

# Microbes in mud flats clean up oil spill chemicals

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Micro-organisms occurring naturally in coastal mudflats have an essential role to play in cleaning up pollution by breaking down petrochemical residues. Research by Dr Efe Aganbi and colleagues from the University of Essex, presented at the Society for General Microbiology's meeting at Harrogate today (Monday 30 April), reveals essential differences in the speed of degradation of the chemicals depending on whether or not oxygen is present.

In aerobic conditions (where [oxygen](#) is present), benzene, toluene and naphthalene, which all occur in petroleum, were rapidly degraded by microbes. In the absence of oxygen degradation was slower and only toluene was significantly broken down. This means that in a healthy marine ecosystem where the water is oxygenated, petrochemical contamination can be degraded by micro-organisms, but if the oxygen supply is depleted by pollution and other processes leading to the breakdown of organic matter in the soil, the contamination will persist.

While almost all known [aromatic hydrocarbons](#) (the petroleum breakdown products) are degraded with oxygen only a few can be completely broken down in the absence of oxygen. However, in a contaminated environment oxygen is quickly depleted and anaerobic breakdown (without oxygen) becomes an important mechanism for getting rid of contaminants

The scientists also investigated the impact of the three chemicals on the make-up of different estuarine microbial communities. Over time the

types of micro-organisms changed as the compounds were degraded. In aerobic conditions, benzene and toluene did not appear to affect community structure but naphthalene stimulated the growth of *Cycloclasticus spirillensus*, a [bacterium](#) known to break down oil residues. These bacteria might be used as a natural way of cleaning up pollution.

"Our work shows that microbes are very versatile and can live on most types of chemicals" said Dr Aganbi, "More work is needed to identify bacteria in these mud sediments as little is known about the range of bacteria present. Estuaries are ideal locations for refineries and petrochemical facilities - it is essential that mudflats are preserved to provide a natural clean-up area for pollution".

Source: Society for General Microbiology

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