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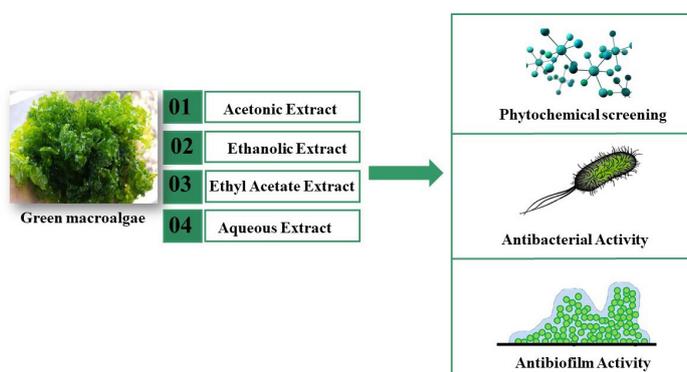
VALORIZATION OF SEAWEED EXTRACTS AND EVALUATION OF THEIR POTENTIAL ANTIBACTERIAL AND ANTI-BIOFILM ACTIVITY

Valorisation d'extraits d'algues marines et évaluation de leur activité antibactérienne et anti-biofilm potentielles

The uncontrolled use of antibiotics targeting the basal bacterial life processes has led to the development of multiple drug-resistant bacterial strains (MDR) causing infectious diseases that are difficult, and sometimes, impossible to treat. In addition, some pathogens tend to form biofilms defined as a sessile bacterial community enclosed in an extracellular matrix «EPS». This way of life provides to bacteria a protective barrier against antimicrobial agents. In this regard, great attention has been paid to the research for alternative antimicrobial and anti-biofilm agents that regulate biofilm formation without interfering with bacterial growth.

Natural products are considered a valuable and cost-effective source of new drugs, with less side effects and minimal toxicity in comparison with synthetic drugs. Marine organisms, especially macroalgae, provide a reservoir of bioactive compounds with a broad spectrum of biological activity. Indeed, given the stressful environmental conditions, algae synthesize active secondary metabolites, some of which exhibit antimicrobial activity. Other metabolites, such as the halogenated furanone produced by the *Delisea pulchra macroalga*, can interfere with the bacterial Quorum Sensing and inhibit biofilm formation.

Thus, the aim of the thesis is to explore the potential of Lebanese seaweed extracts in terms of antibacterial and anti-biofilm activity against *P. aeruginosa*, an opportunistic pathogen responsible for serious infections. Once the extraction process optimized, the extracts will be evaluated for their effect on the formation of *P. aeruginosa* biofilms. Their chemical composition will be analyzed (LC/MS) to identify the bioactive compounds. Their possible synergistic activity with synthetic compounds will be also evaluated.



General scheme of the thesis project