UCDinnovation
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Purchasing Opportunity

ENZYME-FUNCTIONALISED NANOBEADS FOR ANTI-BIOFOULING PURPOSES

VALUE PROPOSITION

Enzyme-functionalized nanobeads as an environmentally friendly and cost effective alternative to pure enzyme and chemical treatments for biofilm removal.

MARKET

Oil, food, pharmaceutical industries and medical devices

IP STATUS:

Patent granted
EP 3 144 374;
CN108350399:

Publication;

https://dx.doi.org/10.1002%2Fbit.25835

OPPORTUNITY

Research Collaboration
Research Sample Purchase

PRINCIPAL INVESTIGATOR:

Professor Eoin Casey
School of Chemical & Bioprocess Engineering
UCD

CONTACT

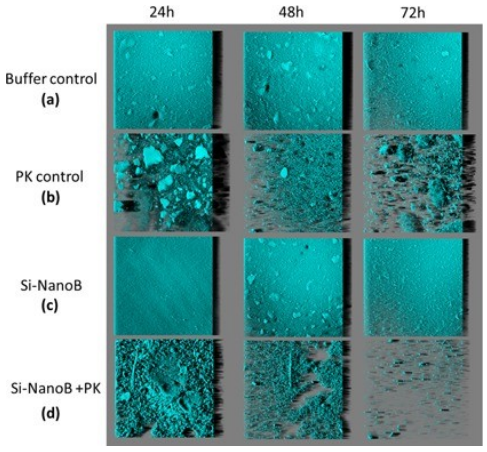
Hugh Hayden
NOVAUCD
Technology Transfer
t: +353 1 716 3725
e: hugh.hayden@ucd.ie

Biofouling is a significant operational problem in the oil, food, pharmaceutical industries and medical device sector. Adhesion of bacteria to surfaces and subsequent proliferation and extracellular polymeric substance (EPS) production lead to the formation of surface-associated bacterial communities called biofilms.

The amelioration of biofouling in industrial processing equipment is critical for performance and reliability. While conventional biocides are effective in biofouling control, they are potentially hazardous to the environment and in some cases corrosive to materials. Enzymatic approaches have been shown to be effective and can overcome the disadvantages of traditional biocides, however enzymes are typically uneconomic for routine biofouling control.

Solution

Functionalized nanobeads presents a new family of non-corrosive and environmentally friendly anti-biofilm and antifouling agents.
Researchers in UCD have designed a robust and reusable enzyme-functionalized nano-bead system which has strong biofilm dispersion properties and provide a cost effective, environmentally friendly solution to biofilm removal.



Confocal micrographs of protein–based hydrogels treated for 24, 48, and 72 h with buffer control solution (**a**), PK buffer control (**b**), Si-NanoB (**c**), and Si-NanoB+PK (**d**).

Example

A PK-functionalized Si-NanoB are effective in dispersing both protein-based model biofilms and structurally altering *Pseudomonas fluorescens* biofilms, with significant decreases in surface coverage and thickness of 30.1% and 38.85%, respectively, while increasing surface roughness by 19 % following 24 h treatments on bacterial biofilms.