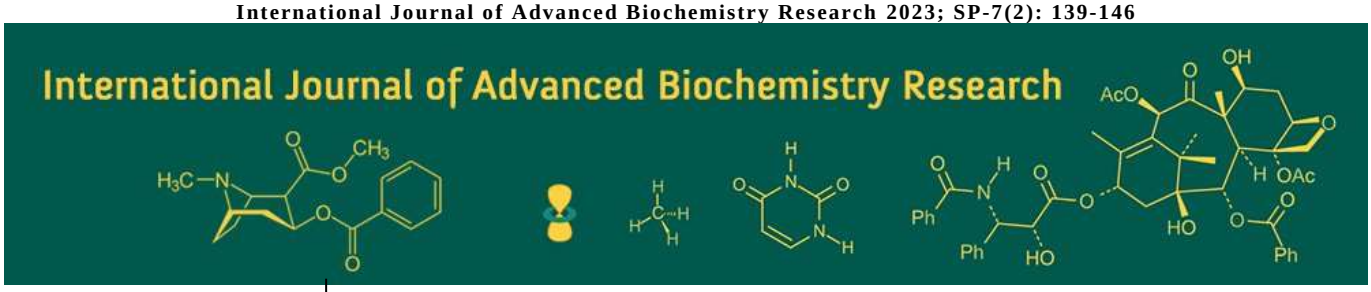

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Study the response of bio-stimulants and micronutrient for growth, yield and quality attributes in chilli (*Capsicum frutescens* l.) var. Pusa Jwala

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Abstract
Capsicum frutescens L. belongs to the Solanaceae family, which is also known as the nightshade family. It originated in Mexico and was naturalized by ancient peoples in various regions of Southern, Central, and Northern America more than five times. In recent years, climate change has had an impact on farming, establishing previously unrecognized limitations and goals. Bio stimulants are ecologically friendly compounds that help plants. Plant bio stimulants, also known as agricultural bio stimulants, are a diverse group of substances that can be applied to the environment of a plant to promote plant growth, nutrition, and abiotic and biotic stress tolerance. The experiment was carried out in a Randomized Block - Design with three replications throughout the Rabi season of 2022-2023 to evaluate the performance of three bio stimulants (Neem, Moringa, and Hibiscus) with Boron from T_0 to T_7. The tests found that the number of primary branches per plant ranged from 2.60 to 4.35, with T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+ Boric acid 0.50%) achieving the highest result of 4.35. Based on data that showed the plant's height ranged from 55.24 to 58.29 cm, we discovered that T_7 performed the best of all treatments, measuring 58.29 cm. T_7 was shown to be the most successful treatment overall, with a fruit per plant range of 8.25 to 10.40. According to data ranging from 0.264 to 0.496 gm, T_7 produced the most fruit per plant, with an average weight of 0.496 gm.

Keywords: Moringa extract, neem extract, boric acid, bio-stimulants, chilli and Growth

Introduction
In Indian agriculture, vegetables are crucial in addressing the issue of malnutrition in the people. Growing vegetables increases the possibility of employment in rural areas, enhancing national security. India accounts for around 12% of worldwide production of vegetables and is the world's second-biggest vegetable grower after China (Nayak *et al.*, 2016) [16].
Capsicum frutescens L. is a member of the Solanaceae family, often known as the nightshade family. It originated in Mexico and was naturalized more than five times by ancient peoples in diverse regions of Southern, Central, and Northern America (Kraft *et al.*, 2013) [24]. The term "annuum" is derived from the Latin term for "annual." Even though it is not an annual, the chilli plant is particularly cold sensitive. In the absence of winter frost, it can survive all four seasons and grow into a large perennial herb. The heat and pungency of chilli are induced by a variety of biochemical and antioxidant compounds found in it. The most noticeable of these chemicals is capsaicin, which varies in quantity depending on the species. Small and marginal farmers in Asia, Africa, and South America use it to cultivate commercial spice and vegetable crops. *C. annuum* is the most widely cultivated Capsicum species, with fruits that are both pungent (chilli syn. hot pepper) and non-pungent (sweet pepper syn. capsicum, bell pepper).
Climate change has had an impact on farming in recent years, establishing hitherto unnoticed boundaries and goals. Farmers' actions are influenced by environmental concerns and product quality in a variety of ways, depending on the specific vulnerability of the environment in which the crops are farmed (Giardini L, 2004) [8]. Bio stimulants are classified as environmentally benign substances that benefit plants. Plant bio stimulants, also known as agricultural bio stimulants, are a varied set of compounds that can be administered to a plant's environment to improve plant growth, nutrition, and abiotic and biotic stress tolerance.

