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Effect of Azotobacter, Azospirillum, PSB on Chemical Parameters and its Combinations with Chemical Fertilizers of Okra [*Abelmoschus esculentus* (L.) Moench] cv. Parbhani Kranti

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Abstract

At the Agricultureal Research Farm of Rama University, Mandhana, Kanpur (U.P.), the current study, " Effect of Azotobacter, Azospirillum, PSB on Chemical Parameters and its Combinations with Chemical Fertilizers of Okra [*Abelmoschus esculentus* (L.) Moench] cv. Parbhani Kranti," was conducted in summer season . Ascorbic acid, acidity, and moisture percentage were all optimized, according to the data. when we apply fertilizers at the 40% RDF for NPK, 75% PSB, 55% Azotobacter, and 60% Azospirillum recommended dosages.

Keyword: Azotobacter, Azospirillum, NPK, Okra, and fertilizer dosages (RDF)

Introduction:

Abelmoschus esculents (L.) Moench, commonly known as okra, belongs to the family Malvaceae and is called lady's finger in England, bhindi in India, and Gombo in the United States. It is found in tropical and subtropical regions, Ahmed et al. (2006). It is an amphidiploid of A. tuberculatus with 2n = 58 and an unidentified species with 2n = 72, with a somatic chromosomal number of 2n = 130. The genus Abelmoschus contains 38 species. This is one of those plants that thrives in warm weather. Currently cultivated in numerous countries, it is among the world's oldest agricultural crops. Okra is a great nutritional supplement for people living in poor countries, where there is typically a major nutritional imbalance, because of its high nutritional content. Okra seeds contain roughly 20% protein (which is comparable to soybean protein in terms of amino acid content) and 20% oil (which is comparable to cotton seed oil in terms of fatty acid composition), according to Siemonsma and Hamon (2002).

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According to Awodoyin and Olubode (2009), Abelmoschus esculentus immature fruits and leaves are used as a thickening agent in soups due to their high vitamin and mineral content. The World Health Organization classifies okra as a health food due to its capacity to fend off illness.

It is high in minerals, lipids, carbs, protein, iodine, and iron. Okra green fruits have the following nutritional values: 89.6% moisture, 1.9 g protein, 88 IU vitamin A, 0.07 mg thiamine, 0.1 mg riboflavin, 13 mg vitamin C, and 0.7 g minerals, which include 103 mg potassium, 6.9 mg sodium, 56 mg phosphorus, 66 mg calcium, and 1.5 mg salt. Okra seeds contain roughly 20% protein (which is comparable to soybean protein in terms of amino acid content) and 20% oil (which is comparable to cotton seed oil in terms of fatty acid composition), according to Siemonsma and Hamon (2002).

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It is a good source of iodine, which aids in the treatment of goiters. In addition to being a great and well-liked vegetable dish in Indian cuisine, it offers several health and nutritional advantages. Living microorganisms known as "bio-fertilizers" have the ability to fix atmospheric nitrogen into a form that plants can use. They can do this by either coexisting freely in the soil or by forming symbiotic relationships with plants (SubbaRao, 1993). Azotobactor, a plant with economic value, has been used in Indian agriculture. Several independent scientists have discovered bacteria in plant roots that transform atmospheric nitrogen into usable ammoniacal form. Blue green algae and symbiotic and free-living bacteria both biologically fix nitrogen. Symbiotic nitrogen fixation accounts for eighty percent of the biologically fixed nitrogen on land. The roots of legume species that nitrogen-fixing bacteria infect, penetrate, and produce root nodules on are very selective (SubbaRao, 1993). Azotobactor, a plant with economic value, has been used in Indian agriculture. Several independent scientists have discovered bacteria in plant roots that transform atmospheric nitrogen into usable ammoniacal form.

Material and methods:

The okra cultivar Parbhani Kranti seed, which was utilized as the experimental material in this study, was provided by the Indian Agricultural Research Institute (New Delhi). The experiment was conducted at Okra using Randomized Block Design (RBD) in three replications. Fertilizer doses (RDF), NPK, PSB, Azotobacter, and Azospirillum (U.P.) were collected for the study during the Kharif season in 2022. The following is the recommended dosage of fertilizers (RDF): The following are the results of the NPK

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calculations: T1 = Azotobacter + 60%, T2 = PSB + 75%, T3 = Azospirillum + 65%, T4 = PSB + Azotobacter + 55%, T5 = PSB + Azospirillum + 75%, T6 = PSB + Azospirillum + Azotobacter 55%, T7 = Azotobacter + Azospirillum 60%, and T8 = PSB + Azospirillum 75%.Observations were made regarding moisture content (%), acidity (%), and vitamin C (mg/100gm).The data were statistically examined.

