

## World Congress and Expo on **Applied Microbiology**

August 18-20, 2015 Frankfurt, Germany

### **Optimisation of temperature conditions for the laboratory scale biodegradation of polycyclic aromatic hydrocarbons in water**

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This study was conducted to investigate the occurrence of Polycyclic Aromatic Hydrocarbons (PAH) degrading microorganisms in two River systems in the Western Cape, South Africa and their ability to degrade acenaphthene and fluorene. A total of 19 bacterial isolates were obtained from the Diep and Plankenburg Rivers among which four were identified as acenaphthene and fluorene degrading isolates. In simulated batch scale experiments, the optimum temperature for efficient degradation of both compounds was determined in a shaking incubator testing at 25°C, 30°C, 35°C, 37°C, 38°C, 40°C and 45°C followed by experiments in a Stirred Tank Bioreactor using optimum temperatures from the batch experiment results. All experiments were run without the addition of supplements, bulking agents, bio surfactants or any other form of biostimulants. Results showed that *Raoutella ornithinolytica*, *Serratia marcescens*, *Bacillus megaterium* and *Aeromonas hydrophila* efficiently degraded both compounds at 37°C, 37°C, 30°C and 35°C respectively. The degradation of fluorene was more efficient and rapid compared to that of acenaphthene and degradation at Stirred Tank Bioreactor scale was more efficient for all treatments. *Raoutella ornithinolytica*, *Serratia marcescens*, *Bacillus megaterium* and *Aeromonas hydrophila* degraded a mean total of 98.60%, 95.70%, 90.20% and 99.90% acenaphthene, respectively, and 99.90%, 97.90%, 98.40% and 99.50% fluorene, respectively. The PAH degrading microorganisms isolated during this study significantly reduced the concentrations of acenaphthene and fluorene and can be used on a larger, commercial scale to bio remediate PAH contaminated river systems.

#### **Biography**

Oluwadara is a graduate of Microbiology from the University of Agriculture, Abeokuta, Ogun State, Nigeria. She recently concluded her Masters in Environmental Health at Cape Peninsula University of Technology, Cape Town, South Africa and is currently working on her Ph.D proposal. She is a certified environmental auditor as well as a certified HACCP auditor. She has worked as a research assistant for two University Professors and is currently working as a teaching assistant tutor at Cape Peninsula University of Technology, Cape Town. She has participated in two WHO sponsored research projects and has published some articles on Bioremediation of recalcitrant organic compounds such as Polychlorinated biphenyls (PCBs), Chlordane and Polycyclic aromatic hydrocarbons (PAHs).

#### **Notes:**