Use of pressmud and biofertilizer influence economic of pea cultivation

RK Singh, Uttam Kumar Tripathi, Kamlesh Ahirwar and Vikram Singh Thakur

Abstract
Input-output data on farm trails of three most popular pea varieties of eastern Uttar Pradesh cultivated under low cost input like biofertilizer were collected during 2002-03 2003-04 from the experimental field of the Indian Institute of vegetable Research Varanasi. The highest yield and benefit ratio per unit input ratio was found when the crop was cultivated under pressmud@5t/ha with seed treated by *Rhizobium* plus soil application of PSB.A return ratio of 2.8rupees per rupee invested was realized in fresh vegetable pea and pea seeds under pressmud with biofertilizer which accounted net profit of 180% to 190%. Maximum net return and cost benefit ratio 1: 3.2 was realized in Arkel when market as fresh vegetable. Maximum net return and cost benefit ratio was obtained when pea grain was marketed.

Keywords: Pressmud, biofertilizer, economic, pea cultivation

Introduction
The modern Agriculture technology has influenced productivity use of cost input like, pressmud, a by product of sugar industry Bio fertilizers (N-Fixers, P solubilizers, etc.) holds vast potential for the supply of major plant nutrient like nitrogen and phosphorus and sulphur. The locally available low cost input like pressmud and biofertilizers could be an economically viable option to use in pea crop and may be proved as boon especially to small and marginal farmers biofertilizers can provide to the small and marginal farmers.

Materials and Methods
The present experiment was conducted during rabi season of 2001-2002, 2002-2003 and 2003-2004 in a sandy loam alluvial soil or Indio Gangetic plains of Varanasi region Seeds of three prominent vegetable pea varieties of eastern Uttar Pradesh, namely Arkel, Azad Pea 1 and Azad Pea 3 were sown in field site and in. Total six treatments combinations were in the experiments where T1 control, T2 seed treatment in *Azotobacter*. T3, Seed treatments in PSM, T4 Seed treatments in *Rhizobium*, T5 seed treatment in *Rhizobium* along with PSB, T6 Seed treatments in *Azotobacter* along with PSM T1 pressmud @5t/ha and T2 FYM5t/ha were evaluated in RBD. The strain of nitrogen fixeing bacteria and phosphate solubilizers microorganism were originally isolated from agronomic soil in IIIVR Varanasi, and were used for trails experiment. The phosphorus solubilizers were cultured PSB and nitrogen fixer culture eg. *Rhizobium leguminosarum*. Seed inoculation alone or dual inoculation with *Rhizobium, Azotobacter* and phosphate solubilizing bacteria in soil or seed treated before seed sowing. Culture slurry of biofertilizer was prepared by adding @200 gm each biofertilizer in 10litters water was prepared separately, the seed were dipped in biofertilizer slurry for 15 minute and thoroughly mixed to get uniform coating on all the seeds. Again the seeds were treated with PSB slurry in the same manner and shade dried for on other 15minute then the uniform coated seeds were dribbled in the field immediately. Required and measured quantity of seeds were taken in plastic bucket (25littr capacity) and recommended quantity of individual biofertilizers. Pea fruits were harvested at breaker stage from each subplot and marketable fruits only weighed for yield determination. In addition to yield and yield contributing traits, the data were also recorded on marketable yield and price fetched by the crop. The costs of cultivations in general vis-à-vis net returns and cost: benefit ratios were worked out for all the varieties and treatment.
**Condition of Soil**
The soil was air–dried and ground to pass thoroughly a 2 mm sieve and mixed thoroughly. The basic properties of the soil were as follows pH 7.6, EC 0.41 dSm⁻¹, available N 270 kg ha⁻¹, P₂O₅ 18 kg ha⁻¹ and K₂O 180 kg ha⁻¹ sulphur 10 kg ha⁻¹, organic carbon 0.38% and (Ca²⁺ + Mg²⁺) 6.42 meq/100 g soil.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Cast of cultivation</th>
<th>Grain yield q/ha</th>
<th>Gross return</th>
<th>Net return</th>
<th>Return/rupee invested</th>
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Grain yield
Application of pressmud @ 5 t/ha along with seed treatment in *Rhizobium* and PSB @ 5 kg/ha soil application T₈ (930.8 kg/ha) T₇ (886.3 kg/ha) and T₃ (876.9 kg/ha) registered 56.27% 48.80% and 47.22%, respectively, higher grain yield over control. The additional cost incurred for low cost input for out yielded the return out put leading to a high net return per rupee invested.

Fresh pod weight
The highest pod yield (q/ha) were found under application of pressmud @ 5 t/ha along with seed treated in *Rhizobium* and soil application of PSB @ 5 kg/ha followed by application of pressmud @ 5 t/ha with seed treated in *Azotobacter* + PSB @ 5 kg/ha soil application which registered 96.6%, to 88%, higher fresh pod yield over control.

Significantly higher yield and yield attributes were obtained under pressmud @ 5 t/ha along with seed treated in *Rhizobium* and soil application of phosphate solubilizing bacteria @ 5 kg/ha, compared to single or un-inoculated crop. Inoculation with *Rhizobium* and PSB resulted more availability of N and P, which caused significant improvement in crop growth rate and leaf area index. The improvement was more conspicuous under dual inoculation because associative effect between *Rhizobium* and PSB inoculation resulted in significant increase in growth and yield attributes compared to single or un-inoculated plot. This favorable effect of combined inoculation might by due to increased availability of N and P in root zone. (Singh and Singh 1992)³


The maximum net return and cost benefit ratio was found under treatment pressmud @ 5 t/ha along with *Rhizobium* and PSB at par to seed treated in *Azotobacter* and *Rhizobium* in case of marketing of fresh pod of vegetable pea. *Rhizobium*+PSB proved more economic than *Rhizobium* or PSB with Pressmud. *Rhizobium* or PSB with Pressmud proved more beneficial than *Rhizobium* or PSB alone. Reported by Sharma and Namdeo (1999)⁷.

Variety evaluation data indicated significantly lowers Arkel of grain and fresh pod yield compared Azad P-1 and AzadP-3.

<table>
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<tr>
<th>Variety</th>
<th>Cast of cultivation</th>
<th>Yield q/ha</th>
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Variety.


References