Despite the fact that the majority of plant bio stimulants are applied to the rhizosphere to encourage nutrient uptake, many of them have detrimental impacts on the environment, including water scarcity, soil salinization, and exposure to temperatures that aren't ideal for growth (Schiavon *et al.*, 2008) [22]. According to recent studies, active compounds found in bio stimulants can boost the activity and transcription of the enzymes involved in N absorption and the Krebs cycle, hence enhancing nitrogen assimilation (Ertani *et al.*, 2009) [6].

Material and methods

"Response of bio stimulants and micronutrient for growth, yield and quality attributes in chilli (*Capsicum frutescens* L.)" was carried out during Rabi season 2022, at the Main Experiment Station CRC Farm II, Department of Vegetable Science, and ITM University Gwalior (M.P.).

Location of Experimental site

The CRC-II is located at latitude of 26º14' N and longitude of 79^{0}14' E with an elevation of 206 m above the mean sea level. The field at CRC-II, School of Agriculture, ITM University, and Gwalior having homogenous fertility and uniform textural make up was selected for the field experimentation (Fig-2).

Soil characteristics

The experimental field's soil type was sandy loam, and it had good drainage. Before layout and mechanical analysis, a composite soil sample from 15 to 30 cm deep was taken to assess the soil's fertility level and other physicochemical characteristics.

Climate and weather conditions

Gwalior experiences hot, humid summers from late March to early July, a mild, dry winter from early November to late February, and hot, humid summers from late June to early October. Gwalior's dry area experiences a humid subtropical climate. 48 °C was the highest recorded temperature, and -1 °C was the lowest. Summertime begins in late March. The monsoon season begins in late June, when temperatures end after reaching their peak in May and June with daily averages of 33 to 35 °C. In general, Gwalior gets 900 mm of rain annually. Late June through early October are the monsoon months. The wettest month is August, with 310 mm of rain. Beginning in late October, Gwalior's winter is often quite mild, with daily average temperatures in the 14–16 °C range and usually dry and sunny circumstances. The coldest month is January, with 0 °C or below average low temperatures.

Experimental design

The experiment was conducted in Randomized Block - Design with three replications during *Rabi* season in 2022-2023 to assess the performance of 3 Bio stimulants (Neem, Moringa Hibiscus) with Boron. The Transplant were planted on 08-12-2022. Each entry was transplanted in the plot size of and 3m x 2.5m in Randomized Block Design in tree replication with spacing of 60 X 50 cm. All the recommended agronomic package of practices and plant protection measures were followed to raise a good crop. Treatment details were are: T_1 = Neem Leaves Extract (0.25%) +Boric acid (0.50%); T_2 = Neem Leaves Extract (0.50%) +Boric acid (0.50%); T_3 =Moringa Leaves Extract (0.25%) + Boric acid (0.50%); T_4= Moringa Leaves Extract (0.50%) +Boric acid (0.50%); T_5= Hibiscus Leaves Extract (0.25%) +Boric acid (0.50%); T_6= Hibiscus Leaves Extract (0.50%) +Boric acid (0.50%); T_7= Neem+ Moringa+ Hibiscus Leaves Extract (0.25%+0.25%+0.25%) +Boric acid (0.50%) (Fig-2).

