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Distillery spent wash is an effective eco-friendly irrigation medium

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ABSTRACT

Field experiment was conducted to study the variation of fertility of soil by the application of different proportions of distillery spent wash. Primary treated spent wash (PTSW), 50% and 33% spent wash were analyzed for physico-chemical parameters and plant nutrients. The experimental soil was analyzed for its physico-chemical parameters. Spent wash of different proportions were applied to the soil at regular intervals, ploughed and exposed to atmosphere. Spent wash treated soil fertility were again analyzed. It was found that the fertility increased in the order 33%>50%>PTSW treated soil.

Key words : Distillery spent wash, Plant nutrients, Soil, Fertility, Parameters.

INTRODUCTION

In India about 40 billion liters of waste water is discharged from distilleries during the production of ethanol by the fermentation of Molasses.

Molasses (one of the important byproducts of sugar industry) is the chief raw material for the production of alcohol in distilleries. They produce about 40 billion liters of wastewater known as raw spentwash, which is characterized by high biological oxygen demand (BOD: 5000-8000mg/l) and chemical oxygen demand (COD: 25000-30000mg/l) (Joshi *et al.*, 1994). Generally spentwash is discharged into open land or near by water bodies results number of environmental hazards including threat to plant and animal lives. The raw spentwash is highly acidic and containing easily oxidisable organic matter (Patil *et al.*, 1987). Spentwash contains highest content of nitrogen and plant nutrients (Ramadurai and Gearard, 1994). By adopting biomethenation plant in distilleries, reduces the oxygen demand of raw spentwash, this is called primary treated spentwash and is rich in nitrogen (N), potassium (K), and phosphorous (P) and decrease in calcium (Ca), magnesium (Mg), sodium (Na), chloride (Cl^-), and sulphate (SO_4^{2-}) (Mohamed Haron and Subash Chandra Bose, 2004). Also it contains easily biodegradable organic matter and its application to soil has been reported to be beneficial to increase the yield of sugar cane (Zalawadia *et al.*, 1997), rice (Deverajan and Oblisami, 1995), wheat (Pathak *et al.*, 1998), quality of groundnut (Amar B Singh *et al.*, 2003) and physiological response of soyabean (Ramana *et al.*, 2000). Diluted spentwash increases the growth of shoot length, leaf number per plant, leaf area and chlorophyll content of peas (Rani and Vastava, 1990). The spentwash consists excess of various forms of cations and anions, which are harmful to plant growth. The concentration of these constituents should be reduced to beneficial level by diluting the spentwash, which can be used as a substitute for chemical fertilizer (Sahai *et al.*, 1983). The spentwash could be used as a complement to mineral fertilizer to sugarcane (Chares, 1985) and thus valued as a fertilizer when applied to soil through irrigation water (Samuel, 1986). Higher percentage of spentwash irrigation causes decrease in seed germination, seedling growth and chlorophyll content in sunflowers (Helianthus annuus) and the spentwash could be safely used for irrigation purpose at lower concentration (Rajendran, 1990 and Ramana *et al.*, 2001) without adversely affecting soil fertility and crop productivity (Raverkar *et al.*, 2000, Kuntal *et al.*, 2004 and Kaushik *et al.*, 2005). Twelve pre sowing irrigations with the diluted spentwash had no adverse effect on the germination of maize but improved the growth and yield (Singh and Raj Bahadue, 1998). The diluted spentwash irrigation improved the physical and chemical properties of the soil and further increased soil microflora (Deverajan *et al.*, 1994, Kuntal *et al.*, 2004 and Kaushik *et al.*, 2005). Application of diluted spentwash increased the uptake of Zinc (Zn), Copper (Cu), Iron (Fe) and Manganese (Mn) in maize and wheat, the highest total uptake of these were found at lower dilution than at higher dilution levels (Pujar, 1995). The diluted spentwash increase the uptake of nutrients, height, growth and yield of leaves vegetables (Chandraju and Basavaraju, 2007, Basavaraju and Chandraju, 2008, and Chandraju *et al.*, 2008), nutrients of pulses (Chandraju *et al.*, 2008), condiments and root vegetables (Chandraju *et al.*, 2008), top vegetables (Basavaraju and Chandraju, 2008), cabbage and mint (Chandraju *et al.*, 2008). Hence, the present investigation

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