

Influence of distillery spentwash irrigation on the yields of leafy medicinal plants in normal and spentwash treated soil

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ABSTRACT

Cultivation of some leafy medicinal plants was made by irrigation with distillery spentwash of different proportions. The spentwash *i.e.*, primary treated spentwash (PTSW) and 33% spentwash were analyzed for their plant nutrients such as nitrogen, phosphorous, potassium and other physical and chemical parameters. Experimental soils *i.e.*, normal soil (plot-1) and spentwash treated (plot-2) soils were tested for their chemical and physical parameters. The leafy medicinal plants, namely, Coriander (*Coriandrum sativum*), Dill (*Anethum graveolens*), Pudina /Spearmint (*Mentha viridis*), Fenugreek/Methi (*Trigonella foenum-graecum*) (Namadhari and Mayhco) were sowed in the prepared land and irrigated with raw water (RW) and 33% spent wash. Influence of spentwash in normal and spentwash treated soils on the yields were recorded at their respective maturity. It was found that the yields of all medicinal plants were high in 33% spentwash than raw water irrigation. Further, the yields were very high in spentwash treated soil (plot-2) than normal soil (plot-1) and raw water irrigations for all plants.

Chandraju, S., Nagendraswamy, R., Chidankumar, C.S. and Girijanagendraswamy (2011). Influence of distillery spentwash irrigation on the yields of leafy medicinal plants in normal and spentwash treated soil. *Internat. J. agric. Sci.*, 7(1): 23-26.

Key words : Distillery spentwash, Medicinal plants, Nutrients, Proximate principles, Normal soil, Spentwash treated soil

INTRODUCTION

Molasses (one of the important byproducts of sugar industry) is the chief source for the production of ethanol in distilleries by fermentation method. About eight (08) liters of waste water is discharged for every liter of ethanol production in distilleries, known as raw spentwash (RSW), which is characterized by high biochemical oxygen demand (BOD: 5000-8000mg/l) and chemical oxygen demand (COD: 25000-30000mg/l)(Joshi, *et al.*, 1994), undesirable color with foul smell. Discharge of raw spent wash into open land or near by water bodies resulting in a number of environmental, water and soil pollution including threat to plant and animal lives. Hence, discharge of spentwash is a major problem.

The RSW is highly acidic and contains easily oxidizable organic matter with very high BOD and COD (Patil *et al.*, 1987). Also, spent wash contains highest content of organic nitrogen and nutrients (Ramadurai and Gearard, 1987). By installing biomethanation plant in distilleries, reduces the oxygen demand of RSW, the resulting spentwash is called primary treated spent wash

(PTSW) and primary treatment to RSW increases the nitrogen (N), potassium (K), and phosphorous (P) contents and decreases the calcium (Ca), magnesium (Mg), sodium (Na), chloride (Cl⁻) and sulphate (SO₄²⁻) (Mahamod Haroon and Subhash Chandra Bose, 2004). The PTSW is rich in potassium (K), sulphur (S), nitrogen (N), phosphorous (P) as well as easily biodegradable organic matter and its application to soil has been reported to be beneficial to increase sugar cane (Zalawadia *et al.*, 1997), rice (Devarajan and Oblisami, 1998), wheat and rice yield (Pathak *et al.*, 1998), quality of groundnut (Amar *et al.*, 2003) and physiological response of soybean (Ramana *et al.*, 2000). Diluted spentwash could be used for irrigation purpose without adversely affecting soil fertility (Kaushik *et al.*, 2005; Kuntal *et al.*, 2004; Raverkar *et al.*, 2000), seed germination and crop productivity (Ramana *et al.*, 2001). The diluted spentwash irrigation improved the physical and chemical properties of the soil and further increased soil microflora (Devarajan *et al.*, 1994). Twelve pre sowing irrigations with the diluted spentwash had no adverse effect on the germination of maize but improved

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