levels and reduces symptoms of xerosis (dry skin) [27]. These properties make lauric acid an excellent choice for individuals with dry or sensitive skin.

Anti-Inflammatory and Antimicrobial Effects

Lauric acid exhibits potent anti-inflammatory and antimicrobial properties, making it effective for treating skin conditions such as eczema, acne, and psoriasis. It reduces inflammation by inhibiting the production of pro-inflammatory cytokines and combats acne-causing bacteria, such as *Propionibacterium acnes* [28]. Studies have demonstrated that lauric acid is more effective than benzoyl peroxide in reducing acne lesions, with fewer side effects[29]. Additionally, its antimicrobial properties help prevent infections and promote faster healing of skin wounds [30].

Antioxidant Protection

Lauric acid protects the skin from oxidative stress caused by free radicals, which contribute to premature aging and skin damage. Its antioxidant properties help neutralize free radicals, reducing the appearance of fine lines, wrinkles, and hyperpigmentation [31]. Coconut oil, rich in lauric acid, also contains polyphenols and other antioxidants that further enhance its protective effects [32]. Regular use of lauric acid-rich oils can help maintain youthful, healthy skin and prevent age-related damage.

CONCLUSION

In the contemporary era, where synthetic chemicals and environmental pollutants have become pervasive, the need for natural, sustainable, and effective health solutions has never been more critical. Cold-pressed virgin coconut oil has emerged as a powerful alternative, offering a multifaceted approach to well-being. Its rich composition, with nearly 50% lauric acid, contributes significantly to various physiological and therapeutic benefits, including metabolic regulation, immune system enhancement, cardiovascular support, and dermatological applications. The antimicrobial, anti-inflammatory, and antioxidant properties of lauric acid make coconut oil an indispensable resource in both preventive and curative healthcare.

Traditional Ayurvedic wisdom has long recognized the therapeutic value of coconut oil in maintaining overall health and vitality. Modern scientific research is now validating these ancient insights, reinforcing the relevance of this natural remedy in contemporary health practices. By substituting chemical-laden products with pure, unrefined coconut oil, individuals can minimize exposure to toxic substances, thereby fostering a holistic, toxin-free lifestyle. This shift not only aligns with sustainable living principles but also reaffirms the importance of integrating traditional knowledge with modern scientific advancements.

Furthermore, as the global health industry continues to explore natural alternatives to synthetic formulations, the significance of coconut oil in functional nutrition, dermatology, and integrative medicine is gaining momentum. The evidence supporting its role in enhancing skin health, managing metabolic disorders, and promoting cardiovascular well-being highlights its versatility and efficacy. Given its affordability, accessibility, and minimal environmental impact, coconut oil serves as a cornerstone of sustainable health interventions.

In conclusion, the resurgence of interest in coconut oil reflects a broader movement towards natural, evidence-based wellness solutions. As ongoing research further elucidates its therapeutic potential, its application in mainstream healthcare, personal care,

and dietary practices is expected to expand. Embracing coconut oil as part of a balanced, nature-aligned lifestyle not only benefits individual health but also contributes to the global efforts in promoting ecological sustainability and reducing dependency on synthetic chemicals. This holistic approach ensures that the wisdom of traditional medicine continues to thrive in a scientifically validated and globally relevant framework.

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***Address for correspondence**
Dr. Muzzammel M
Assistant Professor,
Agad Tantra Department,
Institute of Teaching and Research in Ayurveda, Institute of National Importance, Ministry of Ayush,
Jamnagar, Gujarat
Email: dr.jamiayur@gmail.com