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**REVIEW: HERBAL PLANTS USED IN THE SUNSCREEN**

Yogesh B. Raut ,Sanjay K Bais, Kunal Ghodake .

Fabtech College of Pharmacy, Sangola, Maharashtra, India.

Corresponding author mail ID : kunalghodake2711@gmail.com

**ABSTRACT :**

*Sunscreen is a chemical substance that aids in UV radiation protection. UV B radiation is what causes sunburn, while UV A may do greater harm to the skin. The optimal sunscreen should obstruct both wavebands.*

*The purpose of this study was to create a topical herbal sunscreen formulation using a mix of medicinal herbs and certain fixed oils. The development of melanoma, squamous cell carcinoma, and actinic keratosis is decreased by regular use of sunscreen. Chemicals in sunscreen can be either organic or inorganic. Sunblock lotion is another name for sunscreen. The product that shields skin from UV rays of the sun by reflecting or absorbing them. Sunscreen use has grown because of the rising prevalence of skin cancer and the photo damaging effects of UV radiation. Sunscreen ingredients should be completely safe, chemically inert, non-irritating, non-toxic, photo stable, and able to shield the skin from sun harm.*

**Key words:** radiation, carcinoma, obstruct, non-irritating.

**INTRODUCTION:**

In recent years, a surge in concern has emerged regarding the safety and potential risks associated with the use of chemical sunscreen ingredients. Traditional sunscreens often contain chemicals such as oxybenzone, octinoxate, and avobenzone, which have come under scrutiny for their potential adverse effects on human health and the environment. Numerous studies have suggested that these chemicals can be absorbed through the skin, raising concerns about systemic exposure and potential health implications. For instance, a study conducted by Matta et al. (2019) found that certain chemical sunscreen ingredients can accumulate in the bloodstream at levels exceeding the threshold established by the U.S. Food and Drug Administration (FDA)<sup>1</sup>.

The detrimental effects of these chemicals on coral reefs have prompted legislative actions, with places like Hawaii and Key West, Florida, implementing bans on the sale of sunscreens containing oxybenzone and octinoxate. This growing body of evidence and regulatory response has fueled a rising apprehension among consumers, driving an increased interest in alternative sun protection options, particularly herbal sunscreens, perceived as safer and more environmentally friendly.<sup>2</sup>

The escalating concerns surrounding chemical sunscreen ingredients have precipitated a notable rise in the popularity of herbal sunscreens. Consumers, seeking safer and environmentally friendly alternatives, are turning to herbal formulations that utilize natural ingredients like green tea extract, aloe vera, and calendula. This shift signifies a growing awareness of the potential health and environmental

risks associated with traditional sunscreens, fueling a demand for herbal options perceived as gentler on the skin and less harmful to ecosystems<sup>3</sup>.

The purpose of this review is to comprehensively assess the efficacy, safety, and potential benefits of herbal sunscreens. By synthesizing existing research and clinical studies, the review aims to provide a thorough understanding of how herbal ingredients, such as green tea extract, aloe vera, and calendula, contribute to sun protection. Evaluating the effectiveness of these natural alternatives against traditional chemical sunscreens, considering their safety profiles, and exploring potential skin health benefits will contribute valuable insights to both consumers and researchers in the field<sup>4</sup>.

Several herbal plants and extracts are commonly used in the preparation of herbal sunscreens for their potential sun-protective properties. Here's a list of some herbal plants often incorporated into sunscreen formulations:

Sr no.	Herbal Plant	Scientific Name	Properties	Common Uses
1	Green Tea	Camellia sinensis	Antioxidant properties	Neutralizing free radicals caused by sun exposure
2	Aloe Vera	Aloe barbadensis miller	Soothing and moisturizing properties	Common ingredient in after-sun products
3	Calendula	Calendula officinalis	Anti-inflammatory properties	Soothing and calming the skin
4	Chamomile	Matricaria chamomilla	Anti-inflammatory and antioxidant properties	Contributing to overall skin health
5	Coconut Oil	Cocos nucifera	Natural SPF properties; Moisturizing	Providing sun protection and skin hydration
6	Lavender	Lavandula angustifolia	Potential sun protection; Pleasant fragrance	Valued for its pleasant scent
7	Jojoba	Simmondsia chinensis	Rich in antioxidants; Moisturizing	Used for its moisturizing properties
8	Carrot Seed	Daucus carota	Rich in antioxidants; Believed to have SPF	Potential natural sun protection
9	Raspberry Seed	Rubus idaeus	Natural sun-blocking agents; SPF potential	Used for potential sun protection benefits
10	Sesame	Sesamum indicum	May offer some sun protection	Commonly included in natural sunscreen formulations
11	Olive leaf	Olea europaea	Rich in antioxidants, may contribute to skin protection	Potential skin protection against oxidative stress.