Result and Discussion

Vegetative parameters

We noted that T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25% +Boric acid 0.50%) found best among all the treatments with 58.29 cm based on data that demonstrated the height of the plant was 55.24 to 58.29 cm. We found that T_3 (Moringa leaves extract 0.25% + 0.50% Boric acid) and T_6 (Hibiscus leaves extract 0.50% + 0.50% Boric acid) have the pertinent data, which comprise 56.09 and 57.68 cm, respectively. The highest plant height was recorded in T_8, which could be attributed to the quick availability of nutrients, particularly nitrogen, the primary nutrient of protein for protoplasm production, which leads to cell division and cell expansion. Chakravarthy *et al*., (2023) [4] discovered similar results, indicating that the interaction impact of bio stimulants might be related to plant development (Table-1). T_0, the period of time during which we do not use any bio stimulants and lasts for 55.24 cm, is also discernible. The trail showed that leaves had a length that varied from 44.81 to 50.27 mm. With a total score of 50.27mm, T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25% +Boric acid 0.50%) was the most effective treatment. The samples T_6 (Moringa Leaves Extract 0.25% + Boric acid 0.50%) and T_8 (Hibiscus Leaves Extract 0.25% + Boric acid 0.50%) contained relevant data that contained 47.19 and 46.58 mm, respectively. Additionally, we found T_0, which comes in last with 44.81mm and in which no bio stimulants are used. The range of primary branches per plant was discovered to be 2.60 to 4.35 in the trial, with T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+Boric acid 0.50%) finding the best among all treatments with 4.35. We discovered that T_4 (Moringa Leaves Extract 0.50%+Boric acid 0.50%) and T_1 (Neem Leaves Extract 0.25% +Boric acid 0.50%) have relevant data of 3.10 and 3.26 days, respectively. Weerasingha and Harris (2022) [25] exposed similar results with the vegetative parameters of Chilli, as due to physiological crop growth interactions.

In the present study the vegetative parameters *viz.*, plant height (cm), leaf length (mm) and number of primary branches per plant were significantly affected by various bio- stimulants and micronutrient doses and their combinations. The maximum plant height (58.29 cm), leaf length (50.27 mm) and number of primary branches per plant (4.35) were observed in the treatment T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+ 0.25%+0.25%+ Boric acid 0.50%). This study confirmation with Norhidayah *et al*. (2021) [26] he used four concentrations of neem extract (0, 25, 50, and 75%) and a commercial chemical pesticide to study the impact of neem extracts on pre-harvest parameters on chilli plants. All of the chilli pre-harvest performance was shown to be extremely significant in the findings, with a concentration of 25% neem extract used to reduce pest severity and increase pre-harvest parameter performance. The chemical insecticide created the most stiffness, whereas the 25% neem extract had the best effects when applied to the leaf area. This might be due to the presence of cytokinin in MLE which is helpful in

increasing amount of pods/plant. These findings are supported by Ogbuehi and Agbim's (2018) [17] research, which showed that the treatment of 10% MLE increased the quantity of soybean pods. These findings concur with those of Mandal (2004) [15], who found that MLE improved the characteristics of wheat's plant growth. He said that the growth characteristics, such as the number of branches per plant, grew in arithmetical order with increasing MLE concentration. These findings concur with those made by Basavarajeswari *et al.* (2008) [2], Halder *et al.* (2007) [9] in the study of ginger, and Haleema *et al.* (2018) [10] in the study of tomato. It was also observed that foliar application of Boron at the rate of 75 ppm increased plant height in pepper Shnain *et al.* 2014 [23]. The vegetative growth of eggplant responds positively to foliar application of boric acid. Boron is essential for plant health because it aids in the formation and strengthening of cell walls. Broadley and colleagues (2012) [3].

Flowering attributes

Based on data that revealed the range of first flowering was 39.33 to 47.66 days, we discovered that T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+Boric acid 0.50%) was best among all treatments with 39.33 days. T_3 and T_6 have pertinent data containing 43.00 and 44.33 days, respectively. According to data showing a range of 55.00 to 63.66 days for 50% flowering, we saw that T_7 performed the best among all treatments with 55.00 days. We discovered that T_3 and T_6 (Hibiscus Leaves Extract 0.50% + Boric acid 0.50%) contain pertinent information and have respective durations of 60.66 and 59.66 days. According to the research, the first fruit setting ranged from 68.00 to 86.33. T_7 was shown to be the most effective treatment with 68.00 days. The experimental results of the study demonstrated that the first fruit setting ranged from 71.00 to 89.33. According to observations, T_7 has the best results of any treatment with 71.00 days. We discovered that T_3 & T_6 have pertinent data that includes 83.00 and 78.00 days, respectively. Saraswathi *et al.*, (2003) [27] observed an increase in fruit length due to an increase in leaf production, ultimately in photosynthesis, higher amounts of carbohydrates production, and translocation from source (leaves) to sink (reproductive parts) (Table-2).

