

PAINTS Case Study

Project: PAINTS

Funded by: Innovate UK

Innovation Pillar: Industrial Biotechnology

Public Description:

PAINTS focuses on using bio-based styrene as part of the production in paints and coatings instead of using petrochemically produced styrene. Bio-styrene has the potential to significantly reduce the industry's carbon footprint, but there is still uncertainty about product yields, and the initial toxicity of bio-styrene generated inside the cell presents a barrier to achieving the required production values.

To address these challenges, PAINTS will use bio-derived feedstocks that undergo enzymatic conversion to produce bio-styrene, which will be used to create polymers following Hempel's existing formulations as a guide. The resulting high-performance styrene-acrylic emulsion paint formulations will have significantly lower environmental impact, and the process supports a 20% reduction in GHG-emissions.

Project involvement:

Hempel - Lead Industrial Partner / End-user Representative
The University of Edinburgh - Academic Partner
Impact Solutions - Industrial Partner / Project Manager

Process:

The project will use synthetic biology capabilities at The University of Edinburgh to genetically optimize the entire pathway enabling the project to increase productivity and titres of bio-styrene from L-phenylalanine and deliver predictable/consistent processes suitable for manufacturing at scale surpassing the state-of-the-art.

Goal:

The project outcomes include a bioprocess for styrene production from waste feedstocks; an optimized, purpose-built protocol for creating bio-styrene-based polymers; a report detailing the full characterization of the bio-styrene monomer/polymer; and a life cycle/market analysis and route to commercialization report.

The potential impact of PAINTS is significant, as the project could significantly reduce the industry's carbon footprint while aligning with the UK government's aim to grow the bio-economy sector to £440bn by 2030.