

ABSTRACT

„Knowledge based bioeconomy“ (KBBE) interlocks traditional academic topics like food research, agri- and aquaculture with new fields such as red, white, green and blue biotechnology to enhance important topics like medicine, health, nutrition as well as the merging of traditional chemical synthesis routes with biological approaches. One important part of KBBE is the integration of novel bio-derived catalysts, into biotechnological applications. To achieve this, it is crucial to have a variety of specialized biocatalysts at hand. Therefore, science is looking for new methods to identify novel enzymes to establish completely new and artificial production routes. Promising source for the discovery of new enzymes are metagenomes. Especially marine metagenomes offer an enormous potential as the ocean and seas cover not only more than 70% of the earth's surface, but also comprise an unlimited diversity of ecological niches. Unsurprisingly, Bacteria and Archaea in marine waters constitute a major fraction of global microbial biomass. Marine microorganisms have accordingly been used in the past as a source for novel enzymes, although many challenges exist when aiming at the exploration and exploitation of this biomass. To analyze the vast amount of genetic information within marine metagenomes, an efficient and powerful all-in-one function-linked screening system has yet to be found. To overcome these limitations, we want to develop a new screening platform for the fast and reliable all-in-one screening of metagenomes. We will introduce habitat guiding, as a preselection tool and develop an innovative approach that combines an in-vitro compartmentalization system with cell-free protein synthesis as function-based approach. Thus, our technology will improve the exploitation of the unique opportunities of marine microbiomes.

Topic:

- Metagenomes

Marine biomass:

- Microorganisms

Source of marine biomass:

- Microbiomes

Keywords:

Function-based metagenomics, habitat guiding, microfluidics, emulsion droplets, synthetic enzyme cascades

Total costs*: € 1.073.000

Funding granted*: € 1.032.000

Duration: 3 years (2018-2020)

** Exact amount may change after completion of national contracts*



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