

Cyanophycin production with a novel biocatalyst and functionalization for improved material properties

Initiative: Zirkularität mit recycelten und biogenen Rohstoffen

Ausschreibung: Kooperationsprojekte

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Cyanophycin (multi-L-Arginyl-Poly-L-Aspartate) is a nitrogen-rich biopolymer produced by various bacteria. Currently, it is produced photosynthetically with cyanobacteria in a light-dependent process. The application of cyanophycin has so far been hindered by its poor solubility and its amorphous structure. Recently, the team succeeded in converting cyanophycin through esterification into a promising polycationic polymer with manifold application options. This project aims at a transfer of the know-how from cyanobacteria to acetogenic bacteria yielding a new production route of cyanophycin from hydrogen (H₂) and carbon dioxide (CO₂), which alleviates the limitations of the light-dependent system. Further, the team wants to explore applications of various cyanophycin-esters as novel biomaterials. This will provide a platform to recycle waste streams from industries (H₂+CO₂ or synthesis gas), contributing to a circular economy. As a result the production of high-value materials with promising properties for medical, pharmaceutical and industrial applications is anticipated, as well as a broad impact on the technological, environmental, and economic levels.

Projektbeteiligte

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