1st Seaweed for Health Conference

June 24-27, Galway, Ireland 2018

BOOK OF ABSTRACTS

Anti-aging activity of beach-cast macroalgae wracks from Macaronesia

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Topic

Seaweed and antiaging/skin care

Abstract text

In addition to macroalgae obtained by harvesting or cultivation, beach-cast macroalgal wracks can be an alternative source of added-value compounds. In several coastal areas, thousands of tons of macroalgae are cast on beaches and shorelines, either as a result of seasonal blooms or as a result from climacteric conditions. Although these phenomena play a part in coastal ecology, the occurrence of massive amounts of decaying biomass in these areas conflict with human use, especially in areas where tourism has economical relevance. These massive amounts of biomass are removed to dumping grounds or the sea, which is both costly and a waste of a resource. In this context, it would be very interesting if these algal biomasses could be removed before significant decay occurs, allowing the extraction of added-value compounds. In the present work, ethanol and methanol extracts from beach-cast macroalgae from Gran Canaria (Canary Islands, Spain) were prepared and antiaging activities of those extracts were assessed, by determination of antioxidant, anti-tyrosinase, anti-collagenase and anti-elastase activities. For antioxidant activity, namely ABTS scavenging activity, samples with the best results presented EC50 between 6 and 25µg/mL (close to the reference compound Trolox, 2.68±0.08µg/mL). Most samples inhibited tyrosinase activity, with the best samples presenting EC50 between 60 and 69µg/mL. Anti-collagenase activity presented interesting results both for methanol and ethanol extracts (EC50 between 193-195µg/mL). The results obtained indicate the anti-aging potential of this natural resource. Acknowledgements: Study financed by: MACBIOBLUE project (MAC/1.1b/086, Interreg Mac 2014–2020); FCT for funding cE3c (UID/BIA/00329/2013); DRCT for funding ABG

Enzymatic hydrolysis of seaweed to produce bioactive carbohydrates and peptides

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Topic

Seaweed and others

Abstract text

Seaweed have gained increased interest due to their promising applications within food, cosmetic and health industries. The enzymatic pre-treatment of seaweed can result in enhanced extraction of bioactive compounds. So far, commercially available enzymes have been used with variable success. Our focus is on identification of enzymes from bacterial consortia capable of degrading macroalgae cell walls and protein content producing small peptides and oligosaccharides. The gut microbiome of algae-eater organisms (Paracentrotus lividus, Arbacia lixula and Littorina littorea) and microbiome of marine of shallow sediments, were enriched in growth medium containing algae. 24 active consortia from algae-eater organisms and 12 from marine sediments were produced. From these, two bacterial consortia (AU and P5) were selected based on its capacity breakdown seaweeds with distinct cell walls compositions - Gelidium microdon, Fucus spiralis, Ulva rígida. Depending on seaweed the consortia AU has able to hydrolyse and solubilize 50 - 65 % of dry matter and the P5 60 - 80 %. The bioconversion enabled a recovery of 8.35 g and 10 g of oligosaccharides and 50 g to 300 g of peptides with low molecular weight (< 10 kDa) per kg of seaweed. These derived oligosaccharides and peptides are sources of functional activities. Selected consortia were also able to hydrolyze drift algae composed by Lobophora variegata with a yield of 40 to 60% and by Halophytis incurvus and Dictyota sp. with a yield of 30 to 50%. Acknowledgements: Study financed by: MACBIOBLUE project (MAC/1.1b/086, Interreg Mac 2014–2020); FCT for funding cE3c (UID/BIA/00329/2013).

Valorization of beach-cast macroalgae biomass as anticholinesterasic agents

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Topic

Seaweed and others

Abstract text

Macroalgae, especially Phaeophyta and Rhodophyta, often contain significant amounts of secondary compounds which render them less palatable or even toxic to grazing organisms. This effect can be due to several types of compound, and the mechanisms by which this antigrazing effect acts may vary. One of the most frequent mechanisms of action is related with the anti-cholinesterasic activity, which therefore interferes with the neurotransmission of the target predators. Compounds which inhibit the activity of acetylcholinesterase activity are highly searched by the pharmaceutical industry, because in controlled doses they may contribute to cognitive improvement in Alzheimer's Disease patients, whose brains present levels of acetylcholine lower than normal brains. It has been shown that molecules which inhibit both acetyl- and butyrylcholinesterase are more efficient in the therapy of this neurogenerative disease. Taking this into account, the inhibition of acetyl and butyrylcholinesterase by extracts from beach-cast macroalgae wracks was evaluated. The samples tested inhibited between 18 and 49% of acetylcholinesterase activity and between 23 and 46% of butyrylcholinesterase activity. Some of the extracts which were tested, prepared both from ethanol or methanol, were dual cholinesterasic inhibitors, raising the attention of this source of macroalgal biomass for the extraction of added-value compounds.
Acknowledgements: Study financed by: MACBIOBLUE project (MAC/1.1b/086, Interreg Mac 2014–2020); FCT for funding cE3c (UID/BIA/00329/2013); DRCT for funding ABG.