



Nutrient Content and Quality of Brinjal as Influenced by Zinc and Boron-fortified Briquettes in Lateritic Soils of Konkan

S.S. PATIL^{1*}, S.B. DODAKE¹, M.C. KASTURE¹, P.B. SANAP²,
V.G. MORE³, K.P. VAIDYA⁴ and S.S. MORE¹

¹Department of Soil Science and Agricultural Chemistry, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth,
Dapoli - 415 712, Maharashtra, India

²Vegetable Improvement Scheme, Central Experimental Station, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth,
Wakawali - 415 711, Maharashtra, India

³AICRP on Agrometeorology, Department of Agronomy, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth,
Dapoli - 415 712, Maharashtra, India

⁴Khar Land Research Station, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth,
Panvel - 410 206, Maharashtra, India

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A field experiment was conducted during the *Rabi* seasons of 2021-22 and 2022-23 to study the effect of zinc and boron-fortified briquettes on yield, nutrient content and quality of brinjal. The treatments included three levels of the recommended dose of nitrogen *viz.*, 100, 80 and 60% through Konkan Annapurna Briquettes (KAB) with and without fertilization of zinc and boron. The recommended dose of straight fertilizers with and without zinc and boron was also included in the experiment. The results revealed that the highest brinjal yield (31.43 and 31.99 t ha⁻¹) was recorded in the treatment that received the application of 100% nitrogen through KAB fortified with 2 kg boron and 3 kg zinc ha⁻¹, which was 16-18% higher yield than with the recommended dose of straight fertilizers without boron and zinc (26.61 and 27.57 t ha⁻¹). Nutrient content, *i.e.*, total N (1.26-1.59%), total P (0.31-0.33%), total Zn (75.32-74.82 mg kg⁻¹) and total B (96.66-85.57 mg kg⁻¹), as well as protein content (8.40-9.92%) in brinjal fruit were significantly affected by different fertilizers as well as briquette treatment against control during both years of experimentation. Treatment T₇ consisting of 100% nitrogen through KAB fortified with 2 kg boron and 3 kg zinc ha⁻¹ proved most effective in enhancing fruit yield, nutrient content, and quality parameters of brinjal. This treatment gave the best result by increasing the nutritional status of the plant through the beneficial effects of briquettes.

(Key words: Brinjal, Konkan Annapurna Briquettes, Nutrient content, Quality)

Brinjal is a versatile crop adapted to different agro-climatic regions and can be grown throughout the year. Several cultivars are grown in India, consumer preference being dependent upon fruit colour, size, and shape. The varieties of brinjal display a wide range of fruit shapes and colours, ranging from oval or egg-shaped to long club-shaped; and from white, yellow, green, and bicolor through degrees of purple pigmentation to almost black. (Sahu *et al.*, 2022). The area under brinjal cultivation in India is 764.55 thousand hectares with a production of 12607.36 thousand tonnes and productivity of 16.49 MT ha⁻¹ (Indiastat, 2023). In Maharashtra, the area under brinjal is 19.09 thousand hectares with 320.57 thousand tonnes of annual production and productivity of 16.79 MT ha⁻¹. Micronutrients play an important role in plants' metabolic function, and are important in crops whose quality is to be maintained (Dimkpa and Bindraban, 2016). Improvement in growth characters because of

the application of micronutrients might be due to the enhanced photosynthetic and other metabolic activity that leads to an increase in various plant metabolites responsible for cell division and elongation, as opined by Hatwar *et al.* (2003). Enhancement of photosynthesis in the presence of zinc and boron was reported by Rawat and Mathpal (1984). Briquettes are a compressed form of two or more fertilizers and contain major macronutrients. Briquettes act as slow release fertilizers and release nutrients slowly according to plant growth. Through the fortification of micronutrients into the briquettes, the yield and quality of fruits can be improved (Kasture *et al.*, 2019). Some researchers documented the utility and economic feasibility of the application of Konkan Annapurna briquettes (KAB) for increasing the yield of crops, nutrient content and quality of vegetables in lateritic soils of the Konkan region (Kokare *et al.*, 2015; Dademal, 2018). Though several investigations on brinjal

*Corresponding author: E-mail: sagarpatil4597@gmail.com

fertilization have been carried out in the Konkan region of Maharashtra, India there is limited information available regarding the use of micronutrient-fortified briquettes in brinjal. Considering the above facts, the present study was undertaken to evaluate the nutrient content and quality of brinjal on fertilization with zinc and boron fortified briquettes.