Yield Attributes

According to the research trail, T_7 was shown to be the most effective treatment overall, with a fruit per plant range of 8.25 to 10.40. Additionally, we discovered that the relevant data for T_1 (Neem leaves extract 0.25% +Boric acid 0.50%) and T_5 (Hibiscus leaves extract 0.25% +Boric acid 0.50%) contain 9.15 and 9.23 days, respectively. According to the study's experimental findings, fruit lengths ranged from 5.42 to 7.37 cm. Observations show that T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25% +Boric acid 0.50%) produces the best outcomes overall with 7.37cm. As we've seen, the relevant values for T_3 (Neem Leaves Extract 0.50% + Boric acid 0.50%) and T_5 (Hibiscus Leaves Extract 0.50% + Boric acid 0.50%) are 6.255 and 6.385cm, respectively. We observed that, of all treatments, T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+Boric acid 0.50%) produced the most fruit per plant, averaging 0.496gm in weight, according to data that ranged from 0.264 to 0.496gm. T_3 and T_5 were found to contain 0.318 gm and 0.325 gm of significant data, respectively. T_0 comes in last with 0.264gm and we don't use any bio stimulants in this experiment (Table-3). Graphical representation had been analgised for the yield parameter in respect of av. Fruit Wight (gm) (fig-1).

In the present flowering, yield and yield attributing traits *viz*., days to first flowering, days to 50% flowering, days to first fruit setting, number of fruits per plant, days to first fruit harvest, average fruit weight (gm), fruit length (cm), fruit diameter (mm), total fruit yield per plant (kg) and fruit yield per plot (kg/plot) of chilli were significantly influenced by the foliar application of different bio-stimulants and micronutrient doses and their combinations. The minimum days to first flowering (39.33), days to 50% flowering (55.00), days to first fruit setting (68.00) and days to first fruit harvest (71.00) were observed in the treatment T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25% + 0.25% +0.25% +Boric acid 0.50%). However, the maximum number of fruits per plant (10.40), average fruit weight (4.75 gm), fruit length (8.51 cm), fruit diameter (8.90 mm), total fruit yield per plant (0.49 kg) and fruit yield per plot (7.94 kg/plot) were recorded from the treatment T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+Boric acid 0.50%). The first flowering of the chili plant may be accelerated by high doses of moringa leaf extract, resulting in the early flowering in chili plant Islam (2021) [12]. It could be because of the high concentration (up to 100%) of Moringa oleifera extracts used. The degree of the observed rise may be primarily determined by the concentrations used, and increases in concentration result in a simultaneous increase up to the limit in the above growth parameters. Some tree extracts and agricultural residues have been shown to influence crop growth and yield in vegetable crops by Ahmed *et al.* (2002) [5] and Faroo *et al.* (2008) [14]. M. oleifera leaf extracts have been shown to accelerate early plant growth, strengthen plants, expand leaf area duration, increase the number of roots, produce more and larger fruits, and enhance yield by 20 to 35%. Fuglie, 2002 [29]. Foliar applications of moringa leaf extract can be used effectively to improve fruit set, yield and fruit-weight of okra Reddy (1992) [19]. Moringa, Neem and Garlic leaf extract was sprayed on to leaves of tomato, melon and maize, sorghum, coffee, tea, onions, bell pepper, soya beans, chili and was shown to increase yields of these crops Fuglie (2000) [28]. These results are consistent with those of Rouf and Sardar (2011) [20], who found that treating bean plants with 150g/l of neem seed extract applied at intervals of 7 days increased pod yield by 68.49%. Similar findings by Alabi and Olorunju (2004) [1] demonstrated that, aside from untreated plants, groundnut plants sprayed with neem seed extract produced higher yields than plants that received alternative treatments (cow dung and black soap).

