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Review Article

## Potential of Aloe vera in Dermato-cosmetology: An Integrative Appraisal of Unani Therapeutics and Contemporary Biomedical Evidence

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### Abstract

Skin disorders are a growing global health burden, often associated with significant physical morbidity and psychosocial impairment. The increasing demand for safe dermatological and cosmetic agents has strengthened interest in natural products with multifunctional properties. *Aloe vera* is widely used in traditional and modern medicine for skin and hair care due to its broad biological activities. In Unani medicine, *Aloe vera* (*Elwa/Sibr*) is an important drug described under *Umoor-e-Zeeenat* and is traditionally indicated for inflammatory, infectious, and chronic dermatological conditions. This review integrates classical Unani concepts with contemporary biomedical evidence to evaluate the dermatological, dermatocosmetic, and topical drug delivery potential of *Aloe vera*. Classical Unani literature was assessed to identify its temperament, actions, and formulations, while modern studies were reviewed to summarize its phytochemistry, pharmacological effects, and clinical applications. Unani texts attribute actions such as *Jāli*, *Qābiz*, *Mujaffif*, *Murattib*, *Mulattif*, *Muhallil-e-Waram*, and *Munaqqī-e-Qurūh*, which correlate with experimentally proven anti-inflammatory, antimicrobial, antifungal, antioxidant, wound-healing, moisturizing, and barrier-restorative effects. These activities are mainly linked to anthraquinones, polysaccharides, vitamins, enzymes, and other bioactive compounds. Clinical evidence supports its use in acne vulgaris, tinea, dermatitis, psoriasis, pruritus, radiation dermatitis, burns, wounds, scars, and scalp disorders. Its favorable safety profile and formulation adaptability further support its incorporation into topical drug delivery systems and cosmeceuticals. Overall, the convergence of Unani therapeutics with biomedical evidence highlights *Aloe vera* as a promising integrative agent in dermatology, warranting further standardized clinical research.

**Keywords:** *Aloe vera*; Unani medicine; *Umoor-e-Zeeenat*; Skin disorders; *Sibr*; *Elwa*

### Introduction:

The skin plays a crucial role in maintaining overall health by acting as a protective barrier against environmental insults and disease, while also contributing significantly to physical appearance and aesthetic identity.<sup>1,2</sup> Skin and subcutaneous disorders represent a substantial and growing global health burden, accounting for billions of cases and approximately 41.9 million disability-adjusted life years (DALYs) worldwide in 2021, with marked regional variations. India bears a disproportionately high share of this burden, underscoring the urgent need for accessible, affordable, and culturally acceptable therapeutic interventions.<sup>3,4</sup> In addition to physical morbidity, skin disorders are frequently associated with significant psychosocial distress and impaired quality of life, further amplifying their public health impact.<sup>5,6</sup>

Parallel to the rising prevalence of skin disorders, the role of cosmetics has expanded beyond aesthetic

enhancement to encompass therapeutic benefits. This evolution has led to the emergence of cosmeceuticals, which offer functional advantages such as skin protection, photoprotection, anti-aging effects, and barrier repair, thereby bridging the gap between cosmetic application and therapeutic dermatology.<sup>7</sup> Cosmetic drugs and cosmeceuticals are now widely used to address both aesthetic and functional aspects of skin and hair health, including the development of multifunctional skincare and hair care formulations.<sup>8</sup> However, concerns regarding their extensive and often inadequately regulated use have highlighted the need for rigorous safety assessment and the development of safer, sustainable, and evidence-based formulations.<sup>9</sup>

Traditional systems of medicine, particularly Unani medicine, provide a valuable foundation for the development of such cosmeceutical products. Since antiquity, Unani physicians have accorded significant importance to cosmetic care, extensively documented

under the domain of *Umoor-e-Zeeenat* in classical medical texts such as *Kitab-ul-Mansoori*, *Al-Hawi-fil-Tib*, *Kamil-us-Sana*, *Al-Qanoon-fit-Tib*, and *Zakheera Khwarzam Shahi*. These texts describe a wide range of single and compound formulations in solid, semi-solid, and liquid dosage forms, valued for their safety, affordability, and broad applicability for both oral and topical use.<sup>10</sup> Unani medicinal substances have been utilized for centuries in the management of various skin disorders and cosmetic conditions, demonstrating efficacy in alleviating inflammation, infections, pigmentation abnormalities, and dryness, while enhancing skin texture and overall appearance.

