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Study of native bioinoculants from the mung bean of district Sagar (M.P.) India

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SUMMARY

Exploration and isolation of efficient and multifunctional native strains from legumes can yield a roubst bioinoculants. In order to obtain such strains isolation of *Rhizobium* from the root nodules of mung bean (*Vigna radiata*) collected in 2007 from different fields of district Sagar (M.P.) was carried out. The isolation was done by serial dilution of nodule content on yeast extract mannitol agar (YEMA). A total of 50 isolates were isolated. Primary identification of isolates was done on the basis of gram staining and the presence of poly-â-Hydroxy butyrate granules. Among these, a total of 23 isolates were identified as *Rhizobium*. These were further characterized by different biochemical test *i.e.* oxidative fermentation of lactose, growth on nitrogen free medium, phosphate solubilization test, motility, nitrate reduction test, utilization of different sugars and their ability to grow at pH- 4.0 - pH- 10.0 etc. All the isolates grew well on medium containing 0.2% to 4.5% NaCl and pH 4.0-10.0 pH; they were also able to grow at different temperatures thus showed salt, pH and temperature tolerance. While only 13 isolates showed phosphate solubilization activity. Maximum phosphatase activity (phosphate solubilization) was noted in Two *Rhizobium* isolates of mung bean (*i.e.*, M21 and M34) found with good activity of phosphatase, using Pikovskaya's medium. Significance of the test *Rhizobium* strains will be discussed in the present communication.

Key words : *Rhizobium*, Mung bean, Isolates, Legumes, Phosphatase

Mung beans originate from India and India remains a leading producer of this legume. Most mung beans are olive green in colour but they can also be yellow, brown, or mottled black. They are an excellent source of folic acid and a good source of magnesium, phosphorus and thiamin. Mung beans are an important food in rural areas of southern Africa, where the dry bean seeds are used or the beans themselves are eaten as a vegetable.

To meet out continuously growing food requirements of increasing population, an indiscriminate use of chemical fertilizers has posed many problems to modern agriculture. The use of biofertilizers to replace chemical fertilizers is one of the most feasible solution to reclaim our agricultural land and to sustain required productivity. But the commercially available biofertilizers have not been found to show desired results in practice, may be because of the failure of bioinoculants in highly competitive soil ecosystem and its changing chemical composition. To short out the regional problems of bioinoculant failure we need to develop bioinoculants based on potential native strains. It will be economically more sound and environmentally more acceptable (Halliday, 1982).

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MATERIALS AND METHODS

Sample collection:

20 Samples of leguminous plants of mung bean (*Vigna radiata*) were collected from different fields of district Sagar (M.P.)

Isolation of bacteria:

The emerging healthy, pinkish nodules were harvested from healthy plants 30 days after sowing. Plant roots were rinsed in tap water to remove loosely adhering soil. four to five healthy nodules were removed from each plant with forceps and surface sterilized first with 95% ethanol and then with 0.1% mercuric chloride (Subba Rao, 1995). Individual nodules were crushed in sterilized water and the serial dilution of the suspension were streaked over yeast extact-mannitol agar (YEMA) congo red plates and incubated for 3 days at 35°C.

One single colony was taken from each nodule extract directly or after purification through subsequent streaking.

Slants of YEM medium were routinely used for maintenance of the parent cultures of rhizobia (Weaver and Graham, 1994). Bacterial cultures were incubated at 35°C. The purity of the bacteria was checked by repeat streaking as well as by microscopic examination with Gram staining.

Identification:

For this each bacterial isolates was grown on YEMA medium containing Congo red and after 3-4 days of growth