12	Grape seed	Vitis vinifera	Known for anti-oxidant properties, it contains proanthocyanidins.	Supporting overall skin health.
13	Almond	Prunus dulcis	Moisturizing, rich in vitamin E	Nourishing the skin contributes to overall skin health.
14	Turmeric	Curcuma longa	Anti inflammatory and antioxidant properties.	Soothing sun- exposed skin,
15	Frankincense	Boswellia	Specific benefits vary, often used for skin healing.	Potential skin healing properties, diverse skin care uses

**Table no.1 Medicinal plants used in herbal sunscreen.**

**1. Camellia sinensis:**

Green tea extract derived from *Camellia sinensis* has gained prominence in sunscreen formulations due to its potent antioxidant properties. The polyphenolic compounds, particularly catechins like epigallocatechin gallate (EGCG), present in green tea, demonstrate remarkable free radical-scavenging capabilities<sup>5</sup>. When incorporated into sunscreens, green tea extract acts as a natural shield against oxidative stress induced by sun exposure. It helps neutralize free radicals generated by UV radiation, thereby mitigating skin damage and premature aging. Moreover, green tea's anti-inflammatory characteristics contribute to overall skin health.<sup>6</sup>



Fig.1 *Camellia sinensis*

**2. Aloe vera:**

Aloe vera (*Aloe barbadensis miller*) plays a crucial role in sunscreen formulations due to its exceptional soothing and moisturizing properties. Widely recognized for its ability to alleviate sun-induced skin irritations, aloe vera acts as a natural remedy against redness and inflammation caused by sun exposure.<sup>7</sup> Its moisturizing effect helps combat skin dryness, promoting hydration in sunscreens and preventing the adverse effects of prolonged sun exposure. Aloe vera's presence in sunscreens is especially prominent in after-sun products, where its cooling sensation and skin-healing attributes provide relief to sun-stressed skin.<sup>24</sup>



fig.2 Aloe vera.

### 3. Calendula:

Calendula (*Calendula officinalis*) is a botanical treasure in sunscreen formulations, celebrated for its remarkable anti-inflammatory properties and skin-soothing benefits.<sup>9</sup> Its inclusion in sunscreens is primarily driven by its ability to calm and nourish the skin, making it a valuable ingredient for individuals with sensitive or sun-exposed skin. Calendula's anti-inflammatory effects help alleviate redness and irritation caused by UV exposure, contributing to a more comfortable and soothing sun protection experience. While specific studies on calendula in sunscreens may vary.<sup>10</sup>



Fig.3 calendula.

### 4. Chamomile:

Chamomile (*Matricaria chamomilla*) is a botanical gem in sunscreen formulations, cherished for its anti-inflammatory and antioxidant prowess, which enhances skin health. Its inclusion in sunscreens is attributed to its capacity to mitigate inflammation and provide antioxidant protection against UV-induced damage.<sup>11</sup> Chamomile's anti-inflammatory properties help soothe and calm the skin, making it a valuable addition for individuals with sensitive or sun-exposed skin. Furthermore, its antioxidant components, such as chamazulene and apigenin, contribute to neutralizing free radicals generated by sun exposure, thereby aiding in the prevention of oxidative stress.<sup>12</sup>



Fig.4 chamomile.

