



CODEN [USA]: IAJPBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Review Article

A REVIEW ON ALOE VERA: THE USE IN COSMETICS AND IN FOOD

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Article Received: June 2024

Accepted: June 2024

Published: July 2024

Abstract:

Aloe vera, a succulent plant species of the genus Aloe, has been extensively used in various industries due to its numerous beneficial properties. In the cosmetics industry, Aloe vera is prized for its soothing, moisturizing, and healing effects on the skin. Its gel, extracted from the leaves, is commonly incorporated into skincare products such as lotions, creams, and ointments to treat burns, acne, and dryness. The bioactive compounds in Aloe vera, including vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids, contribute to its efficacy in enhancing skin health and appearance.

In the food industry, Aloe vera is utilized for its health-promoting properties. It is added to beverages, supplements, and functional foods to improve digestion, boost the immune system, and provide antioxidant benefits. The plant's polysaccharides, notably acemannan, play a significant role in its therapeutic effects. Despite its benefits, the consumption of Aloe vera must be approached with caution due to potential side effects and regulatory considerations.

Keywords: Aloe vera, Cosmetics, Skincare, Moisturizing, Healing properties, Vitamins, Enzymes, Minerals,

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Please cite this article in press Shibina S et al *A Review On Aloe Vera: The Use In Cosmetics And In Food., Indo Am. J. P. Sci, 2024; 11 (07).*

INTRODUCTION:

The name aloe is derived from the Arabic word *alloe* meaning a shining bitter substance. The botanical name of Aloe vera is *Aloe Barbadensis* miller. It belongs to Asphodelaceae (Liliaceae) family, and is a shrubby or arborescent, perennial, xerophytica, succulent colony. It grows mainly in the dry regions of Africa, Asia, Europe and America. In India, it is found in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu. Aloe is also popular in both traditional Chinese and Ayurvedic medicine.^[1] In Ayurvedic medicine, the traditional medicine of India, aloe is used internally as a laxative, anti-helminthic, hemorrhoid remedy, and uterine stimulant; it is used topically, often in combination with licorice root, to treat eczema or psoriasis. In Arabian medicine, the fresh gel is rubbed on the forehead as a headache remedy or rubbed on the body to cool it in case of fever, as well as being used for wound healing, conjunctivitis, and as a disinfectant^[2].

TAXONOMY:

Kingdom-Plantae
Order –Asparagales
Division-Spermatophyte
Subdivision-Angiospermae
Class –Monocotyledonous
Genus –Aloe
Species –Barbadensis. Mill.

MORPHOLOGY:

Odour –None
Taste –Bitter
Size & Shape –plant growing to 60-100 cm in lance - shaped with elongated strands
Flower –yellow tubular in 25 -30 cm in a slender loose statement
Colour –Leaves are green to grey –green flower
Root –Root fibers can reach upto 30 –40 cm in length

Aloe vera is a succulent plant species that has been used for centuries for its medicinal and cosmetic properties. Native to North Africa and the Middle East, this versatile plant has gained global popularity for its wide range of health and wellness benefits.^[3] From soothing sunburns to aiding digestion, aloe vera has become a staple ingredient in a variety of consumer products, making it a valuable and sought-after botanical.

Aloe vera has found wide applications in the cosmetics and nutraceutical industry. The plant material is used as fundamental ingredient in food and cosmetics products after processing in the form of gel and juice^[4].

ALOE VERA CONSTITUENTS AND ITS PROPERTIES:

Aloe gel is 99% water with a pH of 4.5 and is a common ingredient in many non-prescription skin salves. The gel contains an emollient polysaccharide, glucomannan. It is a good moisturizer, which accounts for its use in many cosmetics. The gel also contains bradykininase, an anti-inflammatory, magnesium lactate, which helps prevent itching, and salicylic acid and other antiprostaglandin compounds which relieve inflammation^[5]. The phenolics group present in aloe vera extracts act by denaturing the proteins and cell membranes. They act as disinfectant and are effective in presence of organic matter and remain active even long after application.^[6] Numerous aloe species around the world are used for conditions ranging from dermatitis to cancer. There is growing experimental evidence for its use as an antiviral, an ulcer remedy and an adjuvant cancer treatment due to its immune modulating effects^[6].