MATERIALS AND METHODS

The field experiment was carried out during the *Rabi* seasons of 2021-22 and 2022-23 at the Research Farm of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India (latitude 17°45' 57.18" N and longitude 73°10' 24.09" E). The initial soil was sandy loam in texture, moderately acidic in reaction (pH 6.74), low in salt content (0.12 dS m⁻¹), extremely rich in organic carbon (19.11 g kg⁻¹), low in available nitrogen (203.84 kg ha⁻¹) and phosphorus (12.30 kg ha⁻¹) and was moderate in available potassium (201.60 kg ha⁻¹).

The experiment was laid out in a randomized block design (RBD) with three replications with a plot size of 4.8 m × 3.6 m. The experiment comprised nine treatments, viz., T₁ - Absolute control; T₂ - Recommended dose of fertilizer (RDF; 150:50:50::N:P₂O₅:K₂O kg ha⁻¹) through straight fertilizers; T₃ - 100% N through Konkan Annapurna Briquette (KAB); T₄ - 80 % N through Konkan Annapurna Briquette (KAB); T₅ - 60 % N through Konkan Annapurna Briquette (KAB); T₆ - RDF + 2 kg boron + 3 kg zinc ha⁻¹; T₇ - 100% N through KAB fortified with 2 kg boron + 3 kg zinc ha⁻¹; T₈ - 80% N through KAB fortified with 2 kg boron + 3 kg zinc ha⁻¹ and T₉ - 60% N through KAB fortified with 2 kg boron + 3 kg zinc ha⁻¹. FYM @20 t ha⁻¹ was given to all the treatments except T₁ (Absolute control) by spot application method. Briquettes were applied by deep placement at transplanting, 30 days after transplanting (DAT) and 60 DAT, whereas, in the case of straight fertilizers, full doses of P and K, and three split doses of nitrogen were applied by ring placement method at transplanting, 30 DAT and 60 DAT. Crop growth and yield measurements were taken from each treatment. The region's suggested package of practices was followed. One-month-old healthy and uniform size seedlings of brinjal variety 'Konkan Prabha' were transplanted in each plot at the recommended spacing of 60 cm × 60 cm, accommodating 48 plants plot⁻¹. During both years

of research, seedlings were planted in the first fortnight of November. The procedures as outlined in Dademal (2018) were used to determine the leaf nutrient content and quality parameter status. The data from the two years were statistically analyzed to correlate the findings. The analysis of variance (ANOVA) of different variables of different treatments was statistically calculated at the 5% level of significance (Panse and Sukhatme, 1985).

RESULTS AND DISCUSSION

Effect on yield

Different fertiliser and briquette treatments significantly influenced the yield attributes of brinjal (Table 1). The maximum values of fruit yield (31.43 and 31.99 t ha⁻¹) were observed during the years 2021-22 and 2022-23, respectively. Application of 100% nitrogen through KAB fortified with 2 kg boron and 3 kg zinc ha⁻¹ (T₇) registered the highest fruit yield of brinjal during both years of investigation. The minimum values of fruit yield of 11.08 and 11.14 t ha⁻¹ were observed in absolute control (T₁) treatment, respectively, for both years. In the first year, T₇ treatment showed at par results with T₃, T₆ and T₈ treatments, while in the second year, T₇ treatment showed at par results with T₂, T₃, T₆ and T₈ treatments with respect to fruit yield. The increase in the fruit yield of brinjal might be due to the slow release of nutrients through micronutrient fortified KAB for the entire growth period of brinjal crop and this was reflected in terms of higher yield. Dademal (2018), found similar results with the application of KAB fortified briquettes with zinc and boron that resulted in increased green pod yield in chilli. Higher yields of arecanut and cashew crops were also obtained with the application of micronutrient-fortified KAB over the conventional method of application of RDF through straight fertilizers (Gajbhiye *et al.*, 2017; Kasture *et al.*, 2019).

