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**Phytoremediation of Soil Contaminated with Used Lubricant Oil by Marigold Plant  
(*Tagetes erecta* L.)**

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**Abstract**

Lubricating oils, used extensively in various industries and it contains a complex mixture of base oil and additives, posing environmental hazards when improperly disposed as used lubricant oil (ULO). The objective of this study was to explore the potential of Marigold plants (*Tagetes erecta* L.) for phytoremediation as a sustainable and eco-friendly solution to address ULO contamination. The study involved a pot experiment of marigold seeds planted in six different concentrations of ULO-contaminated soil (0%, 1%, 2%, 3%, 5%, and 8% on w/w basis). For the determination of the percentage degradation of ULO in the contaminated soil, the gravimetric method was performed. This involved suspending soil samples from the rhizosphere of the Marigold plants in dichloromethane and subsequently measuring the change in weight after the solvent had evaporated. Soil Samples were drawn after every 30-day intervals over three months continuous period of time with good caring and careful watering to the plant. In a three-month experiment, the percentage degradation of ULO-contaminated soil was assessed in MINITAB 19 software. Results revealed a contamination level-dependent decrease. Notably, higher percentages of oil degradation were observed in 1% and 2% ULO-contaminated soil concentrations. Additionally, the chlorophyll content of Marigold plants in different ULO-contaminated soil concentrations was also evaluated. Chlorophyll a and chlorophyll b contents exhibited similar variations, while total chlorophyll content decreased with increasing ULO contamination levels. The highest total chlorophyll content was found in control plants, while the lowest was observed in plants grown in 8% ULO-contaminated soil. In conclusion, Marigold plants showed moderate potential as phytoremediators for ULO-contaminated soil, with higher oil degradation in lower ULO concentrations. In terms of chlorophyll content, the presence of ULO in the soil resulted in a contamination level-dependent decrease in total chlorophyll content in the leaves.

**Keywords:** Phytoremediation, Used lubricant oil, Marigold plants (*Tagetes erecta* L.), Soil contamination. Chlorophyll content