Among these medicinal agents, *Elwa* (Aloe vera) occupies a prominent position in Unani formulations due to its diverse pharmacological properties and extensive therapeutic and cosmetic applications.

### Aloe vera – History and Importance

Aloe vera has been used for centuries for health, beauty, and skin care. Its name derives from the Arabic “*Alloeh*” (bitter shining substance) and the Latin “*vera*” (true).<sup>11</sup> Historically, Greek scholars considered it a cure for multiple ailments, while Egyptians called it the “plant of immortality.” Today, it remains widely used in dermatology. Morphologically, Aloe vera has thick, yellow-green fleshy leaves growing from a single root without a stem, containing a moist, sticky, and bitter liquid with a mild sweet smell.<sup>12</sup> Unani medicine recognizes its three main varieties: Saqootari (highest quality), Arabian, and Sanjabi (lower quality), distinguished by color, fragrance, strength, and susceptibility to spoilage.<sup>12,13</sup>

Common botanical names include *Aloe barbadensis* Mill, *Aloe indica* Royle, *Aloe perfoliat* L. Var. *vera*, and *Aloe vulgaris* Lam.

Three main forms of aloe are used for medicinal purposes: aloe latex, aloe gel, and aloe whole-leaf extract. Historically, the Greek physician Dioscorides employed aloe gel to treat mouth infections, wounds, sores, hair loss, genital ulcers, haemorrhoids, boils, inflammation, and also as a laxative. In India, fresh aloe gel and whole leaves have traditionally been used to enhance appetite and digestion, act as a laxative, stimulate menstrual flow, and eliminate intestinal worms. By the seventh century, aloe gel was widely used in Asia for managing inflammatory skin disorders and sinusitis. Aloe latex, obtained from the bundle sheath cells within the leaf, has primarily been utilized for its strong laxative properties.<sup>13,14</sup>

The Unani description of *Elwa* (Aloe vera), characterized by a *Haar wa Yabis* temperament and multiple therapeutic actions Given in Table 1, demonstrates significant concordance with experimentally established pharmacological properties derived from its phytochemical profile as give in Table 2. Traditional actions such as *Muhallil-e-Waram*, *Murattib*, *Mulattif*, and *Munaqqī-e-Qurūh* are consistent with the reported anti-inflammatory, antimicrobial, wound-healing, soothing, and moisturizing activities of its bioactive constituents. This correlation highlights the scientific plausibility of classical Unani concepts and supports the continued therapeutic and cosmeceutical application of Aloe vera in dermatological management.<sup>12,16</sup>

**Table 1: Unani Mizaj and Therapeutic Actions of Aloe vera (Elwa)<sup>12,13,15,16</sup>**

Category	Unani Terminology	Interpretation / Activity
<b>Mizaj</b>	<i>Haar wa Yabis (darja-e-doem)</i>	Hot and dry temperament (second degree)
<b>Systemic Effects (Oral Administration)</b>	<i>Mushil</i>	Purgative
	<i>Mushil-e-Saudā</i>	Purgative of melancholic humour
	<i>Mufattih-e-Sudūd-e-Saudāwī</i>	De-obstruent of melancholic channels
	<i>Moharrik-e-Kabid</i>	Hepato-stimulant
	<i>Muqawwi-e-Mi'da</i>	Stomachic tonic
	<i>Qātil-e-Didān</i>	Antihelmintic
	<i>Mudirr-e-Haiz</i>	Emmenagogue
	<i>Musqit-e-Janīn</i>	Abortifacient
<b>Topical Effects (Cutaneous Application)</b>	<i>Musakkhkhin</i>	Warming
	<i>Jālī</i>	Cleansing
	<i>Qābiz</i>	Astringent
	<i>Munaqqī-e-Qurūh</i>	Ulcer cleanser
	<i>Mujaffif</i>	Desiccant
	<i>Murattib and Mulattif</i>	Soothing and softening (Moisturizing)
	<i>Muhallil-e-Waram</i>	Anti-inflammatory
	<i>Musakkin</i>	Analgesic