Based on data that revealed the range of first flowering was 39.33 to 47.66 days, we discovered that T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+Boric acid 0.50%) was best among all treatments with 39.33 days. T_3 and T_6 have pertinent data containing 43.00 and 44.33 days, respectively. According to data showing a range of 55.00 to 63.66 days for 50% flowering, we saw that T_7 performed the best among all treatments with 55.00 days. We discovered that T_3 and T_6 (Hibiscus Leaves Extract 0.50% + Boric acid 0.50%) contain pertinent information and have respective durations of 60.66 and 59.66 days. According to the research, the first fruit setting ranged from 68.00 to 86.33. T_7 was shown to be the most effective treatment with 68.00

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These findings concur with those of other researchers, Kumar *et al*. (2010) [13] in the case of the cauliflower and Rab and Haq (2012) [18] in the tomato. Boron increases ion absorption, pollen viability, and has an impact on how certain nutrients are metabolized. Davis and others, 2003. However, according to Steel *et al*. (1997) [30], boron has a role in the metabolism of carbohydrates and water absorption. Additionally, boron plays an indirect role in the metabolism of phosphorus and nitrogen. A lack of boron can make plants sterile and produce little amounts of fruit. Boron shortage may potentially contribute to tissue aging and cambium cell disintegration, according to Agarwal (2018) [31]. According to Hatwar *et al.* (2003) [11], increased photosynthetic and other metabolic activities may be to blame for the increase in several plant metabolites responsible for cell division and elongation. This would explain why micronutrient feeding improved the number of flowers per cluster. According to Hatwar *et al.* (2003) [11], the increase in various plant metabolites responsible for cell division and elongation as a result of feeding micronutrients may be attributable to improved photosynthetic and other metabolic activities that lead to increased levels of various plant metabolites.

Correlation result

From the correlation Metrix table, it has been interpreted that, days to 50% flowering is positively correlated with the days to first flower in chili at the value 0.69. It has been observed from table-4 that, days to first fruiting is significantly correlated with days to first flower and days to 50% flowering the value 0.79 and 0.91 respectively. Number of fruits/plants is positively correlated with number of primary branches/plants with 0.97 as it showed that more the number of branches more will the fruits/plants. From the proposed correlation matrix table, it can also be observed that the main yield attribute, fruit yield/plot (kg/plot) is completely correlated with number of primary branches/plants, number of fruits/plants, av. Fruit weight, plant height and leaf length at p=0.05.

Table 1: Effects of Bio stimulants with Boron over flowering attributes

Treatments	Days to first flowering	Days to 50% flowering	Days to first fruit setting	Days to first fruit harvest
T_0 Control	47.66	63.66	86.33	89.33
T_1 = Neem Leaves Extract (0.25%) +Boric acid (0.50%)	43.00	62.33	83.33	86.33
T_2 = Neem Leaves Extract (0.50%) +Boric acid (0.50%)	43.66	61.33	79.33	82.33
T_3 =Moringa Leaves Extract (0.25%) + Boric acid (0.50%)	43.00	60.66	80.00	83.00
T_4= Moringa Leaves Extract (0.50%) +Boric acid (0.50%)	42.33	61.33	78.66	81.66
T_5= Hibiscus Leaves Extract (0.25%) +Boric acid (0.50%)	42.00	63.00	78.33	81.33
T_6= Hibiscus Leaves Extract (0.50%) +Boric acid (0.50%)	44.33	59.66	75	78.00
T_7= Neem+ Moringa+ Hibiscus Leaves Extract (0.25%+0.25%+0.25%) +Boric acid (0.50%)	39.33	55.00	68.00	71.00
MEAN	43.16	60.87	78.62	81.62
Min.	39.33	55.00	68.00	71.00
Max.	47.66	63.66	86.33	89.33
S. Em. ±	1.28	1.51	1.43	1.68
C.D. at 5%	3.89	4.60	4.34	5.11
C.V.%	5.15	4.32	3.16	3.57

