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# Polyhydroxyalkanoates from marine bacteria for the development of MRI-visible biomaterials.

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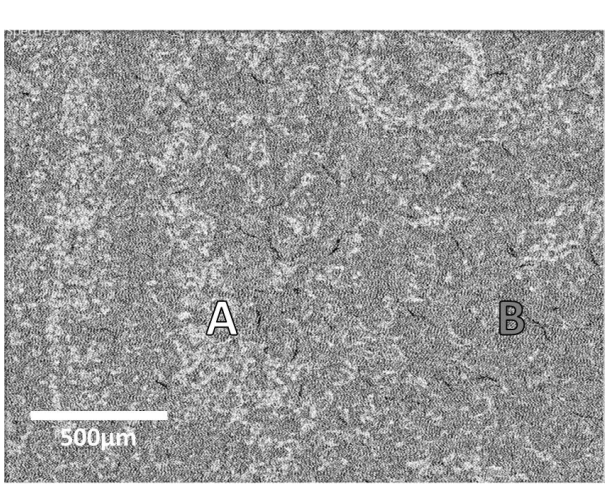
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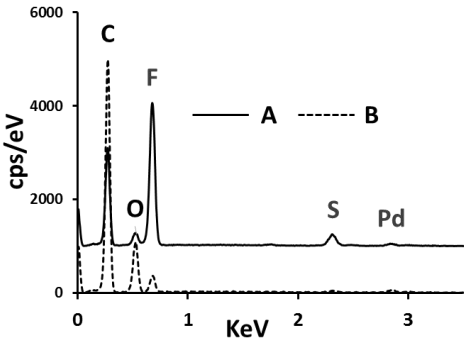
## I. Abstract Body

Polyhydroxyalkanoates (PHA), are biobased, naturally biodegradable polymers and show high biocompatibility with human body, thus they are regarded as good candidates for medical applications. In this study, an unsaturated $PHA_{MCL}$ was produced by *Pseudomonas raguenesii sp. nov*. grown on coprah oil (low cost vegetable oil) and 10-undecenoic acid. Optimization through a scale up process from flask to batch fermentation in 30L-bioreactor, allowed the biosynthesis of a PHA of original structure composed of 3HO, 3HD, 3HDD and 3HN:1, 3HUD:1 for saturated and unsaturated monomers respectively, in equivalent amount. GCMS analysis confirmed the localization of unsaturation in terminal position of the side chain, thus making it possible to consider future modifications. These PHA were then modified via a thiol-ene reaction in order to graft fluorinated molecules onto their side chains. Two grafting processes were carried out: (i) by grafting on surface thanks to double bonds available on the surface of a thin film of PHA and (ii) grafting in solution. Grafting success has been confirmed by NMR ($^{1}H$ and $^{19}F$) and Raman spectra. Homogeneous distribution of fluorine on the surface of a PHBHV/PHOU-F film was highlighted by SEM-EDX (Figure1). We point out here the use of PHA as biomaterials for the design of promising innovative $^{19}F$ MRI-visible systems by combination with fluorinated agent, for enhanced visualization in medical imaging, and thus improved diagnostic and theranostic.

## II. Image:

Figure 1: SEM-EDX picture of the surface of PHBHV / PHOU-F film (left) and spectra corresponding to zone A and zone B (right).




% Mass

| spectrum | C | O | F | S | Total |
|---|---|---|---|---|---|
| - - B | 63.9 | 26.8 | 8.5 | 0.8 | 100 |
| — A | 40.6 | 5.1 | 48.5 | 5.8 | 100 |

## III. Biography

Marion LE GAL is currently in the last year of a PhD thesis co-directed by two laboratories with complementary skills: LM2E and ICMPE. Through this thesis project, she takes part in research work on the study of marine microbial biodiversity for the production of polyhydroxyalkanoates and the study of their potentials for the development of biomaterials visible in MRI. During her university courses based on the study of microorganisms and the valorization of their associated biomolecules, she acquired a double competence at the interface of chemistry and biology.

## IV. Research interest:

Biopolymer, Polyhydroxyalkanoates, Polymer functionalization, $^{19}F$ MRI, Medical imaging.

## V. Presenting author details



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