FUNCTIONS:

Aloe vera contains many potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids.

1.Vitamins: It contains vitamin A (betacarotene) C and E, which are antioxidants. It also contains vitamin B12, folic acid and choline.

2.Enzymes: It contains several enzymes such as alliasse and lipase. Bradykinase helps to reduce excessive inflammation when applied to the skin topically.

3.Minerals: Aloe vera contains minerals such as calcium, magnesium, and zinc, which are essential for various physiological functions

4.Sugars: It provides monosaccharides (glucose and fructose) and polysaccharides (glucomannans/polymannose).

5.Anthraquinones: It provides 12 anthraquinones, which are phenolic compounds traditionally known as laxatives. Aloin and emodin act as analgesics, antibacterials and antivirals.

6.Fatty acids: It provides four plant steroids, cholesterol, campesterol, β -sisosterol and lupeol. All these have anti-inflammatory action and lopesol also possesses antiseptic and analgesic properties.

7.Hormones: Auxins and gibberellins that help in wound healing and have anti-inflammatory action^[7].

THERAPEUTIC PROPERTIES OF ALOEVERA**1. Wound Healing:**

- Aloe vera accelerates wound healing due to its ability to stimulate collagen production and enhance tissue regeneration.
- It also has antimicrobial properties that help prevent infection in wounds.

2. **Anti-inflammatory:**

- Aloe vera contains several anti-inflammatory compounds that reduce inflammation both when applied topically and when ingested.
- This property is beneficial for treating skin conditions like psoriasis and eczema, as well as inflammatory disorders internally.

3. **Antioxidant:**

- Aloe vera contains vitamins A, C, and E, as well as various antioxidants such as flavonoids and phenolic compounds.
- These antioxidants help protect cells from damage caused by free radicals, contributing to overall skin health and reducing oxidative stress.

4. **Immunomodulatory:**

- Polysaccharides present in Aloe vera gel have immunomodulatory effects, enhancing the activity of macrophages and other immune cells to help fight infections.

5. **Anti-microbial and Anti-fungal:**

- Aloe vera has natural antimicrobial and antifungal properties, making it effective against bacteria and fungi that can cause infections in wounds or skin conditions^[8].

USES OF ALOEVERA

Aloe vera is known for its diverse range of functions and therapeutic benefits, owing to its rich composition of bioactive compounds. Here are some key functions and uses of Aloe vera:

1. **Skin Care:**

- **Moisturizing:** Aloe vera gel is hydrating and helps to replenish moisture in the skin, making it a popular ingredient in moisturizers and lotions.
- **Soothing:** It has anti-inflammatory properties that can help calm irritated skin, reducing redness and itching.
- **Wound Healing:** Aloe vera accelerates wound healing by stimulating the production of collagen, which is essential for skin repair.
- **Sunburn Relief:** Its cooling properties provide relief from sunburns and minor burns, promoting healing and reducing discomfort.

2. **Digestive Health:**

- **Digestive Aid:** Aloe vera juice or supplements are used traditionally to support digestive health by promoting regular bowel movements and easing discomfort from digestive disorders.

- **Anti-inflammatory:** It has anti-inflammatory effects in the digestive tract, which may help reduce symptoms of conditions like irritable bowel syndrome (IBS) and acid reflux.

3. **Immune Support:**

- Aloe vera contains polysaccharides and other compounds that stimulate the immune system, aiding the body's natural defenses against infections.

4. **Dental Care:**

- Aloe vera is used in some toothpastes and mouthwashes for its antibacterial and anti-inflammatory properties, which can help reduce plaque buildup, gum inflammation, and promote overall oral health.

