Bioactive phenolic compounds in red algae (Rhodophyta): Ecological variation and their potential

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Seaweeds have garnered significant attention in recent years due to their chemical and bioactive properties, which hold promise for discovering new molecules with valuable applications for humanity. Among their metabolites, phenolic compounds stand out for their structural diversity and high abundance in seaweeds. The most extensively studied class of seaweed polyphenols is phlorotannins, uniquely synthesized by brown seaweeds. However, other polyphenolic compounds such as bromophenols, flavonoids, phenolic terpenoids, and mycosporine-like amino acids add to their chemical complexity. These identified and characterized compounds exhibit a wide range of bioactivities, suggesting potential applications across various industrial sectors. Green and red algae have been described to contain lower concentrations of phenolic compounds than brown algae, and by consequence have received considerably less attention. Moreover, most studies reporting phenolic content use the colorimetric Folin-Ciocalteu assay, which is incapable of discriminating the diversity of phenolic compounds known so far. Therefore, in this study, we aimed to characterize and quantify phenolic compounds in three cultivated red algae (*Palmaria palmata*, *Gracilaria gracilis* and *Acrochaetium secundatum*) using liquid chromatography-mass spectrometry (LC-MS). Additionally, we investigated variation in the seaweed's phenolic content as a response to different environmental conditions (i.e. after cultivation in different levels of nutrient availability and at different temperatures).

Keywords
Rhodophyta; Phenolic Content; Marine Natural Products; Bioprospecting