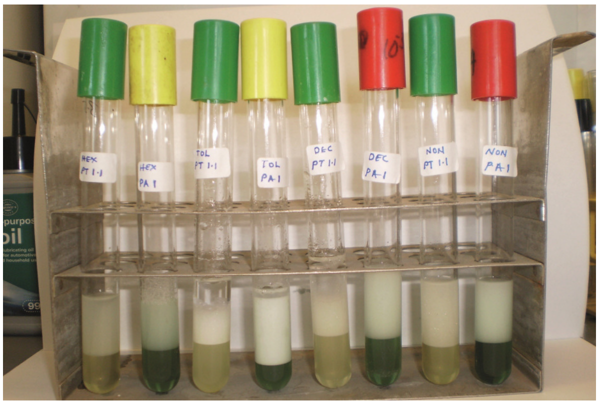
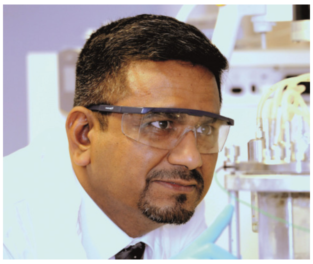
TEEGENE BIOTECH





"Most people consider soap to be an effective means of removing bacteria from their skin. However, we have flipped this concept on its head by discovering a way to create soap from bacteria" – Dr Pattanathu Rahman, Director of TeeGene Biotech.

TeeGene Biotech is a spin off venture from Teesside University which is pioneering the use of biosurfactants in a range of environmental and biomedical applications. The company was founded by Dr Pattanathu Rahman (Senior Lecturer in Process Engineering and Biotechnology). TeeGene was recently named as a runner up in the 'Innovation in Bio-Based Product Development' category at the Industrial Biotechnology Leadership Forum (IBLF) awards (London) and 'Best Start-up' at the IChemE Global awards in 2015. It won 'Best Enterprise Project' of the year award from Teesside University in 2016.

BIOSURFACTANTS

Surfactants work by reducing surface tension between two liquids or a liquid and a solid. Biosurfactants, surface-active agents of biological origin, have environment-friendly properties; they are bio-degradable, non-toxic and can be made organically using local raw material and producers. Biosurfactants can be used in soaps, detergents, medical ointments or as emulsifiers, i.e. within ice cream, facial cream or sun lotion.

PSEUDOMONAS TEESSIDEA

Pseudomonas teessidea is a new bacterial species which was discovered by Dr Rahman in the North East of England. This bacteria has DNA coding distinct from existing species and has unique properties developed in response to the contaminated soil from which it comes. It produces biosurfactants to detoxify oil and chemicals contaminants in the ground.

ACID MINE DRAINAGE

Water seepage from old ironstone mines into Skelton Beck is caused by rising ground-water levels from the old Longacre Pit in Skelton, which is choked with iron ochre. The iron deposits have coloured the beck red and threaten wildlife. One of the consequences of Acid Mine Drainage is the formation of iron oxide rich soil, or 'ochre'. Government agencies worldwide often face challenges toward remediation of water contaminated by historical mining activities.

The objective of the project was to develop a sustainable procedure to extract elemental iron from the hazardous ochre using bacteria to convert the ochre to iron using samples collected from Skelton Beck in North East England. Teesside University scientists tested the ability of two anaerobic bacteria to reduce the iron present in ochre. This process took eight days. These results could provide the basis for the production of elemental iron from ochre sediments.

From contaminated stream to filtered, dried ochre

BIOREMEDIATION

Across Europe, 2-4 million hectares of former industrial land form 'brownfield' sites. These sites are often contaminated by metals, making them unsuitable for human use and posing a threat to water. Soil on this type of land can be polluted and expensive to clean. It is often excavated and removed from the site as hazardous waste, a method that merely relocates the polluted soil, leaving the problem of its decontamination unsolved.

Bioremediation was a pilot study by Dr Lord and Dr Rahman. The project aimed to demonstrate the viability of growing plants on brownfield sites on an industrial scale, applying the method to a variety of contaminated sites. This study, in Bishop Aukland, demonstrated how certain high productivity plants can act as bio-accumulators of metals contained in the soil in which they are grown, offering a cost-effective option for the remediation of contaminated ground. In addition, it used plants that could also be used as biomass crops to generate heat and power.

TeeGene Biotech

Teesside University