**Impact of Basfoliar and Biovita Applications on the Growth, Yield and Quality of Brinjal (*Solanum melongena* L.)**

**ABSTRACT**

The present investigation was conducted to out the impact of basfoliar and biovita applications on the growth, yield and quality of brinjal (*Solanum melongena* L.). Basfoliar (an extract from *Ecklonia maxima*) and Biovita (a fresh extract from Norwegian seaweed, *Ascophyllum nodosum*) are products that provide naturally occurring macro and micronutrients. These extracts are beneficial for achieving optimal crop yields and enhancing the quality of the harvest. The experiment was laid down in Randomized Block Design consist of ten treatments i.e. Basfoliar and Biovita at 5, 10, 25 and 20% along with the Recommended dose of fertilizer. Observations were recorded on growth, yield and quality attributes. The results showed that an application of the RDF + Basfoliar @ 20% had a beneficial effect on the growth and yield parameters i.e. minimum days to first flowering, days to 50% flowering, maximum height, stem diameter, number of primary branches, number of secondary branches, number of leaves, fruit length, fruit diameter, numbers of fruits per plant, average fruit weight, yield per plant and yield per plot. Further the quality parameters viz total soluble solids and ascorbic acid was also highest in same treatment i.e. RDF + Basfoliar @ 20%. It is concluded that applying RDF + Basfoliar @ 20% is beneficial as this enhances the growth, yield and quality attributes of Brinjal.

**Keywords:** Brinjal, Basfoliar, Biovita, Growth, Yield, Quality.

**Introduction**

 Brinjal (*Solanum melongena* L.), also known as eggplant, is a widely cultivated vegetable in tropical and subtropical regions, prized for its nutritional value and culinary versatility (Datta *et. al.,* 2021). However, its productivity is often limited by factors such as nutrient deficiencies, environmental stress, and susceptibility to pests and diseases. To address these challenges and improve the overall health and yield of brinjal, the use of foliar fertilizers and biostimulants has emerged as a promising strategy. Among these, seaweed extract-based products like Basfoliar and Biovita have gained significant attention for their ability to enhance plant growth, increase resistance to stress, and improve crop quality (Michalak and Chojnacka, 2016).

Basfoliar is a foliar fertilizer enriched with essential macro and micronutrients, including nitrogen, phosphorus, potassium, and trace elements, which are rapidly absorbed by plants through their leaves (Aja and Al-Abbasi, 2021; Lotze and Hoffman, 2016). This promotes enhanced plant growth, flowering, and fruit development. Biovita on the other hand, is a biostimulant derived from natural sources, including seaweed extracts, which contain a variety of bioactive compounds, such as auxins, cytokinins, and vitamins. These compounds help to stimulate root growth, improve nutrient uptake, and increase plant resilience to biotic and abiotic stresses (Kumari *et. al.,* 2023; Rafiee *et. al.,* 2016). Both Basfoliar and Biovita are believed to play key roles in boosting plant health and maximizing crop yield.

The incorporation of seaweed extract into agricultural practices has been shown to have beneficial effects on plant metabolism, improving overall physiological performance and enhancing the quality of harvested produce. This research aims to evaluate the impact of Basfoliar and Biovita applications on the growth, yield and quality of brinjal (*Solanum melongena* L.). By assessing key growth parameters such as plant height, leaf area, fruit production, and nutritional content, this study seeks to provide valuable insights into the potential of seaweed extract-based treatments in enhancing brinjal production. The findings could contribute to the development of more sustainable and efficient agricultural practices for brinjal cultivation.

**Material and method**

The study entitled “Impact of Basfoliar and Biovita Applications on the Growth, Yield and Quality of Brinjal (*Solanum Melongena* L.).” was carried out at the research farm of the Faculty of Agricultural Sciences, DAV University, Jalandhar, Punjab during the 2023 academic year. The seeds of Brinjal cv. Pusa Bhairav was collected from the Faculty of Agricultural Sciences, DAV University, Jalandhar. On month of January 2023, the brinjal seedlings was raised in portrays. Seeds was sown in portrays with cocopeat as rooting media. The media was treated with Bavistin @ 2g/lit water. Before sowing, the seeds were treated with captain @ 2.5g/kg of seeds. The trays were kept in the polyhouse to provide favourable condition for early germination. The experiment was laid out in randomized block design followed by three replications and ten treatments. The field preparation involved through ploughing and the application of farmyard manure. The experiment was carried out in a randomized block design (RBD).

