

EFFECT OF RHIZOBIAL ISOLATES OF *PITHECELLOBIUM DULCE* (BENTH) ON *VIGNA MUNGO* AND *VIGNA RADIATA*

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ABSTRACT

Biological N₂ fixation by symbiotic association of legume with micro organism is economically more sound and environmentally more acceptable than nitrogen fertilizer used in Agriculture. In this present investigation, the Rhizobia were isolated from the legume tree *Pithecellobium dulce* (Benth) which belongs to the family Mimosaceae. These rizobial isolates were inoculated to economically important legume crops *vigna mungo*, *vigna radiata* to determine the fertilizer potential of rhizobial isolates of legume tree *Pithecellobium dulce*.

KEYWORDS

Pithecellobium dulce, rhizobial isolates, N₂ fertilizer, *vigna mungo* and *vigna radiata*.

INTRODUCTION

Biological N₂ fixation by symbiotic association of legume with microorganism is economically more sound and environmentally more acceptable than nitrogen fertilizer used in Agriculture.^[4] Inoculation of legumes with effective strains of rhizobia has been a major faster in improving their yield and quality^[3,10] agree that inoculation is desirable in majority of the agricultural soils throughout the world. Studies conducted in past several years have conclusively shown that the naturally occurring Rhizobium in the soils for a number of years gradually loses its efficiency with time and hence an introduced efficient strain of the rhizobia can be established better in the root zone of legume in competition with local strain.

Therefore, a study was undertaken to find out the efficiency of Rhizobial isolates of the legume tree *Pithecellobium dulce* inoculation on modulation, nitrogen fixation and yield of *Vigna mungo* (Black gram) and *Vigna radiata*. (green gram).

MATERIALS AND METHODS

Pithecellobium dulce (Benth) belongs to the sub family Mimosoideae Leguminosae. It produces club shaped, elongated nodules on the roots of seedlings and trees. Nodules were collected from the roots of legume tree and surface sterilized by using standard techniques.^[11] These sterilized root nodules were crushed simply with pestle and mortar.

The extract was serially diluted with distilled water and inoculated into a Yeast Extract Mannitol Agar (YEMA) medium. The Rhizobium was confirmed by congo red test and staining of poly β - hydroxy butyrate test^[7] and mass cultured. The cultured rhizobial isolated were mixed with finely powdered sterilized lignite as carrier material and kept for curing.

POT CULTURE EXPERIMENT

The seeds of economically important legumes such as *Vigna mungo* and *Vigna radiata* obtain from the depot of the Agricultural department, Thanjavur, Tamilnadu were used throughout the study. The seeds of the above species were scarified and surface sterilized. The sterilized seeds were germinated in pots containing garden soil. The experiment was performed in replicated under natural conditions. After 5 days, from the date of seeding the seeds, the rhizobial inoculums of *P.dulce* were added into the pots containing the seedling of *V.mungo* and *V. radiata* controls were also maintained without rhizobial inoculation. The plants were uprooted for nodulation and N₂ fixation study at 30, 45 and 75 days respectively, were done for nodulation studied. Three plants were uprooted from each plot carefully without damaging the entire root system. The roots were then washed with water and intact nodules were detached from the roots. Nodules were dried at 60⁰-80⁰ C. Finally, at maturity plants were picked up and grain yield was recorded data on height of the plant nodule number, plant biomass (mg) and grain yield in (g) were analyzed statistically and compared at 5 % level of significance.

RESULT AND DISCUSSION

Rhizobium spp. of *P.dulce* established symbiotic association with *V.mungo* and *V.radiata* in pot culture experiment using garden soil. The level of symbiotic association between and Rhizobium spp. of *P.dulce* and legume crops, *V.mungo* and *V.radiata* were determined by using growth and yield parameters of place.

This present study also showed that a significant positive effect of Rhizobium spp. of *P.dulce* inoculates on height of the plant, nodule number, plant biomass, total number of seeds and seed biomass in inoculated plants of *V.mungo* and *V.radiata* than the uninoculated plants (Table-1). A similar and significant report has already been made in soybean ^[8,5] in *sytylosanthes*.

A significant increase in nodule number in inoculated soybean over uninoculated was recorded by.^[6,1] In the present investigation also, a significant increase in nodule number was observed in *P.dulce*, Rhizobium spp. Inoculated leguminous crops over the un inoculated.

P. dulce, Rhizobium inoculation significantly increased the yield (seed number and seed biomass) of the crop than the uninoculated. A similar observation was also made by^[2] in soybean. Increase in grain yield due to Rhizobium inoculation have also been reported in *cajanes cajan*, *cicer arietinum* and *V. unguiculata* and *A. hypogaea*.^[9]

Among the inoculated crops, the maximum increase in all parameters were recorded in Rhizobium of *P.dulce* inoculated seedlings of *V. mungo* than the *V. radiata*.

From the above discussion, it is concluded that the Rhizobium spp. of *P. dulce* was more effective as a biofertilizer and it can be recommended for the improvement of crop yield.

Table: 1 Effect of P.dulce Rhizobia on *V. mungo* and *V.radiata*

S.No	Plant	Ht. of the Plant	Nodule number g/plant	Nodule biomass g/plant	Shoot biomass g/p	Total seed g/p	Seed biomass g/p
1	Inoculated <i>V.mungo</i>	25±8.5	20±5.2	10.9±2.4	12±8.2	32±1.8	15±8.6
2	Inoculated <i>V.radiata</i>	17±2.5	18±7.8	8.2±7.2	8±2.4	24±1.2	11±4.8
3	Control	12.3±0.4	9±4.2	3.8±2.8	4±6.2	12±6.8	7±9.8

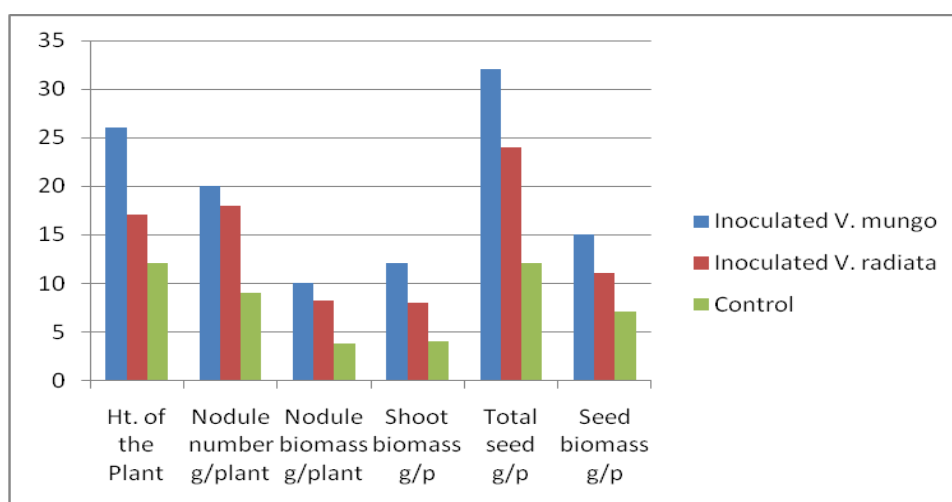


Figure: 1 Effect of P.dulce Rhizobia on *V.Mungo* and *V. Radiata*

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