Table 2: Effects of Bio stimulants with Boron over Vegetative attributes

Treatments	No. of primary branches per plant	Leaf length (mm)	Plant height (cm)
T_0 Control	2.60	44.81	55.24
T_1 = Neem Leaves Extract (0.25%) +Boric acid (0.50%)	3.10	47.66	56.39
T_2 = Neem Leaves Extract (0.50%) +Boric acid (0.50%)	3.21	48.41	56.24
T_3 =Moringa Leaves Extract (0.25%) + Boric acid (0.50%)	3.15	47.19	56.09
T_4= Moringa Leaves Extract (0.50%) +Boric acid (0.50%)	3.26	47.63	57.87
T_5= Hibiscus Leaves Extract (0.25%) +Boric acid (0.50%)	3.16	46.58	56.15
T_6= Hibiscus Leaves Extract (0.50%) +Boric acid (0.50%)	3.35	48.03	57.68
T_7= Neem+ Moringa+ Hibiscus Leaves Extract (0.25%+0.25%+0.25%) +Boric acid (0.50%)	4.35	50.27	58.29
MEAN	3.27	47.57	56.74
Min.	2.60	44.81	55.24
Max.	4.35	50.27	58.29
S. Em. ±	0.1831	0.6	0.637
C.D. at 5%	0.555	1.820	1.932
C.V.%	9.68	2.18	1.94

Table 3: Effects of Bio stimulants with Boron over Yields attributes

Treatments	No. of fruit per plant	Fruit length (cm)	Fruit diameter (mm)	Average fruit weight (gm)	Total fruit yield per plant (kg)	Fruit yield per plot (kg/plot)
T_0 Control	8.25	5.425	7.50	3.21	0.264	4.23
T_1 = Neem Leaves Extract (0.25%) +Boric acid (0.50%)	9.15	6.125	7.71	3.29	0.301	4.82
T_2 = Neem Leaves Extract (0.50%) +Boric acid (0.50%)	9.3	6.255	7.74	3.41	0.318	5.08
T_3 =Moringa Leaves Extract (0.25%) + Boric acid (0.50%)	9.25	6.200	7.23	3.32	0.307	4.92
T_4= Moringa Leaves Extract (0.50%) +Boric acid (0.50%)	9.34	6.300	7.37	3.48	0.325	5.21
T_5= Hibiscus Leaves Extract (0.25%) +Boric acid (0.50%)	9.23	6.195	7.60	3.38	0.312	4.99
T_6= Hibiscus Leaves Extract (0.50%) +Boric acid (0.50%)	9.42	6.385	7.81	3.56	0.336	5.37
T_7= Neem+ Moringa+ Hibiscus Leaves Extract (0.25%+0.25%+0.25%) +Boric acid (0.50%)	10.40	7.375	8.90	4.75	0.496	7.94
MEAN	9.29	6.283	7.73	3.55	0.332	5.32
Min.	8.25	5.42	7.50	3.21	0.264	4.23
Max.	9.42	7.37	8.90	4.75	0.496	7.94
S. Em.±	0.2214	0.2946	0.252	0.1862	0.0228	0.2618
C.D. at 5%	0.671	0.894	0.764	0.564	0.069	0.794
C.V.%	4.12	44.45	5.64	9.08	11.88	8.51

