

Sunscreen: “Do-It-Yourself” (DIY) does not mean enough protection

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ABSTRACT

Skin cancer can affect anyone regardless of their gender, race, or age. It is estimated that every 1 in 5 Americans will develop skin cancer in their lifetime. In May 2019, the journal *Health Communication* published a study on Pinterest pins tagged with the labels “homemade sunscreen” and “natural sunscreen.” The second most common ingredient listed was essential oils (48.7%), with the most recommended being raspberry and lavender. Kaur and Saraf (2010) explain that the SPF of volatile herbal essential oils varies between 1 and 7, while that of non-volatile essential oils varies between 2 and 8. Therefore, DIY sunscreen based on essential oils does not offer enough sun protection and dermatologists should be concerned about such influence of social media on skincare trends. In addition, family doctors, dermatologists, and the relevant healthcare providers should be prepared and open to talk to their patients about sun safety and address their concerns regarding sun protection, as this can help reduce the risk of skin cancer in the long run.

Key words: Essential oils; Sunscreening agents; Sun protection factors

Skin cancer can affect anyone regardless of their gender, race, or age. It is estimated that every 1 in 5 Americans will develop skin cancer in their lifetime [1]. Exposure of skin to UVB light can cause DNA damage, leading to the destruction of keratinocytes and malignant transformation. If the damaged cells are affected less severely, cell-cycle progression can be halted and nucleotide excision repair (NER) can begin to undo the DNA damage. Cells that were not irreversibly damaged and can be successfully repaired will survive. However, keratinocytes will undergo apoptosis and produce “sunburn cells” if no appropriate repair process can take place successfully [2].

According to the American Academy of Dermatology (AAD), everyone needs to use sunscreen for protection against the excessive harmful ultraviolet radiation (UVR) of the sun. Sunscreen options include creams, gels, lotions, ointments, sprays, and wax sticks, and are categorized into chemical and physical sunscreens. Chemical sunscreens absorb sunrays and normally contain oxybenzone, avobenzone, octocrylene, homosalate, octinoxate, and/or octisalate. Physical sunscreens deflect sunrays and contain zinc oxide and/or titanium dioxide [1]. According to the

journal *Scholars Academic Journal of Pharmacy*, recipes for homemade and DIY sunscreen include all-natural ingredients, such as aloe vera, tomato, pomegranate, and cucumber, but also oily ingredients such as shea butter, soybean oil, evening primrose oil, almond oil, jojoba oil, and carrot seed oil [3].

In May 2019, the journal *Health Communication* published a study on Pinterest pins tagged with the labels “homemade sunscreen” and “natural sunscreen.” The second most common ingredient listed was essential oils (48.7%), with the most recommended being raspberry and lavender. Researchers analyzed 189 relevant pins and discovered that 68.3% of them were homemade sunscreen recipes offering insufficient UVR protection. Claims about sun protection factor (SPF) made in 33.3% of pins ranged between 2 and 50, most frequently between 30 and 40. Additionally, 41.8% of the pins had been saved anywhere from once to more than 21,000 times, with a mean of 808.4 saves, which proves to be a substantial number. According to Dr. Lara McKenzie, the lead author of the study and principal investigator at the Centre for Injury Research and Policy at Nationwide Children’s

How to cite this article: Lim TLC. Sunscreen: “Do-It-Yourself” (DIY) does not mean enough protection. *Our Dermatol Online*. 2020;11(3):273-274.

Submission: 11.01.2020; **Acceptance:** 14.03.2020

DOI: 10.7241/ourd.20203.12

Hospital, many of the recipes claim SPF levels of up to 50, yet the ingredients used have not been scientifically proven to offer broad-spectrum coverage. According to Merten, who conducted the research together with Dr. Lara, the amount of mineral scientifically proven to be effective and present in DIY sunscreens—for instance, zinc oxide—might not be sufficient and may not be mixed properly [3]. Furthermore, Kaur and Saraf (2010) mention that the SPF of volatile herbal essential oils varies between 1 and 7. These include olive oil, coconut oil, castor oil, almond oil, mustard oil, chaulmoogra oil, and sesame oil. On the other hand, the SPF of nonvolatile essential oils varies between 2 and 8. Examples include peppermint oil, tulsi oil, lemongrass oil, lavender oil, orange oil, lemon oil, tea tree oil, eucalyptus oil, and rose oil [4].

The U.S. Food and Drug Administration (FDA) recommends sunscreen with an SPF of at least 15. On February 21, 2019, the FDA proposed sunscreen regulation changes. The two main ingredients of sunscreen—i.e., zinc oxide and titanium dioxide—which are “generally recognized as safe and effective” (GRASE) are proposed to be effective and safe for sunscreen use. A sunscreen would also require an SPF of 15 or higher to be labeled as broad-spectrum. As the SPF increases, the broad-spectrum protection increases as well. Broad-spectrum sunscreen is important to provide protection from both UVA and UVB light. The AAD highly recommends the use of broad-spectrum, SPF-30, water-resistant sunscreen. In short, there are recognized public health benefits of sunscreen use [1]. Even though essential oils are known to possess some level of SPF inherently, it is exceptionally low and, thus, they do not meet the minimum recommended by the FDA or ADD and do not provide adequate UVR protection. The FDA mentions that sunscreens lacking an SPF of at least 15 or not being broad-spectrum are proven to only prevent sunburn, but can, nonetheless, increase the risk of skin cancer and early skin aging [1]. Research has found that essential oils may have medical properties—remedial, antimicrobial, anti-inflammatory—but they have also been found, among other things, to be toxic or lead to photosensitivity [5].

The rise of DIY sunscreen could be due to the misconceptions or misinformation surrounding sunscreen. According to the *Journal of Clinical Pharmacy and Therapeutics*, the state of Hawaii will be banning two major ingredients of sunscreen—oxybenzone and octinoxate—from January 1, 2021. This is due to the direct and indirect association of sunscreen with coral toxicity, which was supported by mechanism studies

and concentration estimates [6]. The AAD verified that the FDA did not mention that many sunscreen ingredients are unsafe. The proposed rule by the FDA is for manufactures to provide more data regarding the safety of certain sunscreen ingredients. This is to know and understand the effects of sunscreen on the skin and body as well as the degree of absorbance of sunscreen ingredients. Two of the ingredients proposed by the FDA that are not GRASE are tolamine salicylate and PABA. However, in the U.S., these two ingredients are not legally sold in sunscreens. The FDA is also asking for more safety data regarding 12 ingredients: ensulizole, cinoxate, homosalate, dioxybenzone, meradimate, octisalate, padimate O, octinoxate, sulisobenzene, octocrylene, oxybenzone, and avobenzone. However, the FDA did not warn or ask to abandon the use of sunscreens with these ingredients. Research on four sunscreen ingredients conducted by the FDA concluded that more safety data is necessary due to their absorption in the body. The research did not determine the effects of the sunscreens on a person’s health but concluded that more research needs to be conducted to understand the possible risks and dangers [1].

In conclusion, DIY essential-oil sunscreen does not offer enough sun protection and dermatologists should be concerned about the influence of social media on skincare trends. In addition, family doctors, dermatologists, and the relevant healthcare providers should be prepared and open to talk to patients about sun safety and address their concerns regarding sun protection, as this can help reduce the risk of skin cancer in the long run.

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Source of Support: Nil, Conflict of Interest: None declared.