New insights into the potential of the red seaweed *Gelidium corneum* in sustainable cosmetics

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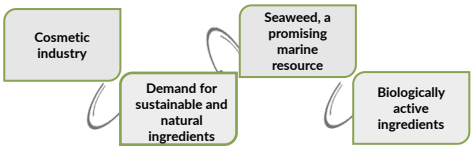
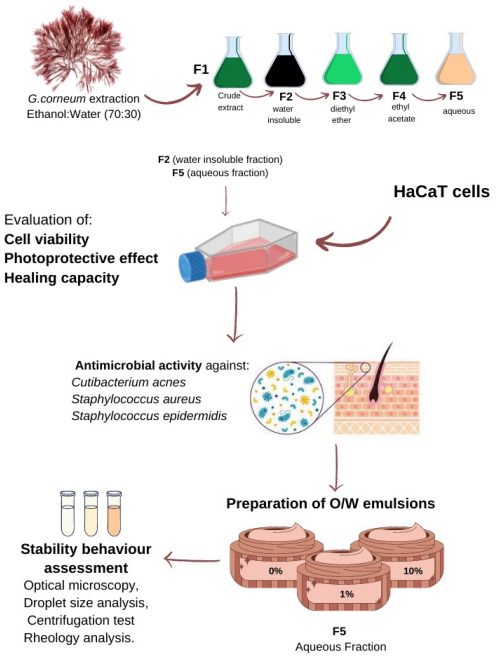
Introduction:

Cosmetic industry remains a major focus of economic development in the 21st century being actively interlocked with health-based concerns and environmental awareness. On the other hand, consumer's demand for sustainability is driving the search of new active natural ingredients.
The marine environment is a relevant source of new bioactive compounds that could be incorporated into sustainable cosmetic formulations. In particular, seaweeds are one of the most studied marine organisms, mainly due to their wide range of therapeutic properties [1],[2].
Gelidium corneum is a red seaweed commonly found in the Portuguese shore, which is almost exclusively explored as a source of agar. However, other interesting bioingredients can be extracted from this marine resource.



AIM: Therefore, the main goal of this study was to assess the potential of different fractions from this seaweed for further application in sustainable cosmetics.

Materials & Methods:



Results & Discussion:

Gelidium corneum extracts – In vitro characterization

Table 1. Antimicrobial effect of the selected fractions

Bacteria	F2 (IC_{50} µg/mL)	F5 (IC_{50} µg/mL)
Cutibacterium acnes	**53.3**	>1000
Staphylococcus aureus	>1000	>1000
Staphylococcus epidermidis	**16.1**	>1000
Mechanisms of action Membrane hyperpolarization DNA damage	 ✓ ✓	 ----- -----

F2 displays the best antibacterial potential , this could be due to lipophilic compounds in its composition. [3].

Table 2. Effects of the selected fractions on HaCaT cells at subtoxic concentrations.

In vitro assays	F2	F5
MTT (*subtoxic concentration*)	600 µg/mL	**1000 µg/mL**
Photoprotection (% of ROS reduction)	**25%**	0%
Healing assay (% of healed cells after 12 h)	**76.8±10%**	61.8 ± 7.2%

The lipophilic fraction F2 has provided photoprotection (25%) against UV light-induced photooxidation in HaCaT cells. F2 together with the most hydrophilic one, F5, have shown a high potential in the healing assay, with 76.8 ± 10.0% and 61.83 ± 7.25% of healed area in 12 h, respectively [3,4].

Cosmetic emulsions – In vitro characterization

All formulations were semi-solid. The particle size values are between 10 µm and 100 µm. All samples showed shear-thinning and solid-like behaviour, with a storage modulus G′ >G′′.

The best performance was achieved with the 1% formulation. The polysaccharides presented in this fraction can be regarded as valuable natural ingredients due to their healing effect and water retention properties, together with their role on the bonding and consistency of formulations.

Conclusions:

Gelidium corneum **should be fully explored as a source of bioactive ingredients with multitarget properties for cutaneous use. The noticeable antimicrobial effect of the most lipophilic fraction over two microorganisms of skin microbiota is a basis for more detailed studies on this fraction aiming the development of a formulation able to control microbial growth without affecting skin homeostasis.**

References:

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