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"Effect Of Chemical Fertilizers And The Combinations With Bioferilizer Of Okra [*Abelmoschusesculentus* (L.) Moench]"Cv. Pusa Mukhmali

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Abstract

A field experiment was conducted during 2023 at Horticulture Research Farm, Rama University, Studies on the "Efficacy of bio-fertilizer and the combinations with chemical fertilizers on chemical parameters of okra [*Abelmoschusesculentus* (L.) Moench]", revealed that Acidity, Ascorbic acid and moisture percent were maximized. when we use withRecommended dose of fertilizers (RDF), NPK (55%), PSB (60%), Azotobacter (70%) and Azospirillum (80%).

Keyword: Okra, Recommended dose of fertilizers(RDF), NPK, PSB, Azotobacter and Azospirillum.

Introduction:

Okra [*Abelmoschus esculents* (L.)Moench] is commonly known as bhindi in India and lady's finger in England, Gombo in U.S.A. belonging to the familymalvaceae. It is grown in both tropical and subtropical regions of the world **(Ahmed *et al.*, 2006**). It has somatic chromosome number 2n = 130 and is an amphidiploids of ***A. tuberculatus*** with 2n= 58 and an unknown species with 2n=72. There are 38 species of the genus ***Abelmoschus.*** It is heat loving plant. It is one of the oldest cultivated crops and presently grown in many countries.Okra has a relatively good nutritional value and is a good complement in developing countries where there is often a great alimentary imbalance. Okra seeds contain about 20% protein similar to amino acid composition of soybean protein and 20% oil (similar in fatty acid composition to cotton seed oil) (**Siemonsma and Hamon, 2002)**. According to **Awodoyin and Olubode (2009)**, the immature fruits and leaves of *Abelmoschusesculentus*are used in soup as a thickener because it is a rich source of vitamins and minerals. Okra is recommended for consumption by World Health Organization due to its ability to fight diseases. It is a good source of vitamin A, B, C and also rich in protein, carbohydrates, fats, minerals, iron and iodine. The green fruits (per 100 g edible portions) of okra contains 89.6 per cent of moisture, 1.9 g protein, 88 IU of vitamin A, 0.07 mg thiamine, 0.1 mg riboflavin, 13 mg vitamin C, 0.7 g minerals like 103 mg potassium, 6.9 mg sodium, 56 mg phosphorus, 66 mg calcium, 1.5 mg iron, 30 mg sulphur and other nutrients **(Aykroyed, 1963)**. It is an excellent source of iodine which is useful for control of goiter. It provides a delicious and favorite dish in Indian vegetable meals and attributes several medicinal and nutritional properties.Biofertilizers are the formulation of living

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microorganisms, which are able to fix atmospheric nitrogen in the available form for plants either by living freely in the soil or being associated symbiotically with plants **(SubbaRao, 1993)**. Biofertilizers are inputs containing microorganisms which are capable of mobilizing nutritive elements from non-usable form to usable form through biological processes **(Tien*et al.*, 1979)**. Biological nitrogen fixation is carried out by both symbiotic and free-living bacteria and blue green algae. Symbiotic nitrogen fixation provides 80% of the biologically fixed nitrogen on land. Nitrogen fixing bacteria are very selective in choosing roots of particular legumes species to infect, invade and form root nodules **(SubbaRao, 1993).***Azotobactor*within the plant of economics importance has been harnessed in Indian agriculture. So many workers reported that there are several free-living bacteria found the roots of plant, which convert atmosphere nitrogen to the usable ammoniacal form. *Azotobactorchroococcum*, a heterotrophic bacterium fixes atmospheric nitrogen symbiotically and used as an inoculants for plants. Besides fixing nitrogen, it produces antifungal metabolizes and certain vitamin and growth promoting substances which increase seed germination and initial vigour in inoculated sorghum plants **(SubhaRao, 1974).**The ability of *Azospirillum* to produced plant growth regulatory substances along with N_2 fixation stimulate growth and thereby productivity. The changes that occur in the plant roots helps in transports minerals and water **(Sarig *et al.*, 1988).**

Material and methods:

A field experiment was conducted during 2023 at Horticulture Research Farm, Rama University, Studies on the "Efficacy of bio-fertilizer and the combinations with chemical fertilizers on chemical parameters of okra [*Abelmoschusesculentus* (L.) Moench]". Treatments **T_0**Recommended dose of fertilizers(RDF), **T_1** *Azotobacter* + 50% NPK, **T_2** PSB + 50% NPK, **T_3***Azospirillum* + 75% NPK, **T_4** PSB + *Azotobacter* + 50% NPK, **T_5** PSB +*Azospirillum*+ 50% NPK, **T_6**PSB + *Azospirillum* + *Azotobacter* 50%, **T_7** *Azotobacter* + *Azospirillum*50 %, **T_8** PSB + *Azospirillum*75%.Observation were recorded forAcidity (%), Vitamin-C(mg/100gm) and Moisture content (%).The data so obtained were analysed statically.

Result and discussion:

Data assembled towards acidity content in okra due to effect of different bio-fertilizer present in Table-1 showed that influence of NPK and bio-fertilizer decreased acidity content in okra significantlyT_5 produced the lowest rate of acidity (0.130%) followed by T_1andT_6 (0.540%), T_8(0.560%). The highest acidity content was noted with T_0 (0.847%).

The maximum Vitamin-C (24.73 mg/100g) was recorded in T_4 (PSB + Azotobacter + 50% NPK) and lowest Vitamin-C (13.54 mg/100g) was noted with T_0 (RDF). This is agreement with the result of **Upadhyay*et al.* (2007)** recorded maximum vitamin C, total carotenoids, total carbohydrate and crude fiber content in comprising FYM 20 t/ha^{-1} + PSB (T_3) among 16 treatment combinations including controls.

T_0 (RDF) contain lowest rate of moisture (83.010%) and the highest moisture content (91.833 %) was noted with T_6 (PSB + *Azospirillum* + *Azotobacter* 50%). Similarly, this is quite close

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to the reported of **Premsekhar and Rajashree,** (2009) who has obtained this type of result, while maximum moisture (90.36) in the control.

Table 1 Efficacy of bio-fertilizer and the combinations with chemical fertilizers on chemical parameters of okra [*Abelmoschusesculentus* (L.) Moench]

Treatment	**Acidity (%)**	**Vitamin-c (mg/100)**	**Moisture (%)**
T_0Recommended dose of fertilizers(RDF)	0.847	11.540	80.010
T_1 *Azotobacter* + 55% NPK	0.440	16.150	99.563
T_2 PSB + 60% NPK	0.543	16.547	8.447
T_3*Azospirillum* + 80% NPK	0.247	24.733	91.100
T_4 PSB + *Azotobacter* + 70% NPK	0.283	23.730	85.580
T_5 PSB +*Azospirillum*+ 50% NPK	0.230	22.440	91.397
T_6PSB + *Azospirillum* + *Azotobacter* 50%	0.440	20.953	90.833
T_7 *Azotobacter* + *Azospirillum*50 %	0.547	17.863	83.783
T_8 PSB + *Azospirillum*75%	0.460	16.953	88.253
C.D. at 5%	**0.100**	**2.056**	**3.512**
S.E.(m)±	**0.034**	**1.00**	**1.441**

Conclusion:

On the basis of present investigation, it may be concluded that the application of inoculants (PSB + *Azotobacter* + 50% NPK) increased growth yield and nutrional quality of okra. Therefore, it is recommended to the okra growers for the application of inoculants (PSB + *Azotobacter* + 50% NPK) for higher production and quality of okra under Lucknow condition.

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