Effect on nutrient content

Nitrogen content

Total nitrogen content in the brinjal plant varied across different treatments. A slight but definite increase in the average value of total nitrogen was observed at 60 DAT compared to 30 DAT during both years of investigation. Thereafter total nitrogen content was found to be drastically reduced at 90 DAT and at the harvest. However, it was slightly higher at 90 DAT than at

Table 1. Influence of zinc and boron fortified briquettes on fruit yield of brinjal (t ha⁻¹)

Treatment No.	Treatment Details	Rabi 2021-22	Rabi 2022-23
		Fruit yield (t ha ⁻¹)	Fruit yield (t ha ⁻¹)
T ₁	Absolute control	11.08	11.14
T ₂	RDF (150:50:50::N:P ₂ O ₅ :K ₂ O kg ha ⁻¹) through straight fertilizers	26.61	27.57
T ₃	100% N through Konkan Annapurna Briquettes (KAB)	27.41	28.40
T ₄	80% N through Konkan Annapurna Briquettes (KAB)	21.93	22.56
T ₅	60% N through Konkan Annapurna Briquettes (KAB)	20.30	20.49
T ₆	RDF + 2 kg boron + 3 kg zinc ha ⁻¹	27.44	28.85
T ₇	100% N through KAB fortified with 2 kg boron + 3 kg zinc ha ⁻¹	31.43	31.99
T ₈	80% N through KAB fortified with 2 kg boron + 3 kg zinc ha ⁻¹	27.67	27.94
T ₉	60% N through KAB fortified with 2 kg boron + 3 kg zinc ha ⁻¹	22.30	22.64
SE(m) ±		1.37	1.67
C.D. @ 5%		4.12	5.01

Table 2. Effect of zinc and boron fortified briquettes on total nitrogen content (%) in brinjal plant at different stages and in fruit at harvest

Treatments	Total nitrogen content (%)									
	Rabi 2021-22					Rabi 2022-23				
	30 DAT	60 DAT	90 DAT	120 DAT	Fruit	30 DAT	60 DAT	90 DAT	120 DAT	Fruit
T ₁	0.96	1.10	1.16	0.63	0.98	0.90	1.15	1.17	1.33	0.94
T ₂	1.46	1.75	1.52	1.06	1.30	1.63	1.71	1.63	1.42	1.42
T ₃	1.52	1.76	1.61	1.21	1.33	1.84	1.90	1.77	1.63	1.56
T ₄	1.43	1.61	1.24	1.02	1.13	1.66	1.79	1.60	1.38	1.34
T ₅	1.32	1.40	0.95	0.90	0.99	1.42	1.59	1.31	1.31	1.22
T ₆	1.49	1.75	1.43	1.11	1.27	1.65	1.71	1.66	1.50	1.45
T ₇	1.56	1.79	1.64	1.26	1.34	1.85	1.91	1.87	1.83	1.59
T ₈	1.49	1.69	1.44	1.03	1.20	1.63	1.72	1.59	1.61	1.48
T ₉	1.30	1.55	1.24	0.91	1.00	1.36	1.42	1.47	1.45	1.30
SE(m) ±	0.04	0.05	0.09	0.10	0.06	0.09	0.07	0.09	0.08	0.06
C. D. @ 5%	0.12	0.14	0.26	0.29	0.18	0.26	0.21	0.28	0.23	0.19

120 DAT (Table 2). The application of nutrients through briquettes in split doses might have supplemented a sufficient quantity of nitrogen fulfilling the crop's requirement and contributing to a higher brinjal yield. The nitrogen requirement of the brinjal crop is higher during the flowering stage, which begins after 45 DAT, as reflected in the total nitrogen content during both years. These results conform with the reports of Haque (2007), Kokare *et al.* (2015) and Dademal (2018).

Phosphorous content

The increased phosphorus (P) content observed in briquette treatments resulted from the significant quantity of phosphorous supplied through briquettes compared to straight fertilizers. Additionally, no phosphorous was added to the soil from 60 DAT until the harvesting stage, during which the plants utilized the available phosphorus for its use in reproductive growth. This caused the P content to decline between 60 DAT and 120 DAT (Table 3). The application of different fertilizer briquettes and organic manures significantly increased the phosphorus content, compared to the absolute control (Kokare *et al.*, 2015).

Potassium content

In general, the total potassium content in the brinjal plant showed variation due to the effect of various treatments. A slight but consistent increase in the average total potassium content in brinjal plants was observed at 60 DAT as compared to 30 DAT during both the years of investigation. Thereafter, the total potassium content was drastically reduced at 90 DAT and 120 DAT of brinjal crop (Table 4). However, it was slightly higher at 90 DAT than its content at 120 DAT. The application of N and K in combination with drip irrigation increased the yield by maximizing the mobility of nutrients around the root zone (Ciba and Syamala, 2017).

