

ORIGINAL ARTICLE

RESPONSE OF MAIZE VARIETIES SAMMAZ 31 AND SEEDCO 419 (*ZEA MAYS* L.) TO USED ENGINE OIL CONTAMINATION IN LOAMY SOIL: GERMINATION AND GROWTH

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ABSTRACT

In the present study, the impact of Used Engine Oil (UEO) contamination was assessed on seed germination, seed viability, tolerance of stress, and vegetative growth parameters of maize varieties SAMMAZ 31 and SEEDCO 419 in loamy soil. The study was conducted in August – September, 2025 at Sa'adu Zungur University, Nigeria. Seeds were sown in soil, amended with 0, 200, 400, and 800 g/kg UEO under a completely randomized design with three replicates. Seed germination and seedling survival were monitored for 21 days, while plant height, leaf number, fresh weight, and dry weight were measured. The macronutrient and micronutrient levels of soil were analyzed before and after the treatment using Atomic Absorbance Spectroscopy. Results revealed that increasing UEO concentrations significantly inhibited germination and seedling survival, with SAMMAZ 31 showing greater tolerance than SEEDCO 419. Vegetative growth metrics declined dose-dependently, exacerbated by elevated

heavy metal concentrations (Cu, Zn, Mn, Fe) and nutrient imbalances, notably deficient calcium and excessive potassium and sodium. Despite no statistical significance in ANOVA tests, these reductions indicate strong phytotoxicity from UEO contamination. The study concludes that UEO pollution severely impairs maize establishment and growth, with varietal differences highlighting the potential for selecting tolerant cultivars like SAMMAZ 31 in contaminated environments. It recommends avoiding cultivation on heavily polluted soils, employing tolerant varieties, regular soil monitoring, implementing remediation and phytoremediation strategies, and promoting responsible UEO disposal to protect agricultural productivity and environmental health.

Keywords: Maize varieties, used engine oil, contamination, loamy soil, germination.