

## POTENTIAL MICROBIAL BIOINDICATORS FOR EFFICIENCY ASSESSMENT OF OIL REFINERY WASTEWATER BIOLOGICAL TREATMENT

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This study used a multi-analytical approach based on traditional microbiological methods for isolation and cultivation of heterotrophic bacteria in the laboratory associated with the molecular identification of the isolates and physicochemical analysis of environmental samples. The model chosen for data integration was supported by knowledge from computational neuroscience, and composed by three modules: (i) "microbiological parameters", contemplating taxonomic data obtained from the partial sequencing of the 16S rRNA genes from 80 colonies of heterotrophic bacteria isolated by plating method in PCA media with incubation at 35 °C for 24-48 h. For bacterial colonies isolation were used water samples from Atibaia and Jaguarí rivers collected at the site of water captation for use in effluent treatment, upstream from the entrance of treated effluent from the Paulínia refinery located in the Paulínia-SP municipality, from the biological treatment plant with activated sludge output and from the raw refinery wastewater; (ii) "chemical parameters", ending measures of dissolved oxygen (DO), chemical oxygen demand (COD), biochemical oxygen demand (BOD), chloride, acidity CaCO<sub>3</sub>, alkalinity, ammonia, nitrite, nitrate, dissolved ions, sulfides, oils and greases; (iii) "physical parameters", comprising the pH determination, conductivity, temperature, transparency, settleable solids, suspended and soluble solids, volatile material, remaining fixing material (RFM), apparent color and turbidity. The results revealed positive theoretical relationships between two families of bacteria (Carnobacteriaceae and Aeromonadaceae). Carnobacteriaceae showed positive theoretical relationships with COD, BOD, nitrate, chloride, temperature, conductivity and apparent color and negative theoretical relationships with the OD. Positive theoretical relationships were shown between Aeromonadaceae and OD and nitrate, while this bacterial family showed negative theoretical relationships with COD, BOD, chlorides, ammonia, volatile matter, alkalinity, apparent color, acidity and conductivity. Previous studies have shown the capacity of members Carnobacteriaceae and Aeromonadaceae of metabolizing carbohydrates and optionally utilizing oxygen. The results obtained in this study open the possibilities of investigating Carnobacteriaceae and Aeromonadaceae as potential bioindicators for assessing the efficiency of the methods adopted for biological treatment and disposal of waste from oil refinery.

**Key words:** bacterial taxonomy, lotic environment; oil refining effluents; theoretical relationships bacteria-abiotic factors.

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