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Heavy metals uptake and yield of wheat-pearl millet- green gram crop sequence as influenced by various sludges and soil conditioners

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ABSTRACT

A field experiment was conducted at Agronomy Instructional Farm, Sardarkrushinagar on sandy loam soil to study the influence of sludges and soil conditioners on heavy metals uptake and yield of wheat-pearl millet-Green gram crop sequence during 2002-03. Significantly higher uptake of cobalt and cadmium was register with the use of ETP sludge @ 20 t ha^{-1}, while incorporation of fly ash @ 20 t ha^{-1} registered higher uptake of lead and nickel by grain and straw of all the three crops grown in sequence one after another. The mean values of heavy metals in the grain and straw of crops were far below the tolerance threshold for livestock and toxicity values for plants. Application of ETP sludge @ 20 t ha^{-1} resulted in significantly higher grain yield of wheat, pearl millet and green gram crops.

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Key words: Heavy metal, Uptake, Sludge, Soil conditioners

INTRODUCTION

With the adoption of high yielding varieties in cereal based intensive cropping system has substituted the less productive system. But continuity of profit motivated cultivation of intensive cropping with application of imbalanced fertilization is the matter of great concern for sustained production of the system. In spite of heavy inputs, the crop yields decline because of deficiency of one or more micro-nutrients. The recycling of organic wastes through vermicompost, FYM, coir pith helps to minimize their manurial value for sustainable agriculture. These organic manures supply both macro and micronutrients and improve the physical, chemical and biological properties of soil and very often leave sustainable residual fertility effect on succeeding crop.

Rapid expansion of industrialization colossal amount of solid wastes (sludges) are given out every day. Land application of sludge provides an effective method of wastes disposal, which also recycles valuable nutrients into soil-plant system, sludge contains considerable amounts of major as well as minor plant nutrients.

Thus, to bridge a gap between existing knowledge, present experiment was planned to study the effect of different levels of sludges and soil conditioners to explore possibilities of improving yield of wheat-pearl millet-green gram cropping system and uptake of micronutrients.

MATERIALS AND METHODS

The field experiments were conducted at the Agronomy Instructional Farm, C.P. College of Agriculture, S.D. Agricultural University, Sardarkrushinagar during winter (*Rabi*), hot weather (summer) and rainy (*Kharif*) seasons during 2002-03. The soil was loamy sand with 7.52 pH, low in organic carbon (0.23 %) and available nitrogen (167 kg ha^{-1}), medium in available P_2O_5 (46 kg ha^{-1}) and available K_2O (180 kg ha^{-1}). Each industrial sludge and soil conditioner comprised of two levels (10 and 20 t ha^{-1}). The experiment consisted of seventeen treatments *viz.*, FYM10: FYM 10 t ha^{-1}, FYM20: FYM 20 t ha^{-1}, PFM10: private firm manure 10 t ha^{-1}, PFM20:

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