Zinc content

The treatment (T₇) receiving 100% N through KAB fortified with 2 kg boron and 3 kg zinc ha⁻¹ recorded higher zinc content in brinjal plant as well as in fruit. The increase in zinc concentration might be due to the influence of Zn in enhancing metabolism, promoting auxin biosynthesis and improving nutrient uptake

(Cakmak *et al.*, 1999). Jeetarwal *et al.* (2015) concluded that the application of zinc increases the nutrient concentration in plants, likely due to an increased supply of zinc, which stimulates shoot and root growth, thereby enhancing nutrient absorption from soil. Similarly, Sharma *et al.* (2014) noted that the application of zinc increased the zinc availability in the rhizosphere. The beneficial effect of zinc on nutrient content may be due to the increase in the cation exchange capacity of the roots which would enable the plant to extract more nutrients from the soil (Table 5). Dademal (2018) reported that the highest total zinc content in the chilli plants was recorded when 100% RDF was applied through Konkan Annapurna Briquettes fortified with 2 kg boron and 3 kg zinc, with zinc content ranging from 48.57 to 46.62 mg kg⁻¹ during both the years of investigation.

Boron content

The treatment (T₇) receiving 100% N through KAB fortified with 2 kg boron and 3 kg zinc ha⁻¹ recorded the highest boron content in both the brinjal plant and its fruit (Table 6). There was a slight but definite increase in the average value of total boron content in the brinjal plant at 90 DAT as compared to its content at 30 and 60 DAT in both the years of study. Thereafter the total boron content was found to be reduced after crop harvest though it remained slightly higher at 90 DAT than at harvest. It might have resulted due to greater extraction of the nutrients from the soil and improved translocation of absorbed nutrients to different growing parts of the plant. The accumulation of boron in the leaves of the plant depends solely on the boron levels in the root zone. The boron concentration in the shoot linearly increased with increasing levels of boron application (Samet *et al.*, 2015). The boron requirement is significantly higher during reproductive growth than the vegetative growth stage and it plays a crucial role in increasing flower production and retention, pollen tube elongation, germination, and fruit development (Manas *et al.*, 2014). Dademal (2018) reported the application of 100% RDF through Konkan Annapurna Briquettes fortified with 2 kg boron and 3 kg zinc resulted in the highest total boron content in the chilli plants and it ranged from 76.08 to 74.79 mg kg⁻¹ during both years of investigation.

Table 3. Effect of zinc and boron fortified briquettes on total phosphorous content (%) in brinjal plant at different stages and fruit

Treatments	Total phosphorous content (%)									
	Rabi 2021-22					Rabi 2022-23				
	30 DAT	60 DAT	90 DAT	120 DAT	Fruit	30 DAT	60 DAT	90 DAT	120 DAT	Fruit
T ₁	0.20	0.23	0.20	0.18	0.21	0.16	0.21	0.13	0.14	0.23
T ₂	0.27	0.40	0.32	0.28	0.29	0.25	0.35	0.23	0.19	0.28
T ₃	0.29	0.42	0.35	0.29	0.30	0.26	0.38	0.25	0.20	0.32
T ₄	0.27	0.38	0.32	0.28	0.29	0.21	0.36	0.22	0.19	0.30
T ₅	0.23	0.36	0.27	0.25	0.25	0.17	0.30	0.18	0.15	0.29
T ₆	0.28	0.43	0.32	0.27	0.29	0.21	0.35	0.22	0.17	0.28
T ₇	0.30	0.47	0.36	0.31	0.31	0.27	0.40	0.27	0.21	0.33
T ₈	0.27	0.44	0.32	0.27	0.30	0.22	0.36	0.22	0.18	0.28
T ₉	0.24	0.37	0.26	0.24	0.21	0.15	0.26	0.19	0.16	0.26
SE(m) ±	0.01	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02
C. D. @ 5%	0.04	0.09	0.07	0.04	0.04	0.06	0.05	0.07	0.05	0.05

Table 4. Effect of zinc and boron fortified briquettes on total potassium content (%) in brinjal plant at different stages and fruit

