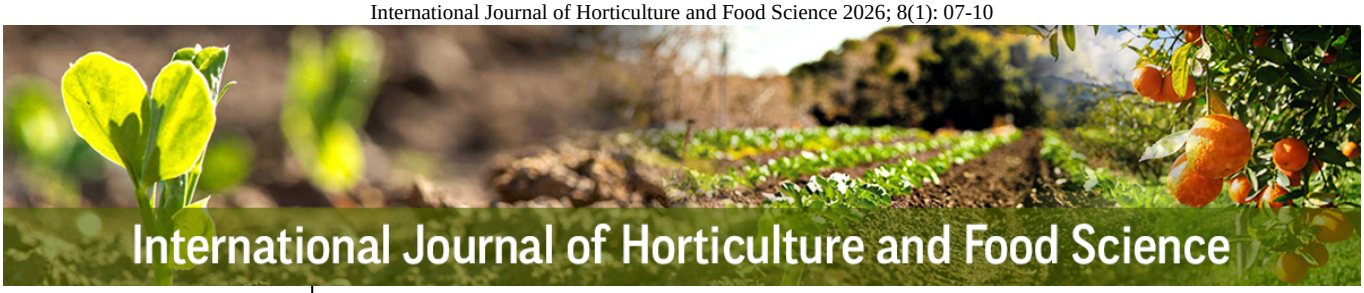

E-ISSN: 2663-1067
P-ISSN: 2663-1075
NAAS Rating (2026): 4.74
www.hortijournal.com
IJHFS 2026; 8(1): 07-10
Received: 04-10-2025
Accepted: 07-11-2025

RS Wankhade
Assistant Professor, Agriculture Research Station, Dr. Panjabrao Deshmukh Krushi Vidyapeeth (Dr. P.D.K.V.), Achalpur, Maharashtra, India

YD Charjan[2]
Associate Professor, Agriculture Research Station, Dr. Panjabrao Deshmukh Krushi Vidyapeeth (Dr. P.D.K.V.), Achalpur, Maharashtra, India

Sonal Nage[3]
Agriculture Research Station, Dr. Panjabrao Deshmukh Krushi Vidyapeeth (Dr. P.D.K.V.), Achalpur, Maharashtra, India

HH Dikey[4]
Assistant Professor, Regional Research Centre, Dr. Panjabrao Deshmukh Krushi Vidyapeeth (Dr. P.D.K.V.), Amravati, Maharashtra, India

Corresponding Author:
RS Wankhade
Assistant Professor, Agriculture Research Station, Dr. Panjabrao Deshmukh Krushi Vidyapeeth (Dr. P.D.K.V.), Achalpur, Maharashtra, India

Evaluation of bio-efficacy of bio stimulant (YK STAR) on chilli

RS Wankhade, YD Charjan, Sonal Nage and HH Dikey

DOI: https://www.doi.org/10.33545/26631067.2026.v8.i1a.448

Abstract
A present investigation was carried out on chilli crop under field condition at the farm of Agriculture Research Station, Dr. P.D.K.V., Achalpur Dist. Amravati, Maharashtra during *Kharif*, 2024-25 with a view to study bio-efficacy of bio stimulant YK STAR with different doses and its role in growth, yield and quality of chili variety PDKV Hirkani. The experiment was laid in the randomized block design with 05 treatments and 04 replications with different quantities of bio stimulant YK STAR. Bio stimulant YK STAR used comprised of oil based eugenol, rhodophytes extract, organic matter, alginic acid and other ingredients at different treatment comprises of 1.5 ml, 2.0 ml, 3.0 ml in one liter of water, control and only fertilizer. From the above experiment, it may be concluded that, the treatment T_4 (YK STAR - 3.0 ml per liter of water) was recorded significantly highest fruit length, fruit width, no of fruits plant^{-1}, yield plant^{-1} and yield ha^{-1} followed by T_3 (YK STAR - 2.0 ml per liter of water) treatment which wear at par. Hence T_3 - YK STAR - 2.0 ml per liter of water treatment found best.

