Biochemical Treatment of Produced Water

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Large Amounts of water are produced during petroleum exploration and production. Depending on location, this produced water may contain salts, dissolved organics, heavy metals and NORM radioactivity. Conventional oil/water separation and physical treatment do not remove all these contaminants, which upon its release into the environment cause adverse effects.

At Brookhaven National Laboratory, processes have been studied for biochemical degradation of oil in water. the metabolites formed by the consumption of oil were identified as oxygenates including organic acids, alcohols and sulfones, which are known to emulsify oil. Recycling these metabolites, together with the water, back into the reservoir would enhance oil production.

In addition, bacteria tested were able to absorb and remove heavy metals, e.g., Pb, Sn, Pt, Co, Cr, Mn, Th and U in water with high capacity and selectivity. It is conceivable that a biochemical process can be developed to treat the produced water for recycling back to the reservoir to improve oil production or for economical disposal.