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P9

## BIODEGRADATION OF ETBE AND BTEX BY A BACTERIAL CONSORTIUM

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### Abstract

Ethyl tert-butyl ether (ETBE) is one of the commonly used fuel oxygenate in Europe to increase the octane number in order to achieve complete combustion of automobile fuel to control air pollution. Accidental spillage of this compound can pollute soil and water as ETBE is a highly water soluble compound leaving an unpleasant odour and taste to drinking water. Although ETBE is not extensively studied for its potential risks, Methyl tert-butyl ether (MTBE) which has similar properties to ETBE has been labeled as a potential human carcinogen. Therefore there is an urgent need to develop methods to eliminate ETBE from the environment. Bacterial degradation can be a promising option to achieve complete mineralization of this compound. Two microbial consortia namely A and B have been isolated and enriched from water samples highly contaminated with fuel oxygenate. Both consortium A and B were found to degrade 100 mg/l of ETBE to about 38% and 40% in 6 days. Consortium A is found to contain *Microbacterium sp.*, *Xanthomonas sp.* through 16srDNA PCR and sequencing. *Herbaspirillum sp.*, *Pseudacidovorax sp.*, *Arthrobacter sp.*, *Pseudomonas sp.*, *Xanthomonas sp.* were found in consortium B. Apart from this, consortium A was tested for co-metabolic degradation together with BTEX compounds. Degradation studies showed that consortium A follows an order of preference with BTEX and ETBE together, with toluene recording the highest degradation of about 86% in 11 days. This is followed by Xylene at 80%, Benzene at 61%, and ETBE at 9%. This also implies that the presence of BTEX in the environment can inhibit the degradation of ETBE.

Further investigations will be focused on versatile degradation capabilities of xenobiotic compounds for both of the consortium as well as for the enzymes which were highly expressed during degradation through proteomic studies.

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