Keywords: Bio Stimulant, YK STAR, Hirkani, Eugenol, Alginic acid

1. Introduction
Chilli (*Capsicum annuum* L.) is the major species commercially grown in India both for green (vegetables) and as dry fruit (as spices). The centre of origin of chilli is considered to be in South America. Chilli was first introduced to India by Portuguese near the end of the 15th century. The largest chilli growing states, which account for more than 80% of the total area and output are Andhra Pradesh, Karnataka, Maharashtra, Orissa, Tamil Nadu, Madhya Pradesh, West Bengal and Rajasthan. Andhra Pradesh has been in the lead both in terms of area and output, providing on average 25% of the total area and more than 40% to 50% of the overall production (Verma *et al.*, 2015) [25]. Major chilli growing countries are Mexico, Japan, Ethiopia, Uganda, Nigeria, Thailand, Turkey, Indonesia, China and Pakistan. Chilli has originated from the wild and weedy species *Capsicum annuum* var. minimum.
Application of commercial inorganic fertilizers has resulted in drastic reduction in soil microbial population and whole rhizosphere is getting polluted (Devi *et al.* 2022) [9]. Continuous deterioration in soil physical properties, nutrient imbalance and rapid depletion of soil fertility are added disadvantages of chemical fertilization (Selim, 2021). The growth, development and yield of chilli can be increased by the balanced application of N, P and K nutrients (Aslam Zubair *et al.* 2022) [5]. However, growth regulation of any crop is manipulated by the exogenous application plant growth regulations (PGR). But in the recent past instead of PGR, biostimulants are being used for crop regulation. The synergistic and complementary effect of biostimulants and essential nutrients is utilized for the synthesis of proteins which eventually leads to stimulated growth and yield (Dhanasekaran and Bhuvaneswari, 2005). High yielding varieties and hybrid Chilli has got good market preference due to its size and appealing attractive colour (Perez-Caselles *et al.* 2020) [18].
YK STAR is a natural product rich in oil based eugenol (10%), rhodophytes extract (40%), organic matter (30%), alginic acid (10%) and other ingredients (10%). Foliar application is recommended during flowering and different stages of fruiting to the plant and it will promotes plant growth and development, enhances flower and fruit production, provides effective protection against pests, helps prevent the spread of viruses among plants, suitable for use on a variety of crops and plants and eco-friendly and safe for beneficial insects (Anon. 2024) [1].

With these facts, the present field experiment was conducted to study the effect of biostimulant on growth, yield and quality of chilli.

Materials and Methods

The field experiment was carried out during the *Kharif* season (July to December, 2024) at Agriculture Research Station, Dr. P.D.K.V., Achalpur Dist. Amravati, Maharashtra, India following Randomized Block Design with four replications along with five treatments *viz.* T_1 (Control or No spraying of YK STAR and no university fertilizer dose), T_2 (YK STAR - 1.5 ml per liter of water and university fertilizer dose), T_3 (YK STAR - 2.0 ml per liter of water and university fertilizer dose), T_4 (YK STAR -3.0 ml per liter of water and university fertilizer dose) and T_5 (Only 150:50:50 NPK kg ha^{-1}) on a gross plot size of 3.60 × 4.80 m^2 and 2.40 x 3.60 m^2 net plot size with the spacing of 60×60 cm to study the effects of different doses of biostimulant (YK STAR) for growth yield and quality of chilli. One-month old seedlings of PDKV Hirkani variety of chilli were transplanted in the field and soil was vertisols. One spray of biostimulant (YK STAR) was applied at 25 DAT. The standard packages of practices were followed for management of the crops. Five plants were randomly selected from each plot to record the observations in respect of growth and yield characters. The data were then analysed statistically (Panse and Sukhatme, 1985) [16].

Results and Discussion

The analyses of variance revealed the significant differences of the treatments for all the characters under the study which amply justified the influences of different doses of biostimulant YK STAR in chilli.

The YK STAR treatments had significant influence on growth, yield and quality of chilli as compared to control.

Growth characters

Treatment T_4 (YK STAR - 3.0 ml per liter of water) was recorded significantly highest number of branches (19.75), plant spread (59.80 cm) and plant height (65.55 cm) at 120 DAT. Whereas they are at par with T_3 (YK STAR - 2.0 ml per liter of water) treatment. The increase in plant height might be due to the quick availability of nutrients especially nitrogen, the chief nutrient source of protein for the formation of protoplasm which leads to cell division and cell enlargement which ultimately results in maximum vegetative growth. These findings are in conformity with earlier research on chilli conducted by Sarojnee *et al*. (2009) [22] in chilli, Sarhan (2011) [21] in potato, Manas *et al.* (2014) [15] in chilli and Anbukkarasi *et al*. (2018) [3] in tomato.

