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THE REMEDIA-LIFE PROJECT: MACROALGAE AS BIOREMEDIATORS AND SOURCE OF COMPOUNDS FOR BIOTECHNOLOGICAL PURPOSES

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The REMEDIA Life Project (REmediation of Marine Environment and Development of Innovative Aquaculture: exploitation of edible/not edible biomass) funded by the European Program LIFE-ENV, foresees, for the first time in Europe. It is the use of an integrated multi-trophic aquaculture system (IMTA) which in addition to fish breeding includes the rearing/cultivation of a new set of biorimediator organisms such as polychaetes, porifera, mussels and macroalgae. Macroalgae in particular are included in the set of biorimediator organisms because some species are able to reduce the nitrogen and phosphorus load produced by the fish farming. The project aims to demonstrate that the bioremediation technologies developed can be successfully applied to an industrial mariculture plant in a confined coastal area with positive effects for the environmental quality, the biotechnological exploitation and the zero-kilometer marketing of the biomass produced. In particular, the produced macroalgal biomass can be used for the extraction of active compounds with antibacterial action as recent studies reported algae as source of a wide and diversified range of secondary metabolites with antibacterial, antifungal, antitumor and anti-inflammatory properties. The cultivation of macroalgae in IMTA constitutes an added value because the antimicrobial compounds produced by some of them are salt tolerant and therefore useful in the control of fish or crustaceans pathogens in aquaculture. The present work reports the presence of an antibacterial activity in the lipid extract of some macroalgae present along the Apulian coasts (Italy, Ionian Sea) selected for the IMTA cultivation. The antibacterial activities highlighted are very interesting since some lipid extracts act against some human pathogens and some vibrios, among which there are several potential pathogens for marine organisms responsible of main diseases in aquaculture. The results obtained therefore open a perspective on the possibility of biotechnological exploitation of the algae examined. In the next steps of the project we will evaluate the yields of bioactive compounds in relation to the biomasses produced in view of possible pharmaceutical prototypes to be realized.

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