5. **Hair Care:**

- Aloe vera is included in shampoos and conditioners for its moisturizing properties, promoting healthy hair growth and reducing scalp irritation.

6. **Antioxidant Properties:**

- The vitamins (A, C, E) and other antioxidants in Aloe vera help protect cells from damage caused by free radicals, contributing to overall health and wellness.

7. **Anti-microbial and Anti-fungal:**

- Aloe vera has natural antimicrobial and antifungal properties, making it effective against various bacteria and fungi that can cause infections or skin conditions.

8. **Pain Relief:**

- When applied topically, Aloe vera gel can help alleviate pain from minor cuts, burns, insect bites, and skin irritations due to its cooling and anti-inflammatory effects.

9. **Cosmetic Uses:**

- Aloe vera is a common ingredient in cosmetics and beauty products due to its ability to improve skin texture, reduce fine lines and wrinkles, and enhance overall skin health^[9].

ALOEVERA USE IN COSMETICS

Aloin and its gel are used as skin tonic against pimples. Aloe vera is also used for soothing the skin, and keeping the skin moist to help avoid flaky scalp and skin in harsh and dry weather. Aloe vera may also be used as a moisturizer for oily skin. Studies show that Aloe vera improves the skin's ability to hydrate itself, aids in the removal of dead skin cells and has an effective penetrating ability that helps transport healthy substances through the skin. Each of these factors makes Aloe vera an ideal

ingredient in cosmetic and dermatological products.

Skin Care

1. Moisturizers:

- **Hydration:** Aloe vera gel is an excellent natural moisturizer, suitable for all skin types. It hydrates the skin without making it greasy, making it ideal for those with oily skin.
- **Soothing:** Its anti-inflammatory properties help soothe irritated or inflamed skin, making it beneficial for sensitive skin.

2. Anti-Aging Products:

- **Collagen Production:** Aloe vera stimulates fibroblast activity, increasing collagen production and skin elasticity.
- **Antioxidants:** Vitamins C and E in Aloe vera help protect the skin from free radical damage, reducing the appearance of fine lines and wrinkles.

3. Acne Treatment:

- **Antibacterial:** Aloe vera's antimicrobial properties help reduce acne-causing bacteria.
- **Anti-inflammatory:** Reduces inflammation and redness associated with acne.
- **Healing:** Promotes healing of acne scars and prevents future breakouts.

4. Sun Care Products:

- **After-Sun Care:** Aloe vera is commonly used in after-sun products due to its soothing and cooling properties, which provide relief from sunburn.
- **Sun Protection:** Although not a substitute for sunscreen, Aloe vera is sometimes included in sunscreens for its skin-soothing benefits.

5. Cleansers and Toners:

- **Cleansing:** Saponins in Aloe vera act as natural cleansers, helping to remove dirt and excess oil.
- **Pore Tightening:** Aloe vera can help tighten pores, giving the skin a smoother appearance^[10].

Hair Care

1. Shampoos and Conditioners:

- **Hydration:** Aloe vera helps moisturize the scalp and hair, reducing dryness and dandruff.
- **Strengthening:** It contains vitamins and minerals that strengthen hair strands and promote healthy growth.

2. Hair Masks:

- **Repair:** Aloe vera helps repair damaged hair by providing essential nutrients.
- **Shine:** Regular use of Aloe vera in hair masks can enhance the natural shine and smoothness of hair^[11].

Other Applications

1. Lip Care:

- **Lip Balms:** Aloe vera is used in lip balms for its hydrating and healing properties, helping to soothe chapped lips.

2. Makeup:

- **Primers and Foundations:** Aloe vera is sometimes included in makeup products to provide a hydrating base and ensure smooth application.

3. Body Care:

- **Body Lotions and Creams:** Aloe vera is a common ingredient in body lotions and creams for its moisturizing and skin-soothing properties.
- **Hand Sanitizers:** Due to its antimicrobial properties, Aloe vera is often included in hand sanitizers to help prevent dryness caused by alcohol^[12].

