Title : The study of brown and green algae enzyme extraction and lactic acid bacteria fermentation processes for increasing phenolic compounds and antioxidant properties

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ABSTRACT

The use of natural product in cosmetics is becoming increasingly popular as consumers seek safe products that promote skin health. Phenolic compounds derived from algae have gained significant attention in the cosmetic industry due to their potent antioxidant and anti-inflammatory properties. This study aimed to optimize the extraction of key compounds from brown and green algae using enzyme-assisted extraction and fermentation with lactic acid bacteria. The algae used in the experiment included brown algae, green algae, and a mixture of both (brown and green algae). The results showed that enzyme-assisted extraction increased the yield of algae extracts by 2 to 5 times compared to extraction without enzymes. Additionally, the total phenolic content in the extracts increased by 20 to 30 times. A mixture of brown and green algae at a 3:1 ratio produced the highest total phenolic content and antioxidant activity, with total phenolic content of 7.40±0.06 mg GAE/g extract and DPPH antioxidant activity of 49.36±0.48% at a final sample concentration of 12.5 mg/mL. Fermentation of the algae mixture with three strains of lactic acid bacteria further increased the total phenolic content by 40% and antioxidant activity by 20-25% during the first 3 to 5 days of fermentation compared to non-fermented extracts. These findings can be applied to the development of high-efficiency algae extracts for use in cosmetic formulations.

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