### 5. Coconut oil:

Coconut oil (*Cocos nucifera*) stands out in sunscreen formulations due to its natural sun protection factor (SPF) properties and exceptional moisturizing capabilities. Rich in medium-chain fatty acids, coconut oil provides a mild level of sun protection while deeply hydrating the skin<sup>13</sup>. The presence of lauric acid, a component in coconut oil, contributes to its antimicrobial properties, further supporting skin health. Its moisturizing effects aid in preventing sun-induced dryness and promoting overall skin hydration. While coconut oil may not provide high SPF levels compared to conventional sunscreens, it adds a valuable layer of hydration and protection.<sup>14</sup>



Fig.5 coconut oil.

### 6. Lavender oil:

Lavender oil (*Lavandula angustifolia*) holds potential in sunscreen formulations, not only for its pleasant fragrance but also for its reported ability to offer a degree of sun protection. Lavender oil contains compounds like linalool and linalyl acetate, which possess antioxidant properties<sup>15</sup>. While it may not replace traditional sunscreens, incorporating lavender oil into formulations may contribute to the overall antioxidant defenses against UV-induced damage. Additionally, lavender oil's soothing properties can help calm the skin after sun exposure<sup>16</sup>.



Fig.5 Lavender

### 7. Jojoba oil:

Jojoba oil (*Simmondsia chinensis*) serves as a valuable component in sunscreen formulations due to its rich antioxidant content and exceptional moisturizing properties. The oil closely resembles the skin's natural sebum, making it an effective emollient that aids in maintaining skin hydration<sup>17</sup>. Jojoba oil's high antioxidant levels, primarily tocopherols and phenolic compounds, contribute to its protective role against free radicals induced by UV exposure. While it doesn't provide significant sun protection on its own, the inclusion of jojoba oil enhances the overall skin-nourishing qualities of sunscreens.<sup>18</sup>



Fig.7 Jojoba

### 8. Carrot Seed Oil:

Carrot Seed Oil (*Daucus carota*) is prized in sunscreen formulations for its rich antioxidant profile and the belief that it possesses a natural Sun Protection Factor (SPF). Abundant in carotenoids, particularly beta-carotene, and antioxidants like tocopherols, carrot seed oil provides added protection against oxidative stress induced by sun exposure. While it is not a replacement for conventional sunscreens, its potential SPF attributes make it a valuable ingredient for boosting the overall sun protection efficacy of formulations.<sup>19</sup>



Fig.8 carrot seed oil.

### 9. Raspberry Seed Oil:

Raspberry Seed Oil (*Rubus idaeus*) is gaining recognition in sunscreen formulations for its potential sun protection benefits attributed to natural sun-blocking agents. Rich in essential fatty acids, including omega-3 and omega-6, raspberry seed oil provides a natural source of UV-absorbing compounds. Notably, it contains ellagic acid, a polyphenol with antioxidant properties that may contribute to protection against UV-induced skin damage.

Research suggests that raspberry seed oil may absorb both UVB and UVA radiation, making it a potential candidate for enhancing sun protection in skincare products. However, it's crucial to note that while raspberry seed oil can offer some level of sun defense, it should not be solely relied upon as a substitute for conventional sunscreens with established Sun Protection Factor (SPF) ratings.<sup>23</sup>

In addition to its potential sun-blocking attributes, raspberry seed oil is valued for its moisturizing properties. The oil's high levels of vitamin E contribute to skin hydration, supporting overall skin health and resilience.<sup>20</sup>



Fig.9 Raspberry seed oil.

## 10. Sesame:

Sesame oil (*Sesamum indicum*) has garnered attention in natural sunscreen formulations due to its potential sun protection properties. Rich in antioxidants, sesamol, and sesamin, sesame oil exhibits natural photoprotective effects, absorbing UV rays and providing a certain degree of sun protection. The presence of sesamol is particularly noteworthy as it has been studied for its ability to mitigate UV-induced oxidative stress on the skin.<sup>21</sup>

Research suggests that sesame oil may act as a natural sunscreen, offering protection against both UVB and UVA rays. The antioxidant components in sesame oil contribute to neutralizing free radicals generated by sun exposure, thereby reducing the risk of skin damage. The photoprotective and antioxidant potential of sesame oil, supporting its inclusion in natural sun care products. However, it's important to note that while sesame oil can contribute to sun protection, it should not be solely relied upon, and its efficacy may vary. Complementing it with other sun-protective measures and ingredients is recommended for comprehensive sun care<sup>22</sup>.



