

EVALUATION OF SINGLE STRAIN AND MULTI-STRAIN RHIZOBIAL INOCULANTS FOR SOYBEAN (*GLYCINE MAX*) CULTIVATION

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Most legumes can obtain much of their N requirement through symbiotic nitrogen fixation when the root nodules are formed by effective strains of rhizobia. As only a few systematic studies have been carried out to evaluate the effect of N fixing by single strain and multi-strain inoculants, the main objective of the present study was to evaluate the application of single strain and multi strain rhizobial inoculants for soybean cultivation in Sri Lanka.

The three strains used to prepare the rhizobial inoculants were previously isolated from wild non-edible legumes (C8 from *Crotalaria brownie*, VD1 from *Vigna dalzelliana* and K7 from *Vigna trilobata*). A preliminary pot experiment was carried out under semi-aseptic conditions, as a complete randomized design with four replicates. Inoculation of rhizobial strains was done 3 days after seeding, and plants were harvested after 8 weeks and a nodule count was taken, plants were oven dried at 70 °C for 48 hours and weighed. A field trial was conducted in the dry zone (Galnewa), using a Randomized Complete Block Design (RCBD) with three replicate blocks per treatment. Seeds were mixed with coir based inoculants prior to sowing. Three plants from each plot were harvested after 8 weeks and a nodule count was taken, plants were oven dried and weighed. Yield and yield component data were recorded in the remaining plants.

According to the results of the pot experiment the multi strain VD1K7 treatment increased the number of nodules and the nodule dry weights significantly, whereas as the rest of the inoculants showed no significant difference. With respect to average total dry weight two single strain inoculants (VD1 and K7) and two multi strain inoculants (VD1K7 and C8K7) showed significantly higher values when compared to the N+ treatment. The field trial results showed that the average number of pods were significantly higher with respect to the N+ treatment with two multi strain inoculants (VD1K7 and C8K7). All other inoculants showed no significant difference. With respect to seed weight, two single strain inoculants (C8 and K7) and two multi strain inoculants (VD1K7 and C8K7) showed significantly higher values when compared to the N+ treatment. The percentage increases were, C8K7=13%, VD1K7=12.42%, C8= 5.03% and K7=4.29%, when compared to the N+ treatment.

It could be concluded that N fertilizer could be replaced with Rhizobial inoculation, and multi-strain inoculation may be better than single strain inoculation for Soybean. Further field testing is needed for these inoculants to be recommended for farmer use.

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