BACTERIAL DEGRADATION OF HYDROCARBONS WITH IMPLICATIONS FOR ASPHALTS
PART 1: EVIDENCE OF LARGE SCALE BIODEGRADATION

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ABSTRACT
Biodegradation is a natural process by which microbes alter and break down petroleum hydrocarbons into other substances. There is a large body of literature that describes the properties of pure and mixed bacterial cultures capable of degrading and dispersing crude oils in sea water. Studies by the U.S. Geological Survey have also shown that microorganisms usually present in the soils are actively consuming fuel-derived toxic compounds and transforming them into harmless carbon dioxide.

In fact, under favourable conditions microorganisms can be found that are capable of attacking practically any hydrocarbon from methane up to the heaviest paraffinic or asphaltic residues. Hydrocarbons are attacked by microorganisms growing under both aerobic and anaerobic conditions. However, the heavier oils become more difficult to attack as the viscosity and molecular weight increase.

In the first part of this paper, basic introductions to bacterial origins, appearance, abundance, mobility, nutritional and environmental requirements are presented.

In the second half of this paper, evidence of hydrocarbon degradation is presented from oil spills in the oceans, degradation of petroleum in soils, aquifers and marine sediments and evidence on a massive scale of microbial alteration of petroleum in reservoirs.

KEY WORDS: Hydrocarbons, biodegradation, microorganisms,