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Production of single cell protein and isolation of new hydrophobins from marine fungi growing on complex substrates

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Seaweed and waste from the algae industry have a high concentration of complex carbohydrates that restricts the efficient obtaining bioproducts <Balina et al., 201>. The marine fungi are often included in screening for new metabolites, and their ability to assimilate complex polymers <Wang et al., 2016>. Since a couple of decades ago some species of fungi have been used to produce Single Cell Protein (SCP), for human food and animal feed, and others important proteins from fungi are the Hydrophobins (HFBs) <Cicatiello et al., 2016; Kamat et al., 2013>. The objective of this study was to develop and optimize a method for utilizing seaweed and seaweed waste to feed marine fungi and extract from these SCP and HFBs. In this study, the growth of 10 strains of marine filamentous fungi from collection NBCR, in Japan, was preliminarily evaluated. The protein concentration of the pre-selected fungi was evaluated in two different wastes from the algal industry (Waste A and B) and <Macrocystis pyrifera>. In the case of HFBs, 4 marine fungi were evaluated and 4 different methods were set up to extract HFBs of class I and II, from the mycelium and the culture broth in two different minimal mediums. The highest concentrations of protein were obtained with *Dendryphiella salina*. The productivity found for *D. salina* was 7.9, 3.3 and 2.6 mg/g day using *M. pyrifera*, waste A and B respectively. *D. salina* and *Penicillium pinophilum* have the ability to produce foam during the growth in shaken cultures, thus indicating the production of biosurfactants. The best medium for improve the production of HFBs was the medium minimal with alginate 0.2%. *D. salina* and *P. pinophilum* produced adequate amounts of putative HFBs of Class I in the culture broth: 280 and 258 mg/L, respectively. This work shows that *D. salina* and *P. pinophilum* can assimilated seaweed and theirs proteins could be used in different biotechnological applications.