**Treatment details**

The experimental treatments utilized in this study are as follows (T1- Absolute control, T2- NPK, T3- NPK+ Basfoliar @ 5%, T4- NPK+ Basfoliar @ 10%, T5- NPK+ Basfoliar @ 15%, T6- NPK+ Basfoliar @ 20%, T7- NPK+ Biovita @ 5%, T8- NPK+ Biovita @ 10%, T9- NPK+ Biovita @ 15%, T10- NPK+ Biovita @ 20%): T1 represents the absolute control, consisting of no additives. T2 involves the application of NPK fertilizer alone. Treatments T3 through T6 consist of NPK combined with Basfoliar at concentrations of 5%, 10%, 15%, and 20%, respectively. Similarly, treatments T7 through T10 involve NPK combined with Biovita at concentrations of 5%, 10%, 15%, and 20%, respectively. These treatments were implemented to evaluate the effects of varying concentrations of Basfoliar and Biovita, in combination with NPK, on the parameters being studied.

**Preparation of Percentage Solutions**

 To prepare a percentage solution, the required amount of solute is calculated based on the desired concentration and the total volume of solution to be prepared. To prepare a 5% solution of Basfoliar in 1 liter (1000 mL) of water, 50 mL of Basfoliar is required, and the remaining 950 mL of the solution is filled with water. Similarly, for a 10% solution, 100 mL of Basfoliar would be required per liter of solution. This process is repeated for each required concentration, ensuring proper mixing to achieve a homogeneous solution.

**Results and discussion**

**Growth parameters**

Growth attributes are an important factor to judge the yield of the crop. The study showed that the treatment of various types of seaweed extract significantly affected the parameters including days to first flowering, days to 50% flowering, plant height, stem diameter, number of primary branches, number of secondary branches, the number of leaves per plant, fruit length and fruit diameter. Among the various treatments, plants which received RDF + Basfoliar at the concentration of 20% (T6)showed minimum days to first flowering (38.24 days), minimum days to 50% flowering (42.21 days), maximum number of primary branches (9.66), maximum number of secondary branches (26.07) and maximum number of leaves per plant (78.27). However, the maximum days to first flowering (51.85 days), maximum numbers of days to 50% flowering (60.95 days), minimum number of primary branches (5.48), minimum number of secondary branches (17.43) and minimum number of leaves (65.27) was observed in Control (T1). The maximum plant height (89.23 cm), maximum stem diameter (2.34 cm), maximum fruit length (24.03 cm) and maximum fruit diameter (6.21 cm) was recorded in T10 (RDF + Biovita @ 20%) and the minimum plant height (64.23 cm), minimum stem diameter (2.01 cm), minimum fruit length (14.63 cm) and minimum fruit diameter (3.06 cm) was recorded in Control (T1).

**Table 1: Impact of Basfoliar and Biovita Applications on the Growth of Brinjal (*Solanum melongena* L.)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Treatments** | **Days to first flowering** | **Days to 50% flowering** | **Plant height (cm)** | **Stem diameter (cm)** | **No. of primary branches** | **No of leaves per plant** | **Fruit length (cm)** | **Fruit diameter (cm)** | **No of fruits per plant** | **No. of secondary branches** |
| **T1** | 51.85 | 60.95 | 64.23 | 2.01 | 5.48 | 65.27 | 14.63 | 3.06 | 26.31 | 17.43 |
| **T2** | 49.20 | 57.19 | 66.97 | 2.08 | 5.56 | 66.23 | 15.70 | 3.08 | 29.29 | 18.25 |
| **T3** | 44.92 | 53.85 | 71.88 | 2.11 | 7.12 | 69.25 | 17.00 | 3.20 | 31.87 | 18.47 |
| **T4** | 41.30 | 52.13 | 75.36 | 2.15 | 7.33 | 69.26 | 18.83 | 3.44 | 33.58 | 20.23 |
| **T5** | 40.30 | 44.23 | 75.81 | 2.22 | 7.35 | 75.18 | 21.52 | 4.25 | 38.56 | 23.35 |
| **T6** | 38.24 | 42.21 | 86.95 | 2.24 | 9.66 | 78.27 | 23.89 | 5.81 | 53.03 | 26.07 |
| **T7** | 50.10 | 59.85 | 82.17 | 2.16 | 8.27 | 68.44 | 15.73 | 3.70 | 43.24 | 20.68 |
| **T8** | 46.97 | 57.23 | 83.20 | 2.16 | 9.09 | 72.58 | 20.67 | 5.21 | 45.28 | 22.94 |
| **T9** | 40.19 | 46.23 | 86.94 | 2.27 | 9.17 | 74.94 | 23.86 | 5.81 | 49.21 | 23.69 |
| **T10** | 39.30 | 43.23 | 89.23 | 2.34 | 9.51 | 77.64 | 24.03 | 6.21 | 51.18 | 23.80 |
| **CD0.05** | 2.83 | 4.90 | 5.74 | 0.16 | 1.43 | 3.91 | 0.19 | 0.95 | 4.15 | 4.19 |

