

IMPACT OF DIFFERENT SOIL AMENDMENTS ON CRUDE OIL POLLUTED SOIL AND PERFORMANCE OF MAIZE

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ABSTRACT

Effects of different soil amendments on crude oil polluted soil and performance of maize was carried out in Egbema, Imo State. The experiment was laid out in a complete randomized design in three replications in pots. Eighteen pots were used in this study, with 9kg soil packed in each pot. The soil in each of the pots was polluted with 22.5g (5t/ha) of crude oil, simulating the spill in the field except in control (Zero pollution). There were six treatments consisting of NPK 20:10:10, Crushed limestone (CaCO₃), Cured cow dung (CD), Cured poultry manure (PM), each applied at the same rate of 13.5g (3t/ha) except in control (Ct) and unamended polluted (UP). Percentage organic carbon was determined three times after amendment. Two maize seeds (Oba II) were planted in each pot. Seed emergence, plant height, time of tasseling, time of silking and yield were recorded in this study. The soil was loamy sand; percentage porosity was moderately high across the pots. The texture was not affected by crude oil pollution; however, it influenced the chemical properties of the soil. Percentage organic carbon was high after pollution, pH was reduced and C/N ratio widened. LSD at 5% probability, showed that crude oil pollution affects basic cations in the soil especially magnesium. The amendment however, reduced the percentage organic carbon, narrowed the C/N ratio, and increased the basic cations and the pH. The performance of maize crop in this study showed the positive impact of the amendment materials used on crude oil-polluted soil when compared with control and unamended polluted pots. NPK-treatment showed a high level of amendment than other treatments; with yield 47t/ha for NPK, 24t/ha for Limestone, 20t/ha for Cow dung, 29t/ha for Poultry manure, then 20t/ha and 18t/ha for Control and Unamended polluted.

Keywords: Impact, soil amendments, crude oil pollution, performance, maize.

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ДЕЙСТВИЕ РАЗЛИЧНЫХ ПОЧВЕННЫХ МЕЛИОРАНТОВ НА СВОЙСТВА ПОЧВЫ, ЗАГРЯЗНЕННОЙ СЫРОЙ НЕФТЬЮ, И РАЗВИТИЕ КУКУРУЗЫ

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Влияние различных почвенных мелиорантов на почвы, загрязненные сырой нефтью и выращивание кукурузы было изучено в в Егбема, штата Имо в Нигерии. Эксперимент был заложен в сосудах по полностью рендомизированной схеме в трех повторениях. Были использованы 18 сосудов, в которых поместили по 9 кг почвы. Загрязнение (разлив нефти) имитировали, добавив к почве в каждом сосуде 22,5 г (5 т/га) сырой нефти, за исключением контрольного сосуда (нулевое загрязнение). Всего было 6 вариантов опыта: NPK 20:10:10; измельченная известь (CaCO₃); твердый навоз коров (CD); твердый птичий помет (PM), которые вносили одинаково по 13,5 г (3 т/га) исключая варианты контроль (Ct) и неисправленное загрязнение (UP). Процентное содержание органического углерода определяли три раза после мелиорации. В каждый сосуд были высажены по два семени кукурузы (Oba II). В опыте контролировали прорастание, высоту растений, время выметывания метелки, фаза выметывания пестичных столбиков и урожай. Почва – супесчаная, умеренно высокой пористости. Грансостав не подвержен влиянию загрязнения сырой нефтью; но химические свойства почвы оказались затронутыми. Процентное содержание органического углерода после загрязнения было высоким, pH снизился, а отношение C/N расширилось. LSD при 5% вероятности, показало, что загрязнение сырой нефтью затрагивает состав основных катионов в почве, особенно магния. Мелиорация, однако, вызвала снижение процентного состава органического углерода, сужение отношения C/N и увеличение содержания основных катионов и pH. Характеристика растений кукурузы в этих исследованиях показала положительное влияние мелиорантов, использованных на загрязненной почве по сравнению с контролем и немелиорированной почвой. Вариант с NPK показал более высокий уровень мелиорации чем другие варианты. Урожай был таким – 47 т/га для NPK, 24 т/га для извести, 20 т/га для навоза, 29 т/га для птичьего помета, затем 20 и 18 т/га для контроля и немелиорированного загрязнения.

Ключевые слова: *воздействие, почвенный мелиорант, загрязнение сырой нефтью, характеристика, кукуруза.*