

Influence of bioagents on seed yield and quality of soybean (*Glycine max* (L.) Merrill)

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Field and Laboratory experiments were conducted to know the influence of bioagents viz., soybean *Rhizobium*, *Pseudomonas fluorescence*, *Bacillus subtilis*, *Trichoderma viridae*, VAM and co-inoculation on seed yield and quality of soybean. Seeds treated with soybean *Rhizobium* @ 20 g/kg seed + *Bacillus subtilis* @ 20 g/kg seed + VAM @ 10 kg/ha + *Trichoderma viridae* @ 5 g/kg seed recorded significantly higher number of nodules in plant (39.3 and 54.1 at 30 and 60 days after sowing respectively), number of pods (54.7 and 77.0 at 60 days after sowing harvest, respectively), seed yield (21.61 g/plant and 29.95 q/ha), net returns (Rs 58,244), benefit:cost (4.5), 100 seeds weight (14.85 g), total dehydrogenase activity (0.950), protein content (41.73 %), germination (97%), seedling length (34.3 cm), seedling dry weight (58.8 mg), vigour index-I (3323) and II (6676), and number of bacteria and fungal colonies (42 x 10⁶ cfu/g soil and 16 x 10³ cfu/g soil).

Key words : Antagonistics, Bacillus, Bioagents, *Glycine max* (L.) Merrill, *Rhizobium*, Seed quality, Seed vigour

INTRODUCTION

The continuous use of chemical inputs in agriculture is one of the main causes of imbalance in the soil microbial activity, which leads to the outbreak of many diseases in crop plants. The crop is affected by several species of fungi that cause severe yield losses and majority of them are pathogenic and are seed-transmitted, thus demanding chemical seed treatment. Brazil is the world's second largest producer of soybean, has more than 90 per cent of the farmers treating seeds with fungicides. However, besides the negative effects on the environment and human health, one main problem reported in the country is that fungicides often drastically reduce the viability of *Bradyrhizobium* cells, decreasing nodulation and nitrogen fixation rates (Hungria *et al.*, 2005). In this context, instead of using chemicals use of micro-organisms as biological agents may represent an alternative method to control pathogenic fungi (Cubeta *et al.*, 1985). Introduction of bacterized seeds having growth-promotion capabilities and antagonistic characteristics offer a valid alternative to chemical protectants. In view of the above facts, the

present study is to investigate the Influence of bioagents on seed yield and quality of soybean (*Glycine max* (L.) Merrill)" was undertaken.

MATERIALS AND METHODS

The cultures of soybean *Rhizobium*, *Pseudomonas fluorescence*, *Bacillus subtilis*, *Trichoderma viridae* and VAM were obtained from Bio-Fertilizer Scheme, UAS, GKVK, Bangalore. Soybean variety JS-335 seeds were treated with bioagents along with jaggery solution as an adhesive and Dithane M-45 and Carbendizem were treated as dry seed treatment. Treated seeds were dried under shade for half an hour and then used for field performance study.

Treated seeds of soybean variety JS-335 were sown in plot of 3.6m x 3 m with a spacing of (45cm x 15cm) by following RCBD design. At the time of sowing entire dose of recommended fertilizers i.e., 30:80:37.5 kg NPK per hectare was applied in the form of urea, single super phosphate and muriate of potash, respectively. Crop was raised following all recommended practices. Field