**Table 2: Phytochemical Constituents and Pharmacological Properties of *Aloe vera***<sup>14,17-19</sup>

Constituent Class	Major Compounds	Pharmacological Activities
Anthraquinones	Aloe-emodin, aloin, emodin, barbaloin	Anti-inflammatory, antimicrobial, wound healing
Polysaccharides	Acemannan, glucomannan	Fibroblast proliferation, collagen synthesis, moisture retention
Vitamins	Vitamin C, $\beta$ -carotene, $\alpha$ -tocopherol	Antioxidant, photoprotective
Enzymes	Catalase, amylase, lipase	Anti-inflammatory, antioxidant
Low-molecular-weight compounds	Salicylic acid, lignins, $\beta$ -sitosterol, arachidonic acid	Anti-inflammatory, antimicrobial, soothing, penetration enhancement

The Unani description of *Elwa* (*Aloe vera*) in terms of its *Haar wa Yabis* temperament and diverse therapeutic actions shows a strong concordance with its experimentally validated pharmacological properties. The classical Unani actions such as *Muhallil-e-Waram*, *Murattib*, *Mulattif* and *Munaqqī-e-Qurūh* correlate well with the documented anti-inflammatory, wound-healing, antimicrobial, soothing and moisturizing effects of its bioactive constituents. This convergence of traditional knowledge and modern scientific evidence substantiates the therapeutic and cosmetic relevance of *Aloe vera* in the management of dermatological conditions.<sup>12,16</sup>

### Dermatological Applications:

Dermatological diseases are common across all age groups and can greatly affect quality of life. They include inflammatory, infectious, and chronic skin conditions marked by symptoms such as itching, redness, dryness, and barrier dysfunction, requiring treatments that reduce inflammation, control microbes, and support skin healing.<sup>1-3</sup>

*Aloe vera* is recognized for its anti-inflammatory, antimicrobial, antifungal, and wound-healing effects, making it beneficial in the management of various skin conditions. Its capacity to calm irritation, maintain skin hydration, and support tissue repair has established its widespread use in dermatology, both as a standalone remedy and in combination with conventional treatments.<sup>18,19</sup> According to *Qanoon* and its commentaries, Sibr possesses *Qabiz* (astringent), *Mujaffif* (Desiccant), *Jaali* (Cleansing) and *Murattib* (Soothing) properties, which are particularly effective when applied topically to the affected area. The Indian and Saqootari varieties of Sibr offer multiple therapeutic benefits, acting as mild astringents and desiccants without inducing inflammation.<sup>12</sup>

### Tinea and its variants

Tinea is a common superficial fungal infection affecting the skin, hair, or nails, typically caused by dermatophytes and marked by redness, scaling, and itching.<sup>1,2</sup> In Unani medicine, such conditions are seen as a result of accumulation of *Mawad-e-Fasida* (morbid matter) and local inflammation, and are treated with remedies that are *Mujaffif* (Siccative), *Murattib* (Soothing), and *Mohallil-e-Warm* (anti-inflammatory)<sup>20,35</sup>.

*Aloe vera* has long been applied topically for fungal skin problems, valued for its antifungal and anti-inflammatory properties. Scientific studies support these uses, showing that its bioactive compounds hinder fungal growth and reduce inflammatory responses, easing irritation. Clinical evidence indicates that *Aloe vera* gel improves skin condition, accelerates recovery, and enhances patient comfort, making it a safe and effective adjunct or alternative in managing tinea infections.<sup>22</sup>

### Atopic dermatitis

Atopic dermatitis is a chronic inflammatory skin condition characterized by dryness, itching, and increased susceptibility to infections<sup>1</sup>. In Unani medicine, it is considered a result of humoral imbalance and local accumulation of *Mawade Fasida* (morbid matter), for which *Murattib* (soothing), *Mulattif* (moisturizing), and *Muhallil-e-Waram* (anti-inflammatory) agents are recommended<sup>23</sup>.

