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RESEARCH ARTICLE

Influence of phosphorus enriched biogas spent slurry (BSS) on growth and yield of sunflower (*Helianthus annuus*)

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SUMMARY

A field experiment was conducted during 2006-2007 at Main Agricultural Research Station (MARS), Dharwad, to study the influence biogas spent slurry enriched with phosphorus using rock phosphate and phosphate solubilizing bacterial cultures in black clayey soil. Significantly highest was plant height recorded for the treatment 100 per cent recommended dose of fertilizers and normal BSS (124.07cm) followed by 75 per cent RDF and 25 per cent P-enriched BSS. The stem girth and head diameter were found to be significantly different for the P-enriched BSS, where PSB-D1 performed better than TNAU-2. The yield attributes *viz*., head weight, thousand seed weight and grain yield were significant in the same treatment enriched with PSB-D1. A matching trend was observed with respect to shoot N and P concentration. Similarly, the population of rhizosphere microflora *viz*., bacteria, fungi, actinomycetes, free living nitrogen fixers and phosphate solubilizers were found to be highest at flowering stage and thereafter decreased at harvest.

Key Words : Sunflower, BSS, Enrichment, P-solubilizers, Yield

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The addition of organic matter to the soil had long been recognized as an essential component in maintenance of soil health for sustainable crop production. Maintenance of soil fertility, release of nutrients to the plants over the growing season, improvement of water holding capacity, cation exchange capacity and resistance to soil erosion are some of the properties of organic matter in soil. Biogas spent slurry (BSS), a product obtained from biogas plants, is one among the various organic inputs used as fertilizer in crop production (Shankarappa and Geeta, 2001; Geeta *et al.*, 2004). BSS contain both macro and micro nutrients in appreciable quantities that promote plant growth and also improve physical, chemical and biological properties of soil, which in turn contribute to increased productivity (Shyam and Sreenivasa, 1998).

The nutrient status of various organic inputs may be deficient in major nutrient, phosphorus. To overcome this, several workers have tried to enrich P in FYM (Bajpai and Sundara Rao, 1971), in compost (Rasal *et al*., 2002), in BSS (Shankarappa and Geeta, 2001; Geeta *et al.*, 2002) and other organic amendments. The performance of BSS in crop production had been documented for few crops. The manurial value of BSS composted with mango leaves, wheat straw and rock phosphate was evaluated on wheat crop (Pathak *et al.*, 1992). The application of BSS along with inoculation of nitrogen fixers enhanced growth and yield of maize (Sreenivasa and Geeta, 2000). Application of BSS with *Azospirillum* inoculation had reduced the fertilizer nitrogen requirement by 25 per cent in potato

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