PRECAUTIONS WHEN USING ALOE VERA:

❖ Advice from Experts:

1. Prolong use of Aloe vera for laxative effects may induce diarrhea and cramping.
2. Aloe vera might prolong the bleeding time. Caution is advised in patients with bleeding disorders or taking drugs that may increase the risk of bleeding

❖ Allergy:

People who are allergic to garlic, onions or other plants of the family Liliaceae may also be allergic to Aloe vera. In such cases, consult a doctor before using Aloe vera.

❖ Breastfeeding:

Avoid Aloe vera if you are breastfeeding as it is found to be unsafe.

❖ Pregnancy:

Avoid Aloe vera during pregnancy as it may cause a miscarriage by increasing uterine contractions^[13].

MERITS OF ALOE VERA IN COSMETICS:

Aloe vera boasts numerous benefits for skin care, making it a popular ingredient in cosmetics:

- **Soothing:** It has anti-inflammatory properties, which can calm irritated or inflamed skin, reducing redness and discomfort.

- **Acne treatment:** Aloe vera's antibacterial and anti-inflammatory properties can help reduce acne breakouts and soothe existing blemishes.
- **Lightening scars:** Regular use of aloe vera can help lighten scars and dark spots, promoting a more even skin tone.
- **Gentle exfoliation:** Aloe vera contains enzymes that gently exfoliate the skin, removing dead cells and promoting cell turnover for a smoother complexion^[14].

DEMERITS OF ALOE VERA IN COSMETICS:

While aloe vera is widely celebrated for its soothing and moisturizing properties, there are a few demerits to consider in cosmetic use:

- **Allergic Reactions:** Despite being natural, some individuals may still experience allergic reactions to aloe vera, resulting in redness, itching, or irritation on the skin.
- **Skin Sensitivity:** Aloe vera can cause skin sensitivity, especially in individuals with sensitive skin types. Prolonged or excessive use may exacerbate this sensitivity, leading to discomfort.
- **Photosensitivity:** Aloe vera contains compounds that may increase the skin's sensitivity to sunlight, potentially leading to sunburn or other sun-related damage if not used in conjunction with adequate sun protection^[15].

ALOE VERA USE IN FOOD

Aloe vera, widely recognized for its medicinal and therapeutic properties, is increasingly being incorporated into food products. Known scientifically as *Aloe barbadensis* Miller, this plant is prized for its nutrient-rich gel, which is packed with vitamins, minerals, amino acids, and antioxidants. However, its potential as a functional food ingredient is now being realized. This trend is driven by the plant's rich nutritional profile and its potential health benefits. Aloe vera's use in food products enhances their nutritional value and offers various health benefits, ranging from improved digestion to enhanced immune function.

Aloe Vera Juice and Drinks

1. Aloe Vera Juice:

- **Hydration:** Aloe vera juice is popular for its hydrating properties.
- **Digestive Health:** It helps soothe the digestive tract and can aid in reducing symptoms of conditions like irritable bowel syndrome (IBS).

- **Detoxification:** Aloe vera juice is believed to help detoxify the body and support liver function.

2. Aloe Vera Gel Drinks:

- **Nutrient-Rich:** These drinks often contain pieces of Aloe vera gel, providing a source of vitamins, minerals, and amino acids.
- **Immune Support:** The polysaccharides in Aloe vera can boost the immune system.

Aloe Vera in Food Products

1. Yogurt and Dairy Products:

- **Aloe Vera Yogurt:** Aloe vera can be added to yogurt for its health benefits and unique texture. It provides probiotics and enhances the nutritional profile of the yogurt.
- **Smoothies and Shakes:** Aloe vera gel can be blended into smoothies and shakes for added hydration and nutrients.