Treatments	Total potassium content (%)									
	Rabi, 2021-22					Rabi, 2022-23				
	30 DAT	60 DAT	90 DAT	120 DAT	Fruit	30 DAT	60 DAT	90 DAT	120 DAT	Fruit
T ₁	1.80	1.79	1.67	0.69	2.08	1.49	1.35	1.20	0.46	1.77
T ₂	2.54	2.40	2.37	1.00	2.81	2.35	2.54	2.35	0.66	3.08
T ₃	2.07	2.10	1.90	0.64	2.63	1.88	1.99	1.74	0.60	2.68
T ₄	1.90	2.07	1.82	0.57	2.47	1.81	1.89	1.59	0.53	2.45
T ₅	1.79	1.85	1.79	0.53	2.27	1.71	1.62	1.02	0.48	2.22
T ₆	2.44	2.51	2.23	0.97	2.77	2.31	2.64	2.47	0.63	3.16
T ₇	2.07	2.09	2.06	0.57	2.53	1.91	2.12	1.99	0.55	2.78
T ₈	2.03	1.98	1.96	0.55	2.39	1.83	2.10	1.11	0.51	2.57
T ₉	1.87	1.88	1.76	0.47	2.25	1.72	1.98	1.01	0.50	2.27
SE(m) ±	0.07	0.13	0.09	0.06	0.15	0.16	0.05	0.04	0.01	0.07
C. D. @ 5%	0.20	0.40	0.26	0.19	0.44	0.48	0.15	0.13	0.04	0.20

Table 5. Effect of zinc and boron fortified briquettes on total zinc content (mg kg⁻¹) in brinjal plant at different stages and fruit

Treatments	Total zinc content (mg kg ⁻¹)									
	Rabi 2021-22					Rabi 2022-23				
	30 DAT	60 DAT	90 DAT	120 DAT	Fruit	30 DAT	60 DAT	90 DAT	120 DAT	Fruit
T ₁	41.29	51.28	71.24	75.22	58.93	39.03	50.48	70.95	72.48	58.27
T ₂	45.76	56.32	76.22	78.33	65.38	44.99	58.71	72.97	77.89	63.91
T ₃	44.23	55.87	75.22	77.30	68.29	46.03	57.35	74.81	77.15	67.94
T ₄	46.72	56.29	76.81	78.23	65.75	49.85	59.71	79.85	76.40	63.76
T ₅	43.15	53.81	73.22	75.83	64.28	45.31	53.48	78.12	70.41	63.38
T ₆	53.00	65.46	88.63	79.75	72.12	57.66	64.26	91.49	83.59	73.15
T ₇	54.65	69.28	93.22	86.93	75.32	58.67	71.34	95.46	93.38	74.82
T ₈	52.98	64.89	86.95	81.20	71.30	53.09	62.89	86.02	84.33	72.43
T ₉	49.92	60.22	83.03	78.64	68.32	50.55	58.66	82.06	74.70	65.94
SE(m) ±	1.28	1.59	2.13	2.02	1.82	3.91	3.48	3.63	3.04	2.68
C. D. @ 5%	3.84	4.77	6.40	6.05	5.46	11.72	10.43	10.90	9.13	8.04

Effect on fruit quality of brinjal

Anthocyanin content

The maximum content of anthocyanin (17.49 and 17.64 mg 100 g⁻¹) was recorded in the treatment receiving RDF + 2 kg boron + 3 kg zinc ha⁻¹ (T₆), while the lowest values of anthocyanin (12.77 and 12.89 mg 100 g⁻¹) were observed in the treatment absolute control (T₁) with an average value of 14.95 and 15.22 mg 100 g⁻¹ during the years 2021-22 and 2022-23, respectively (Table 7). A critical analysis of the anthocyanin content data further revealed that the application RDF + 2 kg boron and 3 kg zinc ha⁻¹ (T₆) had a synergistic effect on the enhancing anthocyanin content in brinjal fruits over almost all other treatments, except for (T₂) during both the years. Only half the quantity of potassium was given through briquettes than that of the recommended potassium dose which is 50 kg ha⁻¹. Potash plays an important role in the activation of several enzymes which promote anthocyanin pigmentation. Higher potassium fertilization has been reported to enhance the contents of phenolic compounds (Oliveira *et al.*, 2019). As demonstrated by Utasee *et al.* (2022), zinc application, particularly when combined with nitrogen, influences anthocyanin content in purple rice by affecting various plant physiological processes. The lower anthocyanin content in the briquette treatments may be due to the lower amount of potassium supplied in these treatments. The briquettes were prepared on 100, 80 and 60% on nitrogen content basis and through this briquettes, less amount of potassium, along with zinc and boron, were supplemented to the crop, which may be the possible reason for lower anthocyanin content observed in the T₆ treatment. Similar findings regarding the influence of these nutrients on anthocyanin content have been reported in chilli by Dhopavkar *et al.* (2019) and in brinjal by Mufti *et al.* (2021).

