# Study of the adhesion of marine organisms according to the mechanical and physical properties of cross-linked hydrophilic coatings

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**Résumé**

Biofouling is an unwanted and complex phenomenon which can be reversible or not. This biocolonization have medical consequences, with, among other, the spread of infectious diseases (1,2). In marine environment, it can anticipate wear and tear of materials, an increase in pollution caused by excessive fuel consumption (2), as well as the introduction of invasive species (1). Paints based on biocides such as cooper were the first antifouling to be used (1,3), but, due to their toxicity, it is necessarily to develop more environmentally-friendly means of resources. Chitosan's absorption and retention properties make it an interesting compound (4). Thus, coating conception based on this hydrophilic biosourced polymer, cross-linked with citric-acid, has been undertaken. Coating's properties effects on microorganisms adhesion were evaluated. First results showed that under dynamic conditions, crosslinked degree's modulated *Vibrio harveyi* adhesion compared to a glass slide. Adhesion was performed with a Drip Flow Reactor, with the marine bacteria *Vibrio harveyi* and the microalgae *Cylindrotheca closterium*, as models. At the same time, physical and mechanical properties of coating are assessed. DQ NMR 1H analyses had showed an increase in cross-linking nodes density with increasing cross-linking agent concentration. This increase of cross-linking led to a decrease in hydratation capacity and film thickness under hydrated conditions. First dynamic mechanical analyses also have shown an increase of stiffness and cross-linking density with cross-linking. Our study aims to determine if the material stiffness influence the colonization of this marine species.

**Mots-Clés:** coating, surface characterization, adhesion, microorganisms

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