2. Desserts:

- **Aloe Vera Jelly:** Aloe vera is used to make jellies and desserts, particularly in Asian cuisines. It adds a refreshing, slightly chewy texture and is often paired with fruits.
- **Ice Cream:** Aloe vera can be incorporated into ice cream for a refreshing flavor and health benefits.

3. Snacks:

- **Aloe Vera Snacks:** Dried Aloe vera pieces or Aloe vera-infused snacks are available, offering a healthy and tasty option.

NUTRITIONAL BENEFITS OF ALOE VERA IN FOOD

Additionally, aloe vera is a source of antioxidants that can help neutralize free radicals and protect cells from damage. The plant's anti-inflammatory properties may also be beneficial for reducing inflammation and pain in the body.

Aloe vera is packed with essential vitamins (A, C, E, and several B vitamins), minerals (calcium, magnesium, zinc), amino acids, enzymes, and polysaccharides, which are known to support the immune system and aid in digestion.

- **Digestive Health:** Aloe vera aids in digestion, alleviating conditions such as acid reflux, irritable bowel syndrome (IBS), and constipation. It has been shown to soothe the digestive tract and promote healthy gut flora.
- **Immune Support:** Polysaccharides in aloe vera enhance immune function by stimulating

white blood cells, helping the body fend off infections^[16].

HEALTH BENEFITS OF CONSUMING ALOE VERA

1. Digestive Health:

- **Laxative Properties:** Aloe vera latex contains compounds like aloin that have strong laxative effects, helping with constipation.
- **Soothing Effect:** Aloe vera juice can soothe and heal the lining of the digestive tract, reducing irritation and promoting healthy digestion.

2. Detoxification:

- Aloe vera helps detoxify the body by supporting liver function and aiding in the elimination of toxins

3. Immune System Support:

- The polysaccharides in Aloe vera enhance immune function, helping the body fight off infections and diseases.

4. Hydration:

- Aloe vera's high water content helps keep the body hydrated, which is essential for overall health and well-being.

5. Anti-Inflammatory:

- Aloe vera has anti-inflammatory properties that can help reduce inflammation in the body, benefiting conditions like arthritis and other inflammatory disorders^[17].

CHALLENGES AND CONSIDERATIONS:

1. **Taste and Texture:** Aloe vera has a distinct taste that may not be universally appealing. Food product formulations must effectively mask or complement this flavor to ensure consumer acceptance.
2. **Regulatory Compliance:** Food products containing aloe vera must comply with food safety regulations. This includes ensuring the safety and efficacy of aloe vera as an ingredient through rigorous testing and validation.
3. **Consumer Awareness:** Educating consumers about the benefits of aloe vera in food products is crucial for market acceptance^[18].

SAFETY AND PRECAUTIONS

- **Quality:** It's important to use high-quality, pure Aloe vera products to avoid contaminants and ensure safety^[19].
- **Dosage:** Consuming Aloe vera in moderate amounts is generally safe, but excessive intake, especially of Aloe vera latex, can

cause adverse effects such as diarrhea and electrolyte imbalance.

- **Allergies:** Some people may be allergic to Aloe vera, so it's important to check for any adverse reactions when trying it for the first time.^[20]

CONCLUSIONS:

Aloe vera, esteemed for its therapeutic properties, has found extensive application in both cosmetics and food products, offering a range of health benefits. In cosmetics, its soothing, hydrating, and healing properties make it a staple ingredient in skincare, haircare, and personal care products. Its ability to promote skin regeneration, alleviate inflammation, and moisturize effectively has made it popular among consumers seeking natural and effective skincare.

Similarly, in food products, aloe vera's nutritional profile, rich in vitamins, minerals, amino acids, and antioxidants, contributes to its popularity as a functional ingredient. It is incorporated into beverages, yogurts, desserts, and dietary supplements to enhance health benefits such as digestive support, immune system reinforcement, and anti-inflammatory effects. The trend towards functional foods aligns with consumer preferences for natural, health-promoting ingredients.

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