Arctic, marine bacteria and their ability to produce polyhydroxyalkonates (PHAs) using underexploited biomass as nutrient source

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In this project we are studying marine bacteria and their ability to produce polyhydroxyalkonates (PHAs), a fully biodegradable polyester known as bioplastic. Bioplastics can replace petroleum-based plastics in many applications. PHAs accumulate as intracellular carbon and energy storages when the bacteria grow in an environment with nutrient imbalance. The monomeric building blocks in the PHA polymers determine the physical properties of the bioplastics and depend upon carbon sources, the bacteria's metabolism and PHA synthetic pathways. The production of PHA is still costly, and the ultimate goal of this project is to develop cost-efficient PHA producers using cold adapted marine bacteria that are able to grow on low-value biomass. Our research group has already identified some promising candidates.

The PhD work will include the following tasks: 1) Screening marine bacteria for PHA production. 2) Optimization of growth conditions and medium for efficient PHA production. 3) PHA quantification and characterization. 4) Genome and transcriptome sequencing and of promising candidates. 5) Genetic engineering of promising candidates to further maximise the PHA output.