*Aloe vera* has traditionally been used to manage atopic dermatitis due to its hydrating, antimicrobial, and anti-inflammatory properties. Modern studies confirm that it helps restore skin barrier function, reduces bacterial colonization, and alleviates inflammation, providing relief from dryness and irritation. Topical application of *Aloe vera* can improve skin hydration, decrease redness, and enhance overall skin health, making it a safe and effective supportive therapy in atopic dermatitis management.<sup>24</sup>

### Contact Dermatitis

Occupational dry skin and irritant contact dermatitis are skin conditions that develop due to repeated or prolonged exposure to chemical, physical, or environmental irritants, such as detergents, solvents, soaps, or frequent handwashing. These exposures disrupt the natural lipid barrier of the skin, leading to increased trans epidermal water loss, dryness, scaling, and visible redness (erythema). Over time, the skin becomes more fragile and susceptible to inflammation, irritation, cracking, and even secondary infections, significantly affecting skin integrity and function.<sup>1</sup>

In Unani medicine, such conditions are managed with agents that are *Murattib* (soothing), *Mulattif* (softening), and *Mujaffif* (siccative) to restore skin balance.<sup>20</sup>

*Aloe vera* is traditionally applied to improve skin hydration, reduce erythema, and strengthen skin

integrity. Modern studies support its use, showing that its moisturizing and anti-inflammatory properties help repair the skin barrier, relieve irritation, and maintain healthy skin, making it a practical and well-tolerated option for managing occupational or irritant-related skin damage.<sup>25</sup>

### Radiation-induced dermatitis

Radiation-induced dermatitis commonly occurs during radiotherapy, presenting with redness, dryness, itching, and irritation due to damage to the skin barrier. In Unani medicine, such conditions are treated with agents that soothe, reduce inflammation, and promote tissue repair. Aloe vera has traditionally been used to relieve these symptoms and support skin healing. Scientific studies show that its anti-inflammatory, moisturizing, and regenerative properties help reduce erythema, alleviate dryness and discomfort, and restore barrier function, making it a safe and effective option for managing radiation-related skin reactions.<sup>26</sup>

### Psoriasis Vulgaris

Psoriasis vulgaris is a chronic inflammatory skin disorder characterized by red, scaly plaques, itching, and accelerated skin cell turnover<sup>1,2</sup>. In Unani medicine, it is associated with humoral imbalance and local inflammation, and is managed with agents that are *Muhallil-e-Waram* (anti-inflammatory), *Murattib* (soothing), *Mulattif* (softening)<sup>20</sup>.

Aloe vera has traditionally been used to reduce scaling, redness, and inflammation in psoriatic lesions. Modern research supports these uses, showing that its bioactive compounds help modulate inflammatory mediators, hydrate the skin, and promote tissue repair. Topical application of Aloe vera can improve lesion appearance, decrease discomfort, and serve as a safe, complementary option alongside conventional psoriasis therapies.<sup>27</sup>

### Burns and Wounds

Aloe vera is traditionally used in Unani medicine for the management of burns, skin ulcers, and fissures.<sup>12,13,15,28</sup> A study showed that it promotes wound healing by enhancing fibroblast and keratinocyte growth and migration, while also protecting keratinocytes from cell damage<sup>29</sup>. A systematic review of 23 clinical trials further confirmed its effectiveness in preventing skin ulcers and treating burn wounds, postoperative wounds, cracked nipples, genital herpes, psoriasis, and chronic wounds such as pressure ulcers. Its properties help maintain skin moisture and integrity, suggesting that Aloe vera can serve as a complementary therapy to enhance wound healing and support overall skin health.<sup>30</sup>

### Pruritus

Pruritus is a common dermatological complaint characterized by persistent itching and may occur in different forms, either as a primary skin disorder or secondary to various underlying systemic or dermatological diseases. In Unani medicine, pruritus is attributed to the accumulation of *Mawād-e-Fāsida* (morbid matter) and derangement of humoral balance,

for which purgative and soothing therapies are advised to eliminate the underlying cause and relieve symptoms.

Traditionally, a decoction prepared from fresh *Shahtara* is used for purgation; the expressed juice is boiled, and 414 g of the preparation is combined with *Sibr Saqootri* (10.5 g), *Haleela Zard* (17.5 g), *Mamiran* (7 g), and *Intaqi Mushawwah* (6 g). The mixture is warmed and administered as a single dose, repeated for three doses, along with topical massage using *Roghan-e-Gul*, which helps soothe the skin, reduce itching, and restore cutaneous comfort.<sup>36</sup>

### Cosmetic Applications

Elwa (*Aloe barbadensis* Miller) is rich in a wide array of biologically active constituents, including polysaccharides, vitamins A, C, and E, enzymes, minerals, amino acids, and antioxidants, which collectively contribute to its diverse cosmetic benefits<sup>33,34</sup>. Aloe gel is widely incorporated into personal care products such as moisturizers, cleansers, sunscreens, toothpastes, mouthwashes, deodorants, and shampoos<sup>14</sup>.