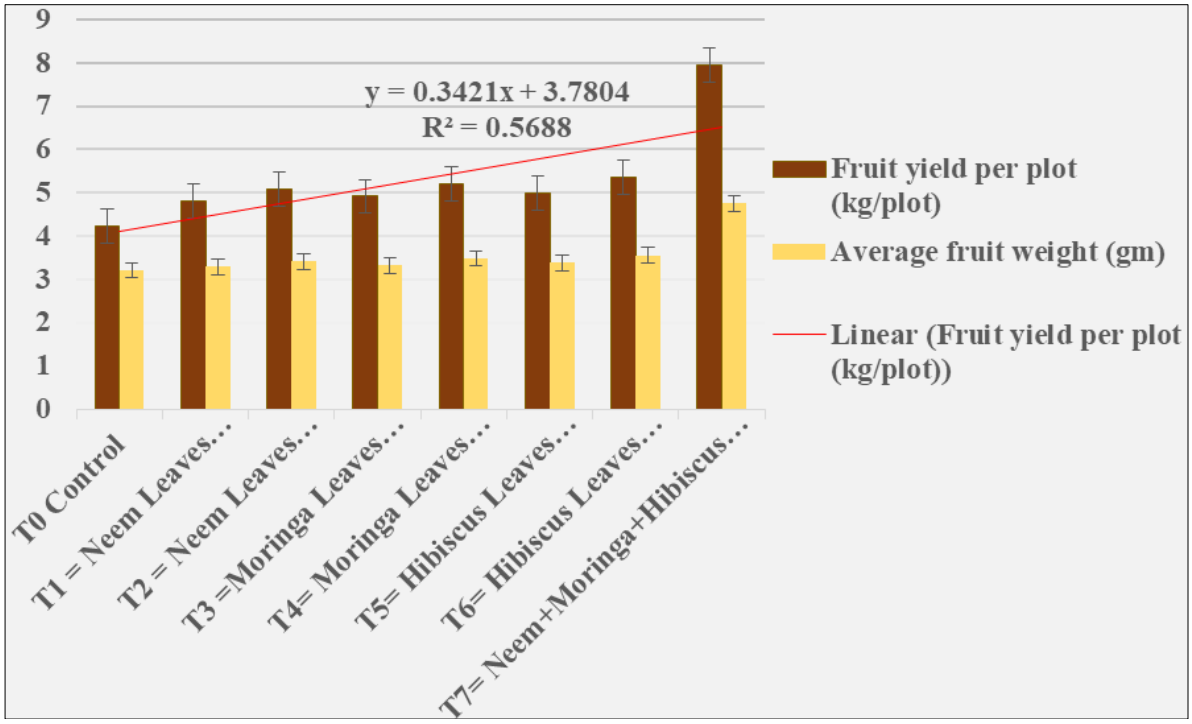

Fig 1: Graphical Representation of Av. Fruit weight with fruit yield per plot (kg/plot)

Fig 2: Seedling transplanting and field preparation

Fig3: Extract preparation

Table 4: Correlation Metrix

	Days to first flow	*50% flo*	*first fruit*	*first fruit*	*ry branch*	*f fruit per*	*it length (*	*diameter*	*fruit weig*	*yield per*	*f length (m*	*t height (d*	*per plot*
Days to first flowering	1.00												
Days to 50% flowering	0.70	1.00											
Days to first fruit setting	0.79	0.91	1.00										
Days to first fruit harvest	0.79	0.91	1.00	1.00									
No. of primary branches per plant	-0.86	-0.95	-0.95	-0.95	1.00								
No. of fruit per plant	-0.91	-0.90	-0.94	-0.94	0.97	1.00							
Fruit length (cm)	-0.73	-0.90	-0.94	-0.94	0.91	0.89	1.00						
Fruit diameter (mm)	-0.58	-0.83	-0.78	-0.78	0.86	0.75	0.69	1.00					
Average fruit weight (gm)	-0.72	-0.94	-0.89	-0.89	0.95	0.86	0.85	0.93	1.00				
Total fruit yield per plant (kg)	-0.79	-0.95	-0.93	-0.93	0.98	0.92	0.88	0.91	0.99	1.00			
Leaf length (mm)	-0.81	-0.87	-0.85	-0.85	0.92	0.95	0.82	0.74	0.79	0.85	1.00		
Plant height (cm)	-0.68	-0.78	-0.83	-0.83	0.81	0.82	0.96	0.59	0.73	0.77	0.79	1.00	
Fruit yield per plot (kg/plot)	-0.79	-0.95	-0.92	-0.92	0.98	0.92	0.88	0.91	0.99	1.00	0.85	0.77	1.00

Conclusion

From the conducted research trail, it has been concluded that T_7 (Neem+ Moringa+ Hibiscus Leaves Extract 0.25%+Boric acid 0.50%), gave the best result as compared to all the other treatments. This may be because of the combined and interactive effects of Neem, Moringa, and Hibiscus extract with Boric acid. Most of the vegetative and flowering parameters were showed good and effective results in this treatment. Presently, we all are focusing over natural farming to meet food demand of the society, in this research experiment, we focused over the natural plant extract in combination with the micronutrient for the better growth and development of the chilli.

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