Tannin content

A critical examination of the data revealed that different treatments exhibited significant statistical variation in the tannin content of brinjal fruit. It was further noticed that treatment absolute control (T₁) recorded significantly the highest tannin content of 149.67 and 147.00 mg 100 g⁻¹ in 2021-22 and 2022-23, respectively than all other treatments. During 2021-22, the lowest tannin content was recorded in treatment T₂

[RDF (150:50:50::N:P₂O₅:K₂O kg ha⁻¹) through straight fertilizers] *i.e.*, 118.33 mg 100 g⁻¹ while in 2022-23 the lowest tannin content was found in treatment T₃ and T₇ *i.e.*, 118.67 and 118.67 mg 100 g⁻¹, respectively (Table 7). As inorganic nitrogen fertilization increased, the tannin content of fruits decreased, indicating an antagonistic relationship between tannin and nitrogen. Valdiviezo *et al.* (2009) reported similar findings in *Acaciella angustissima* (Mill.) Britton and Rose, where phenolic and tannin concentrations increased as nutrient availability decreased.

Protein content

The maximum protein content in brinjal fruits (8.40% and 9.92 %) was recorded in the treatment receiving application of 100% N through KAB fortified with 2 kg boron + 3 kg zinc ha⁻¹ (T₇). While, the lowest protein content (6.13% and 5.89 %) was observed in the absolute control (T₁) treatment with an average value of 7.32 % and 8.54% during the years 2021 - 22 and 2022-23, respectively (Table 7). Protein content was found to improve as nitrogen level increased. Zinc plays an important role in protein metabolism and the structural integrity of ribosomes, which is essential for protein synthesis. Boron also influences nitrogen metabolism and transportation of sugar, which provides energy required for protein synthesis (Tuiwong *et al.*, 2024). This increase in protein content might be attributed to boron, an essential component of various enzymes involved in protein synthesis in fruits (Kumar *et al.*, 2009). Similar results were reported by Palia *et al.* (2020) and Mufti *et al.* (2021) in brinjal.

Correlation between quality parameters and nutrient content

A significant positive correlation between nitrogen and protein content in brinjal fruit and a partial positive correlation between phosphorous and potassium content with protein content further highlights the beneficial effect of NPK nutrient application in enhancing brinjal fruit quality. Anthocyanin content in brinjal fruit was linearly related to potassium content in fruit with a coefficient of determination (R²) of 0.916. In the same way, a significantly negative correlation was found between N content with tannin content in brinjal with R² of - 0.957. This indicates that an increase in nitrogen content drastically reduced tannin content in brinjal fruit, which was favourable for

Table 6. Effect of zinc and boron fortified briquettes on total boron (mg kg⁻¹) in brinjal plant at different stages and fruit

Treatments	Total boron content (mg kg ⁻¹)									
	Rabi, 2021-22					Rabi, 2022-23				
	30 DAT	60 DAT	90 DAT	120 DAT	Fruit	30 DAT	60 DAT	90 DAT	120 DAT	Fruit
T ₁	46.28	66.84	34.96	31.88	47.30	45.04	44.04	47.04	45.89	44.04
T ₂	54.50	62.73	48.27	45.25	63.76	50.54	53.54	49.54	48.45	49.04
T ₃	75.07	82.51	51.42	42.16	65.81	50.04	56.55	47.54	45.48	46.54
T ₄	54.50	66.84	47.30	44.22	57.59	45.04	41.03	55.05	48.77	42.04
T ₅	53.47	59.64	52.45	31.88	45.25	41.53	39.53	42.54	41.92	46.04
T ₆	96.66	100.11	89.47	70.96	84.32	75.56	73.06	69.06	66.95	77.56
T ₇	101.81	105.14	99.75	83.30	96.66	83.57	83.07	80.07	72.01	85.57
T ₈	87.41	94.61	83.25	64.79	76.18	68.56	67.56	62.05	65.25	74.56
T ₉	78.15	83.38	65.59	49.36	58.62	53.04	48.54	47.04	49.95	56.55
SE(m) ±	5.39	5.83	6.40	7.37	7.41	5.72	5.51	7.29	2.53	5.03
C. D. @ 5%	16.15	17.47	19.19	22.10	22.22	17.16	16.52	21.84	7.60	15.09