*(T1- Absolute control, T2- NPK, T3- NPK+ Basfoliar @ 5%, T4- NPK+ Basfoliar @ 10%, T5- NPK+ Basfoliar @ 15%, T6- NPK+ Basfoliar @ 20%, T7- NPK+ Biovita @ 5%, T8- NPK+ Biovita @ 10%, T9- NPK+ Biovita @ 15%, T10- NPK+ Biovita @ 20%)*

Seaweed extracts containing auxin, cytokinin and gibberellins have been shown to initiate early flower bud formation, leading to earlier and more synchronized flowering in brinjal. These extracts modify gene expression related to earlier flowering and promoting the flowering patterns. Similar findings are supported by Ruban *et. al.,* (2019), Khazaal and Rashed (2018) in brinjal, Hussain *et. al.,* (2021) in tomato, Aliko *et. al.,* (2017) in okra and watermelon and Noushad *et. al.,* (2023) in chilli. Seaweed extracts enhance stem growth and nutrient uptake, influencing stem diameter and branching in brinjal. The results agreed with Al-Bayati *et. al.,* (2020), Khazaal *et. al.,* (2018) Ramya *et. al.,* (2015), Khazaal and Rashed (2018), Saied and Aswad (2021) in eggplant and similar results were observed by Zodape *et. al.,* (2008) in okra. They also improve the photosynthetic efficiency, chlorophyll content and leaf production. Seaweed extracts support all over the plant growth and development Seaweed extracts aid in fruit elongation and increase the fruit yield in brinjal. Similar results were found by and Al-Bayati *et. al.,* (2020), Ruban *et. al.,* (2019) in brinjal, Jayasinghe *et. al.,* (2016) in chilli, Sasikala *et al.* (2016) in tomato, Abdel-Mawgoud *et. al.,* (2010) in watermelon and Noushad *et. al.,* (2023) in chilli. Overall, seaweed extracts serve as effective bio stimulants and growth promoters, enhancing various aspects of plant physiology and yield across different agricultural contexts.

**Yield Parameters**

The evaluation study for number of fruits per plant, average fruit weight, yield per plant and yield per plot recorded significant statistical differences among the treatment combinations (Table 2). Among the various treatments, plants which received RDF + Basfoliar at the concentration of 20% (T6)showed maximum number of fruits per plant (53.03), maximum average fruit weight (56.22 g), maximum yield per plant (3.26 kg) and maximum yield per plot (35.35 kg/plot). However, the minimum number of fruits per plant (26.31), minimum average fruit weight (45.79 g), minimum yield per plant (1.38 kg) and minimum yield per plot (13.71 kg/plot) was observed in Control (T1).

**Table 2 Impact of Basfoliar and Biovita Applications on the Yield and Quality of Brinjal (*Solanum melongena* L.)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Treatments** | **No. of fruits per plant** | **Average fruit weight (g)** | **Yield per plant (kg)** | **Yield per plot (kg/ plot)** | **TSS (°BRIX)** | **Ascorbic acid** **(mg/100g)** |
| **T1** | 26.31 | 45.79 | 1.38 | 13.71 | 3.12 | 7.55 |
| **T2** | 29.29 | 48.18 | 1.43 | 15.27 | 3.20 | 10.04 |
| **T3** | 31.87 | 48.24 | 1.82 | 18.99 | 3.22 | 11.24 |
| **T4** | 33.58 | 53.16 | 2.55 | 22.20 | 3.55 | 12.83 |
| **T5** | 38.56 | 56.18 | 3.00 | 27.60 | 3.57 | 13.27 |
| **T6** | 53.03 | 56.22 | 3.26 | 35.25 | 3.63 | 13.60 |
| **T7** | 43.24 | 51.15 | 2.54 | 21.90 | 3.56 | 10.58 |
| **T8** | 45.28 | 52.22 | 2.93 | 27.92 | 3.59 | 11.94 |
| **T9** | 49.21 | 54.87 | 3.15 | 32.21 | 3.61 | 14.87 |
| **T10** | 51.18 | 55.61 | 3.24 | 34.21 | 3.62 | 16.87 |
| **CD0.05** | 4.15 | 3.40 | 0.72 | 3.59 | 0.11 | 1.61 |

