

TITLE: THE INFLUENCE OF VISCOSITY AND ADDITIVES OF AUTOMOTIVE LUBRICANTS OILS ON SOIL BIODEGRADATION.

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ABSTRACT

Lubricants oils, in general, do not dissolve in the water; in the environment, they form films that can prevent the passage of oxygen, resulting in contamination of soil and aquifers. Contamination can affect the ecosystem and cause human health problems. Soil microorganisms present important mechanisms of removal of organic contaminants in natural environments by the biodegradation process. However, this process is dependent on the characteristics and volume of the compound, as well as the environmental characteristics. The objective of this work was to evaluate the biodegradation of automotive oils in the soil. Automotive oils were used: 5w30 mineral, 5w30 semi-synthetic, 5w30 synthetic, 15w40 semi-synthetic, 20w50 mineral, to study the viscosity and additivity of the same, and its biodegradation process in the soil. The lubricants were commercially purchased and the biodegradation of the lubricating oils was evaluated by microbial respiration using the respirometric method of Bartha and Pramer. The biodegradation was evaluated for viscosity, additivity, refining base and gasoline contamination. The experiment was carried out in a BOD greenhouse at $28 \pm 2^\circ\text{C}$ and the accumulated CO_2 generation during the process was evaluated in the period of 28 days, related the refining base and then 62 days to the additivation. The Colony Forming Units (CFU) of heterotrophic bacteria and soil fungi were quantified using the Pour Plate technique. There was lower degradation of the synthetic compound about to the mineral. The lower viscosity compound showed a higher biodegradation tendency when compared to the more viscosity oil. The first generation of CO_2 was higher in the treatment where it was used lubricating oil and gasoline concomitantly, however, during the biodegradation test it was verified that the compound without addition of gasoline generated greater amount of CO_2 . It is concluded that the biodegradation in the soil of the automotive lubricating oils used are influenced by the physical characteristics of the product and its safe disposal is necessary.

Keywords: biodegradation, automotive lubricant oil, Respirometric method of Bartha and Pramer.