One of the most well-established cosmetic benefits of Aloe vera is its skin-hydrating effect. Clinical studies evaluating cosmetic formulations containing freeze-dried Aloe vera extract have demonstrated that even low concentrations (0.10–0.50%) significantly improve stratum corneum hydration after repeated application compared with vehicle controls. This moisturizing property is primarily attributed to aloe polysaccharides, which function as natural humectants by attracting and retaining moisture within the skin<sup>33</sup>. Additionally, antioxidants such as vitamins C and E help neutralize free radicals involved in skin damage and premature aging, supporting the use of Aloe vera in anti-aging cosmetic formulations<sup>34</sup>.

By reducing oxidative stress, improving skin hydration, and modulating collagen metabolism, Aloe vera has gained recognition as a natural agent with potential anti-aging benefits. A clinical study reported that dietary Aloe vera gel significantly reduced facial wrinkles and improved skin elasticity. It also increased type I collagen synthesis while reducing the activity of matrix metalloproteinase-1 (MMP-1), indicating enhanced collagen production and decreased collagen degradation in aging skin<sup>35</sup>.

In Unani medicine, Aloe vera is described as *Musakhkhin*, *Shadeed Jāli*, *Muhallil*, *Munbit-e-Sha'r*, *Musawwid-e-Sha'r*, *Qātil-e-Jarāseem*, and *Mudammil-e-Qurūh*. Owing to these properties, its application to the scalp is reported to prevent hair loss in early stages, promote hair growth, increase hair length, improve curl pattern, darken hair color, reduce shedding, and support regrowth even in bald areas. Traditional formulations include aloe ground in alcohol or water, mixed with astringent alcohol and applied to hair roots, or dissolved in vinegar as a hair wash. Gradual topical application in increasing doses over consecutive days has also been described for conditions such as *Iraq-e-Madani* (Dracunculiasis)<sup>12</sup>. Collectively, these formulations contribute to improved scalp health, hair texture, pigmentation, and density. Aloe

vera is also widely recognized as a common household plant due to its wound- and burn-healing properties<sup>14</sup>.

### Scalp and Hair Disorders

In Unani medicine, scalp and hair diseases such as *Huzāz* (Dandruff), *Sa'fa* (Tinea capitis), *Dā' al-Hayya* and *Dā' al-Şalab* (Alopecia areata), and Pediculosis are attributed to the accumulation of *Mawade Fasida* (morbid matter), deranged temperament, inflammation, and microbial involvement. For these conditions, formulations possessing *Jāli* (detergent/cleansing), *Muhallil* (resolvent/anti-inflammatory), *Munbit-e-Sha'r* (hair growth-promoting), and *Qātil-e-Jarāseem* (antimicrobial) properties are recommended.

Aloe vera has been traditionally used for scalp and hair ailments due to its cleansing, resolvent, hair-growth-promoting, and anti-infective actions. Classical texts describe its topical use in various formulations—such as aloe ground in alcohol or water, mixed with astringent alcohol and applied to hair roots, dissolved in vinegar as a hair wash, or prepared as a liniment with *Barg-e-Murd*—to cleanse the scalp, reduce inflammation, control dandruff, prevent hair fall, and promote regrowth<sup>12,13</sup>.

Modern studies further validate these uses, showing that Aloe vera possesses antifungal, antibacterial, and anti-inflammatory activities relevant to scalp disorders. Its bioactive constituents, including anthraquinones, saponins, and polysaccharides, inhibit pathogenic microbes, reduce inflammatory responses, and promote tissue repair. Topical Aloe vera formulations have demonstrated clinical benefits with good tolerability, supporting their role in integrative scalp and hair care<sup>31,32</sup>.