Fig.10 sesame seed oil.

### SUMMARY:

In recent times, a discernible shift has occurred in public awareness and concern regarding the safety and environmental impact of chemical sunscreen ingredients. The apprehension primarily centers around widely used chemical UV filters like oxybenzone and octinoxate, with research suggesting potential risks to both human health and marine ecosystems. These concerns, supported by various studies, have prompted a significant change in consumer preferences, steering them towards natural and plant-based alternatives for sun protection.

The surge in popularity of herbal sunscreens is a direct response to this growing concern. Consumers are increasingly seeking safer and more sustainable options that harness the protective properties of herbal extracts and botanical ingredients. Notable herbal ingredients include green tea, aloe vera, and calendula, each offering distinct benefits. Green tea contributes antioxidant properties, aloe vera provides soothing and moisturizing effects, and calendula brings anti-inflammatory benefits.

This review aims to comprehensively evaluate the efficacy, safety, and potential benefits of herbal sunscreens. By synthesizing existing literature and research findings, the goal is to provide insights into the performance of herbal sunscreens, considering factors such as UV protection, skin compatibility, and environmental impact. Through this exploration, the review intends to inform consumers, researchers, and



skincare professionals about the viability of herbal sunscreens in addressing the concerns associated with chemical alternatives.

As the skincare industry adapts to this paradigm shift, the review emphasizes the need to not only assess the immediate protective effects of herbal sunscreens but also their long-term impact on skin health and the environment. Herbal sunscreens, with their holistic approach to sun care, align with the growing demand for products that prioritize personal well-being and environmental responsibility. The review contributes to an informed dialogue on sun protection, empowering individuals to make conscious choices that align with their health and sustainability values.

It is important to note that while herbal sunscreens offer promising alternatives, ongoing research and advancements in the field are essential for continually enhancing their efficacy and understanding their full range of benefits. This review serves as a snapshot of the current landscape, acknowledging the dynamic nature of scientific inquiry and the skincare industry.

### **CONCLUSION:**

In conclusion, the escalating concern over chemical sunscreen ingredients, driven by well-documented research indicating potential risks to both human health and the environment, has spurred a paradigm shift in sun protection practices. Oxybenzone and octinoxate, once staples in traditional sunscreens, are now under scrutiny, prompting consumers to seek alternative solutions that align with safety, environmental sustainability, and skin health.

This shift has manifested in the widespread adoption of herbal sunscreens, marking a departure from conventional formulations. The rise in popularity of herbal sunscreens is not merely a trend but a reflection of a broader societal desire for conscientious consumption. Green tea, aloe vera, calendula, and other plant-derived ingredients have become emblematic of this shift, offering a harmonious blend of natural protection and holistic skincare benefits.

The purpose of this review has been to critically evaluate the efficacy, safety, and potential advantages of herbal sunscreens. By synthesizing existing literature and research findings, we aimed to provide a nuanced understanding of the performance of herbal sunscreens, considering factors such as UV protection, skin compatibility, and environmental impact. This exploration serves as a guide for consumers, researchers, and skincare professionals navigating the landscape of sun protection alternatives.

Herbal sunscreens not only address the immediate concerns associated with chemical alternatives but also represent a commitment to a more sustainable and health-conscious approach to skincare. As consumers increasingly recognize the interconnectedness of personal well-being and environmental stewardship, herbal sunscreens offer a bridge between effective sun protection and responsible product choices.

In this era of conscious skincare, where choices are driven by a desire for safety, efficacy, and sustainability, herbal sunscreens stand as a testament to the evolving landscape of beauty and wellness. The journey towards redefining sun protection practices continues, with ongoing research poised to refine formulations, deepen our understanding of long-term effects, and drive innovation in the skincare industry. As herbal sunscreens become integral to sun protection conversations, they represent not just a product choice but a broader commitment to personal well-being and environmental harmony. As we navigate this transformative period, embracing herbal sunscreens emerges as a meaningful step towards a future where skincare aligns seamlessly with health, ethics, and the well-being of our planet.

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