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Application of algae in Cosmetics

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Algae (macroalgae and microalgae) are a complex group of aquatic organisms capable of photosynthesis. The ocean presents a wide variety of ecosystems and resources, as well as a diverse range of marine organisms with great potential to produce bioactive compounds that can be used as pharmaceuticals, nutraceuticals, and cosmeceuticals. Algae contain different biochemical compounds including polysaccharides, proteins, lipids, phenolic compounds, pigments, vitamins, and other bioactive as well as macro and microelements. Some of the compounds in algae can be used in cosmeceuticals, for example, phlorotannins, sulfated polysaccharides, and tyrosinase inhibitors. There is an increasing trend within the usage of photosynthetic microorganisms as well as macroalgae and microalgae in the field of cosmeceuticals by incorporating the bulk products extracted from its biomass into cosmetic formulations. The algae processing for the cosmetic industry, have several steps. In the first step, algal biomass is cultivated in a photobioreactor or open pond. After harvesting, algal biomass is separated from the water, and after that algal biomass is considered for cellular disruption and drying. After drying, algal biomass is considered for moisturizing and used in cosmetics. The applications of alga in the cosmetic industry have recently received more attention for treating skin problems, like tanning, aging, and pigment disorders. The main microalgae established on the cosmetic market include *Arthrospira* sp., *Chlorella* sp., and *Spirulina* sp. They are utilized in skincare, haircare, and sun protection products. As far as macroalgae are concerned, they're applied largely as dry powders in face masks, body lotions, face and hand creams, and other products. The most popular micronized macroalgae present on the market are *Ascophyllum nodosum*, *Chondrus crispus*, and *F. vesiculosus*. This review article focuses on the formulation and potential application of algae in cosmetics.