

Green technology could permit total use of seaweed by cosmetics industry

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An article published in the journal *Phycology* shows that there is room to transform 100% of the raw material from marine macroalgae (seaweed) into ingredients for cosmetics using industrially available green

technology.

"The article arose from the idea of connecting the development of relevant scientific research on the macroalgal universe with potential demand from the cosmetics industry," said Leonardo Zambotti Villela, last author of the article. He has a Ph.D. in biochemistry and [molecular biology](#) from the University of São Paulo's Institute of Chemistry (IQ-USP) in Brazil and is a researcher affiliated with that institute's Biochemistry and Molecular Biology Laboratory (LBBM).

"We conducted a review of the literature to explore how macroalgal extracts are currently used and see what other activities are possible and worthwhile for the cosmetics industry. We set out to build all the knowledge in the scientific and industrial literature into biorefining scenarios and strategies so that seaweed can be 100% converted into ingredients. This entailed developing a pipeline from collection or production of macroalgae to post-production processing," Villela said.

According to Villela, the group's aims included the analysis of protocols that facilitate the transition from the results of scientific research to industrial applications. In his view, many aspects of biotech research are not thoroughly explored. "The industry can only use findings on toxicity and [biological activity](#), such as anti-aging and anti-oxidizing effects, among others, if they come from experiments that strictly follow the protocols of agencies such as the OECD [Organization for Economic Cooperation and Development] and ISO [International Organization for Standardization]. Our study offers a shortcut to this transition," he said.

More comprehensive exploration of the extracts' potential could enable the cosmetics industry to meet the [environmental sustainability](#), social and governance-related (ESG) requirements now in vogue throughout the corporate world.

Researchers have assembled evidence on Brazilian seaweed's potential. "We've always been at the forefront of biotech and ecology, especially bioprospecting and ecotoxicological research," Villela said. "Also, for many years we took part in the Brazilian Antarctic Program [Proantar] and collected macroalgae from the Antarctic for [environmental research](#) and to prospect for biological assets."

The group belongs to Redealgas, a network of researchers affiliated with institutions in Brazil and elsewhere who explore the potential of algae, especially macroalgae, in terms of both biotech and social and environmental impact. "It's a highly productive network from the standpoint of academic output as well as patents. It also works with coastal communities on [social programs](#) for their professional development," Villela said.

More information: Mariana de Sousa Santos Hempel et al, Macroalgae Biorefinery for the Cosmetic Industry: Basic Concept, Green Technology, and Safety Guidelines, *Phycology* (2023). [DOI: 10.3390/phycolgy3010014](#)

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