Table 7. Effect of zinc and boron fortified briquettes on brinjal fruit quality

Treatments	Rabi 2021-22			Rabi 2022-23		
	Anthocyanin (mg 100 g ⁻¹)	Tannin (mg 100 g ⁻¹)	Protein (%)	Anthocyanin (mg 100 g ⁻¹)	Tannin (mg 100 g ⁻¹)	Protein (%)
T ₁	12.77	149.67	6.13	12.89	147.00	5.89
T ₂	17.29	118.33	8.11	17.51	119.00	8.87
T ₃	14.35	119.00	8.34	14.69	118.67	9.74
T ₄	14.16	125.67	7.06	14.43	126.67	8.40
T ₅	13.82	135.33	6.18	14.21	134.67	7.64
T ₆	17.49	120.33	7.93	17.64	119.67	9.04
T ₇	15.05	119.67	8.40	15.55	118.67	9.92
T ₈	14.84	127.67	7.53	15.27	126.33	9.28
T ₉	14.76	134.33	6.24	14.79	135.33	8.11
SE (m) ±	0.34	2.26	0.38	0.41	2.19	0.39
C. D. @ 5%	1.03	6.77	1.14	1.22	6.56	1.17

Table 8. Relationship between anthocyanin, tannin and protein with fruit N, P, K, Zn and B content

	Anthocyanin	Tannin	Protein
N content	0.626	-0.957*	1.000*
P content	0.428	-0.891*	0.896*
K content	0.916*	-0.933*	0.843*
B content	0.540	-0.578	0.698
Zn content	0.532	-0.708	0.805

*Significant at 5%

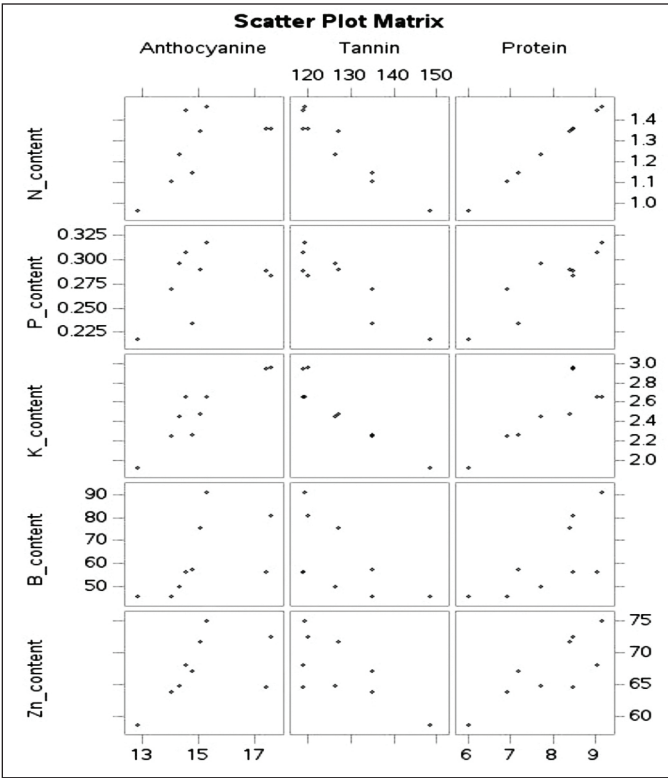


Fig. 1. Relationship between anthocyanin, tannin and protein with fruit N, P, K, Zn and B content

edibility purposes (Table 8 and Fig. 1). A partial negative correlation was also observed between phosphorous and potassium content and tannin content in brinjal fruits. Similar findings were reported by Dhopavkar *et al.* 2019 and Valdiviezo *et al.* (2009).

CONCLUSION

The findings of the present investigation demonstrate that optimizing nutrient management can significantly enhance both the yield and quality of brinjal in the Konkan region of Maharashtra. Among the different nutrient management strategies evaluated, the application of 100% N through Konkan Annapurna Briquettes (KAB) fortified with 2 kg boron and 3 kg zinc ha⁻¹ resulted in the highest fruit yield and nutrient content as well as better fruit quality of brinjal. The second-best treatment was the application of 80% N through KAB, fortified with 2 kg boron and 3 kg zinc ha⁻¹, which also exhibited considerable improvements in yield and fruit quality over the control and other treatments.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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