

Isolation, Characterization and Identification of Rhizobia from Root Nodules of French Bean (*Phaseolus vulgaris* L.) Grown in Acid Soils

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Abstract

A pot experiment was conducted and repeated for two years in the field of the Department of Soil Science, Sylhet Agricultural University. Six treatments, viz. T₀ = Control (without *Rhizobium* inoculum) + Recommended Fertilizer (RF), T₁ = *R.* inoculum 15 g/kg seed + RF, T₂ = *R.* inoculum 30 g/kg seed + RF, T₃ = *R.* inoculum 45 g/kg seed + RF, T₄ = *R.* inoculum 60 /kg seed + RF and T₅ = *R.* inoculum 75 g/kg seed + RF were used following CRD with four replications. Lime application was done @ 2 t/ha. The local variety of french bean was used. Data were collected on nodule formation at the flowering stage of french bean. In addition, plant height, leaves, biomass, pod number, length and weight, seed number and weight at harvest during second year. The results showed that nodules were found in all treatments except the control treatment in first year. The *Rhizobium* bacteria were isolated from effective nodules grown on YEMA medium, showed white translucent, irregular in shape, with smooth surface, mucous producing, circular, convex, raised elevations, glister and non-motile colonies. The strains were found to be fast-growing. The range of colony size was 2-3.5 mm. The identification of isolated pure cultures through colony morphology analysis and biochemical properties includes gram staining (negative), bromothymol blue test (acid producing) and mannitol salt agar (positive). The second-year experiment showed that the plant height (41.97 cm), leaves (32.25 plant⁻¹), and biomass (60.44 plant⁻¹) were the highest in T₄ treatment. Additionally, the highest pods (60.44 plant⁻¹), pods weight (28.54 g pod⁻¹) and length (11.60 cm), seeds number (4.75 pod⁻¹) and weight (8.02 g pod⁻¹), effective nodules (109.25 plant⁻¹) were observed in T₄ treatment.

Key Words: French bean, Nodules, *Rhizobium* inoculum, YEMA media.