*(T1- Absolute control, T2- NPK, T3- NPK+ Basfoliar @ 5%, T4- NPK+ Basfoliar @ 10%, T5- NPK+ Basfoliar @ 15%, T6- NPK+ Basfoliar @ 20%, T7- NPK+ Biovita @ 5%, T8- NPK+ Biovita @ 10%, T9- NPK+ Biovita @ 15%, T10- NPK+ Biovita @ 20%)*

Seaweed extracts act as bio stimulants and growth promoters in brinjal, enhancing flower production and fruit set, thereby increasing the number of fruits per plant. The effect has been observed in studies on brinjal by Al-Bayati *et. al.,* (2020), Zodape *et. al.,* (2008), Swarnam *et. al.,* (2020), Aliko *et. al.,* (2017) in okra and watermelon and Noushad *et. al.,* (2023) in chilli. The application of seaweed extracts, such as Basfoliar contributes to larger and heavier fruits by optimizing nutrient availability and promoting vegetative growth. The findings are in line with the results of earlier researchers of Rasheed and Shareef (2019) in brinjal, Nandwani *et. al.,* (2015) in okra and Alkharpotly *et. al.,* (2024) in summer squash. Seaweed extracts enhance the yield attributes through improved assimilation of nutrients and enhanced soil fertility. The results are in close conformity with the findings of Al-Bayati *et. al.,* (2020), Ruban *et. al.,* (2019) in brinjal, Subramaniyan *et. al.,* (2023), Selvakumari *et. al.,* (2013) in tomato, Shareef *et all* (2022) in summer squash, Sahu *et. al.,* (2022) in red radish and Noushad *et. al.,* (2023) in chilli also referred that better performance of yield attribute might be due to seaweed. Overall, seaweed extracts play a crucial role in enhancing fruit yield and quality in brinjal and other crops, making them a valuable tool for growers seeking increased profitability.

**Quality parameters**

The evaluation study for total soluble solids (TSS) and ascorbic acid recorded significant statistical differences among the treatment combinations (Table 2). Among the various treatments, plants which received RDF + Basfoliar at the concentration of 20% (T6). The maximum total soluble solids (TSS) (3.61°B) and maximum ascorbic acid (16.87 mg/ 100g). However, the minimum TSS (3.12°B) and minimum ascorbic acid (7.55 mg/100g) was observed in treatment Absolute Control (T1).

Seaweed extracts enhance Total Soluble Solids (TSS) content, measured in °B, improving fruit quality attributes such as size, colour, texture and taste in brinjal. This effect is linked to the promotion of secondary metabolite synthesis responsible for flavour and nutrition as evidenced in studies on brinjal. Similar finding was observed by Vasava *et. al.,* (2023) in brinjal, Colla *et. al.,* (2017) in tomato, Shehata (2019) in chilli, Yuniati *et. al.,* (2023) in chilli and Abbas *et. al.,* (2020) in onion. Seaweed extracts contain bioactive compound like polysaccharides, amino acid and phytohormones that stimulate the production of antioxidants such as ascorbic acid. These antioxidants protect plant from oxidative stress and enhance their nutritional value. Similar outcomes were observed by Nanthakumar (2021), Kandoliya *et. al.,* (2015) in brinjal, Subramaniyan *et. al.,* (2023) in tomato, Manna *et. al.,* (2012) in chilli and Abbas *et. al.,* (2020) in onion.

**Conclusion**

The study concluded that applying the recommended dose of fertilizer combined with RDF + Basfoliar @ 20% (T6) significantly enhanced the growth, yield, and quality of brinjal. This treatment showed superior results in parameters like plant height, leaf area, fruit production, and overall fruit quality compared to other treatments. In contrast, the control treatment (T1) exhibited the poorest performance in all measured aspects. The positive effects of Basfoliar, which contains seaweed extract, were particularly notable. Seaweed extract is rich in bioactive compounds such as auxins, cytokinins, and vitamins, which stimulate plant growth, improve nutrient uptake, and enhance stress tolerance. These compounds play a crucial role in boosting plant resilience and overall productivity. Thus, combining Basfoliar @ 20% with the recommended fertilizer dose proved to be highly beneficial for maximizing growth, yield, and quality in brinjal cultivation. This highlights the potential of seaweed extract-based treatments as an effective and sustainable agricultural practice.

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