Result and discussion:

The experimental material for this study was the seed data collected about the acidity content of okra as a result of different biofertilizers. Table 1 showed that okra's acidity content was greatly decreased by the use of biofertilizer and NPK.T5 produced the least acidic rate (0.135%), followed by T1 (0.325%) and T8 (0.326%). At 0.700 percent, T0 had the highest acidity content.

T0 (RDF) had the lowest vitamin-C levels at 11.34 mg/100g, while T4 (PSB + Azotobacter + 40% NPK) had the highest levels at 26.532 mg/100g. This is consistent with the results of Upadhyayet al. (2007), who found that FYM 20 t/ha-1 + PSB (T3) contained the highest levels of vitamin C, total carotenoids, total carbohydrates, and crude fiber among 16 treatment combinations, including controls.

T0 (RDF) had the lowest moisture rate (80.011%) and the highest moisture content (92.433%) was found in T6 (PSB + Azospirillum + Azotobacter 40%). Consistent with this, the outcome is not too dissimilar from the findings published by Premsekhar and Rajashree (2009), who similarly found maximum moisture (93.36%) in the control.

Table 1: Effect of Azotobacter, Azospirillum, PSB on Chemical Parameters and its Combinations with Chemical Fertilizers of Okra [*Abelmoschus esculentus* (L.) Moench] cv. Parbhani Kranti

Treatment	**Acidity (%)**	**Vitamin-c (mg/100)**	**Moisture (%)**
T0Recommended dose of fertilizers(RDF)	0.700	11.34	93.36
T1 *Azotobacter* + 60% NPK	0.325	14.250	86.463
T2 PSB + 75% NPK	0.312	16.540	85.343
T3*Azospirillum* + 65% NPK	0.225	20.531	91.105
T4 PSB + *Azotobacter* + 55% NPK	0.176	26.532	81.381
T5 PSB + *Azospirillum* + 75% NPK	0.135	22.340	90.495
T6PSB + *Azospirillum* + *Azotobacter* 55%	0.221	17.853	92.433
T7 *Azotobacter* + *Azospirillum* 60 %	0.650	14.563	86.483
T8 PSB + *Azospirillum*75%	0.326	17.852	86.353

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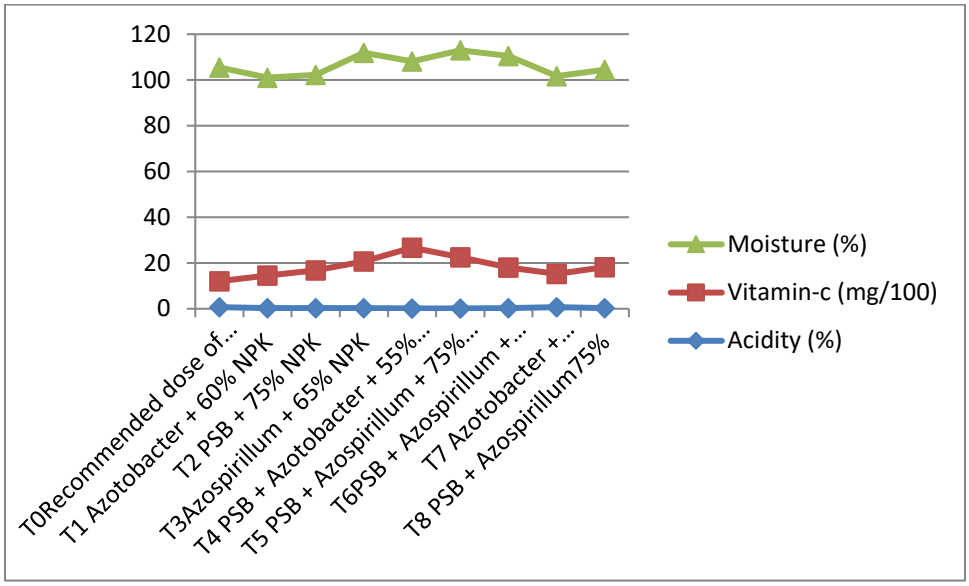
C.D. at 5%	**0.114**	**3.65**	**3.321**
S.E.(m)+	**0.044**	**1.015**	**1.312**

Fig. 1 Effect of Azotobacter, Azospirillum, PSB on Chemical Parameters and its Combinations with Chemical Fertilizers of Okra [*Abelmoschus esculentus* (L.) Moench] cv. Parbhani Kranti



Conclusion:

The present study indicates that the application of inoculants (PSB + Azotobacter + 75% NPK) improved the growth yield and nutritional quality of okra. In order to boost okra production and quality, growers are advised to apply inoculants (PSB + Azotobacter + 75% NPK) in accordance with Rama University's Kanpur conditions.

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