

Natural molecule enhances sunscreen efficacy without increasing concentration of conventional UV filters

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Addition of rosmarinic acid at a mere 0.1% reduced the amount of sunscreen needed to protect the skin, increased the sun protection factor by more than 41%

and combined photoprotection with antioxidant activity. The innovation would reduce the volume of chemical substances discharged into the environment.

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An article published in the journal *Cosmetics* reports an investigation of the effects of including rosmarinic acid, an active antioxidant, in a sunscreen along with two conventional ultraviolet light filters, ethylhexyl methoxycinnamate (against UVB) and avobenzone (against UVA).

The research group increased the sunscreen's photoprotective efficacy by adding rosmarinic acid at 0.1%, a very small proportion compared with those of conventional UV filters. They believe their findings suggest that incorporating [natural molecules](#) with antioxidant activities into sunscreens could decrease the proportion of conventional UV filters in the final product, with the advantage of providing other functional properties.

The product's performance improved without the need to increase active principle levels, reducing both the amount of sunscreen needed to protect the same skin area and the volume of synthetic chemicals discharged into the environment.

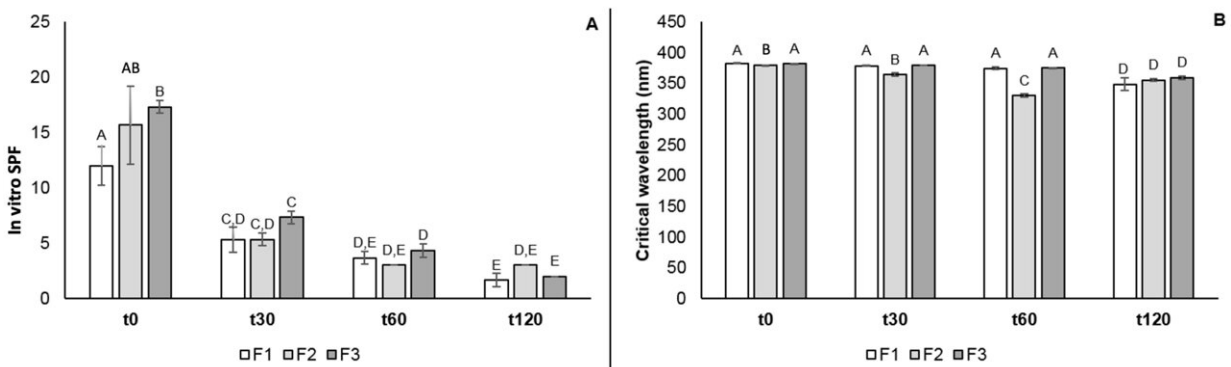
In vitro and [clinical trials](#) obtained a 41% increase in [sun protection factor](#) (SPF). The higher the SPF, the more sunburn protection increases.

Another advantage of including rosmarinic acid was the addition of antioxidant activity to photoprotection so that the product could be used in antiaging cosmetics, for example.

"Our research on photoprotective systems aims primarily to evaluate

potential sunscreen enhancement strategies. We're interested above all in discovering ways to increase sunburn protection while also improving the stability of the product so that it remains safe and effective for longer," said pharmaceutical scientist and biochemist André Rolim Baby, last author of the article and a professor at the University of São Paulo's School of Pharmaceutical Sciences (FCF-USP) in Brazil.

"We're also looking for products or systems with less environmental impact and ways of reducing the concentration of conventional filters by including [natural ingredients](#) that enhance the formulation. And we're very interested in mapping other cosmetic properties of photoprotective molecules, such as anti-free radical action and protection of biomarkers in the outermost skin layers."



Photostability test. **(A)** In vitro sun protection factor (SPF) before and after irradiation; **(B)** critical wavelength (nm) before and after irradiation. Samples that share a letter are statistically equal (Tukey test: $p \leq 0.05$). No irradiation (t0), 30 min irradiation (t30), 60 min irradiation (t60), and 120 min irradiation (t120). F1—ethylhexyl methoxycinnamate 10.0% w/w + avobenzone 5.0% w/w; F2—ethylhexyl methoxycinnamate 10.0% w/w + avobenzone 2.5% w/w + rosmarinic acid 0.1% w/w; F3—ethylhexyl methoxycinnamate 10.0% w/w + avobenzone 5.0% w/w + rosmarinic acid 0.1% w/w. Credit: *Cosmetics* (2023). DOI: 10.3390/cosmetics10010011

Multifunctional compound

The investigation was part of a project to map chemopreventive properties of various UV filters.

In addition to being an antioxidant, rosmarinic acid, a natural polyphenol antioxidant found in rosemary, as well as sage, peppermint and many other herbal plants, has antiviral, anti-inflammatory, immunomodulatory, antibiotic and anticancer properties.

In a review article published in 2022 in the journal [Nutrients](#), the research group highlighted the beneficial effects of rosmarinic acid as a food supplement, such as improvement in skin firmness and wrinkle reduction.

"In another investigation, we found potential benefits of rosmarinic [acid](#) for skin surface hydration, reinforcing the need for more research on the substance in the field of cosmetology," Baby said.

In the study reported in *Cosmetics*, SPF and critical wavelength were measured to establish photoprotective efficacy using a Labsphere UV2000S Ultraviolet Transmittance Analyzer.

More information: Maíra de Oliveira Bispo et al, Photoprotective Efficacy of the Association of Rosmarinic Acid 0.1% with Ethylhexyl Methoxycinnamate and Avobenzone, *Cosmetics* (2023). [DOI: 10.3390/cosmetics10010011](https://doi.org/10.3390/cosmetics10010011)

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