### Acne Vulgaris

Acne vulgaris is a chronic inflammatory disorder of the pilosebaceous unit characterized by increased sebum production, follicular hyperkeratinization, microbial colonization, and inflammation<sup>2</sup>. In Unani medicine, acne-like conditions are attributed to the accumulation of *Mawād-e-Fāsida* (morbid matter) and local inflammation, for which agents possessing *Jāli* (detergent/cleansing), *Muhallil-e-Waram* (anti-inflammatory), and *Mujaffif* (desiccative) actions are recommended<sup>35</sup>.

Aloe vera has been traditionally employed in Unani medicine for inflammatory and suppurative skin conditions due to its detergent, astringent, and anti-inflammatory properties. Classical texts recommend its topical use either alone or in combination with other agents to reduce inflammation and purify affected areas<sup>12,13</sup>.

Modern pharmacological studies support these traditional claims, demonstrating that Aloe vera exhibits significant antibacterial activity against acne-associated pathogens such as *Propionibacterium acnes* and *Staphylococcus aureus*. Its anthraquinones and flavonoids inhibit bacterial protein synthesis, while polysaccharides and enzymes suppress inflammatory mediators including TNF- $\alpha$  and IL-6. Clinical studies have shown improved therapeutic outcomes when Aloe vera gel is

used alone or as an adjunct to conventional anti-acne therapies, with better tolerability and reduced irritation, highlighting its value as an integrative option in acne management<sup>21</sup>.

### Post-Traumatic Scars

Aloe (Elwa) is traditionally used as a topical healing agent, where freshly extracted juice is applied alone or in combination with powdered formulations to enhance tissue repair. Classical Unani literature documents its use in managing post-traumatic skin changes such as bruises, markings, and scars. When combined with agents like *Baranjasif* and *Marzanjosh*, aloe is believed to facilitate the resolution of superficial skin alterations<sup>35,37</sup>.

### Warts and Skin Tags

Aloe is also traditionally employed in the treatment of warts and skin tags. Its juice is combined with *Bora Armani* (borax) and *Barg-e-Aas* (Aas leaf) juice, ground into a paste, and gently massaged over the affected area to support gradual lesion resolution<sup>36</sup>.

Elwa (Aloe vera) is a valuable cosmetic agent, offering benefits such as skin hydration, anti-aging effects, and improvement of hair and scalp health. Its traditional use, supported by modern evidence, underscores its importance in cosmetic applications.

### Conclusion

This review underscores *Aloe vera* as a scientifically significant and therapeutically versatile medicinal plant with broad relevance in dermatology and dermatocosmetology. Classical Unani literature recognizes *Aloe vera* (*Elwa/Sibr*) as a drug possessing a *Haar wa Yabis darja-e-doem* temperament and describes multiple pharmacodynamic actions, including *Jāli*, *Qābiz*, *Mujaffif*, *Murattib*, *Mulattif*, *Muhallil-e-Waram*, and *Munaqqī-e-Qurūh*. These traditional attributes support its longstanding use in inflammatory, infectious, and chronic skin disorders. Importantly, contemporary biomedical evidence demonstrates strong concordance with Unani concepts, confirming that *Aloe vera* exhibits anti-inflammatory, antimicrobial, antifungal, antioxidant, wound-healing, moisturizing, and skin barrier-restorative activities. These effects are largely attributed to its diverse bioactive constituents, particularly anthraquinones, polysaccharides, vitamins, enzymes, and other low-molecular-weight compounds. Available experimental and clinical findings suggest beneficial outcomes in a wide range of dermatological conditions, including acne vulgaris, dermatophytosis, atopic and contact dermatitis, psoriasis, radiation-induced dermatitis, pruritus, burns, wounds, scars, and scalp and hair disorders. In addition, its humectant, photoprotective, and collagen-modulating properties provide a rational basis for its widespread incorporation into cosmetic and cosmeceutical formulations aimed at hydration, anti-aging, and hair care. From a drug delivery perspective, the favorable safety profile, biocompatibility, and formulation flexibility of *Aloe vera* further enhance its suitability for topical preparations and advanced delivery systems. Overall, the convergence of traditional Unani therapeutics with modern pharmacological and

clinical evidence supports *Aloe vera* as a promising integrative agent in dermatological therapeutics. Nevertheless, further standardised formulation studies and well-designed clinical trials are required to optimise dosage forms, ensure quality control, and strengthen their translational and clinical applicability in drug delivery research.

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