T371: Nanobiology, nanomedicine and nanopharmacology

Efficacy of antifouling additives in materials

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The search of materials that can avoid microorganism growth in different types of surfaces and environment is an attractive research field. Among these materials, nanoparticles (NPs) based on metals or oxides, have shown promising results in this subject. In order to use these properties, one promising approach involves the incorporation antifouling additives, such as copper NPs, into materials such as coatings or polymers [1]. These additives come in various micrometric and nanometric geometries. The performance of these materials with different concentrations of additives has been thoroughly studied for up to a year, with a focus on their ability to prevent the adhesion of microorganisms, to kills or stops their growth.
Examples on this subject have shown that the incorporation of these copper nanoparticles into polymeric matrix permit to applied them on different surfaces, showing excellent antimicrobial properties [2]. Moreover, these nanoparticles can be obtained on sustainable manner using different biomaterials such as leaves, or bacteria, allowing to obtain a narrow size distribution of the NPs [3]. Finally, some works have been done in the incorporation of antifouling additives, like copper nanoparticles or graphene-oxide, in polymeric matrices like LDPE, preventing the proliferation of biofouling organisms.
Thus, in this work it is presented the different antimicrobial additives that we have been develop in the last years, and their incorporation into different materials such as coating or polymer. Furthermore, some of these additives have been tested in marine environments to demonstrate their antifouling ability.

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References

[1] Cao S. et al. (2010), doi.org/10.1007/s11434-010-4158-4
[2] Delgado K. et al. (2011), doi/10.1111/j.1472-765X.2011.03069.x
[3]Tarafdar J. C. et al. (2013), doi.org/10.1155/2013/141274