The increase in number of primary branches may be due to the easier nutrient transmission, higher meristematic activity in the plant and an increased supply of photosynthates. These results were in accordance with the previous findings of Manas *et al.* (2014) [15] in pungent pepper, Farouk (2015) [13] in potato, Anbukkarasi *et al*. (2018) [3] in tomato and Chakravarthy and Mohan (2023) [7] in brinjal. Increased branches may be the result of the foliar application of biostimulants, since biostimulants provide essential nutrients for plant growth and development.

Yield characters

The days required to reach 50% flowering varied significantly depending on the biostimulant dosage levels. The treatment T_4 - (YK STAR - 3.0 ml per liter of water) recorded minimum 39.75 days to reach 50% flowering followed by the treatments T_2 and T_3 (YK STAR - 1.5 and 2.0 ml per liter of water recorded 42.00 days). The maximum number of days to reach 50% flowering was recorded in control (44.00 days). The treatment T_4 was statistically at par with treatment T_2 and T_3. This may be due the availability of balanced nutrients and the release of growth-promoting chemicals from biostimulant, which encourage early flower initiation. Similar findings were obtained by Deepika and Tiwari (2021) [8] in chilli, Dookie *et al.* (2021) [11].

Data on yield parameters *viz*. fruit length (cm), fruit width (cm), no. of fruits $plant^{-1}$, yield $plant^{-1}$ (g) and yield ha^{-1} (q) presented in Table 2 and showed that treatment T_4 application of YK STAR - 3.0 ml per liter of water was recorded significantly highest fruit length (cm), fruit width (cm), no of fruits $plant^{-1}$, yield $plant^{-1}$ and yield ha^{-1} 1.90 cm, 0.84 cm, 141.60, 420.00 g and 116.66 q, respectively) followed by T_3 (YK STAR - 2.0 ml per liter of water) treatment (11.80 cm, 0.82 cm, 138.00, 410.00 g and 113.89 q respectively) which wear at par. Whereas, control treatment showed significantly minimum fruit length (cm), fruit width (cm), no of fruit $plant^{-1}$, yield $plant^{-1}$ (g) and yield ha^{-1} (q).

The reason for maximum fruit length might be due to increase in the production of leaves, ultimately in photosynthesis, higher amount of carbohydrates production and translocation from source (leaves) to sink (reproductive parts) resulted increase in fruit length. These results were in confirmation with the previous work of Sarojnee *et al.* (2009) [22] in hot pepper, Tkalec *et al.* (2010) [24] and Mahmood *et al.* (2017) [14] in bell pepper, Deepika and Tiwari (2021) [8], Arthur *et al*. (2022) [24] and Parimala and Singh (2023) [17] in chilli.

The increase in fruit diameter may be attributed to the supply of amino acids along with fertilizers could have enhanced the utilization of assimilates by the growing chilli fruit. The results are in agreement with Sarojnee *et al.* (2009) [22] in hot pepper, Tkalec *et al. (*2010) [24] and Mahmood *et al.* (2017) [14] in bell pepper and Arthur *et al*. (2022) [4] in chilli.

The probable reason for the increase in number of fruits per plant was due to the increased nutrient content in plants that exerted a positive effect on cell division and energy storage. The findings agreed in line with previous research reported by Fathima and Denesh (2013) [12] in chilli, Anbukkarasi *et al.* (2018) [3] in tomato and Parimala and Singh (2023) [17] in chilli. There was a significant difference observed with the application of bio stimulants on fruit length. The reason of maximum fruit length might be due to increase in the production of leaves, ultimately in photosynthesis, higher amount of carbohydrates production and translocation from source (leaves) to sink (reproductive parts) resulted increase in fruit length observed by Saraswathi *et al*., (2013) [20].

The increased in fruit production probably due to the enhancement of fruit set and subsequent fruit weight, which is made possible by the activity of biostimulants. These compounds improve a plant's capacity to efficiently carry out photosynthesis and deliver nutrients to the regions where fruit set takes place. The findings agreed with previous research by Bridgemohan *et al.* (2017) [6] in chilli, Ruban *et al*. (2019) [19] in brinjal, Zarzecka *et al*. (2020) [26] in potato and Abdelkader *et al*.(2021) in tomato.

Table 1: Effect of YK STAR on growth contributing characters of chilli

Treatment	No. of Branches			Plant Spread (cm)			Plant Height (cm)		
	60 DAT	90 DAT	120 DAT	60 DAT	90 DAT	120 DAT	60 DAT	90 DAT	120 DAT
T_1	8.89	10.70	11.75	20.00	20.10	38.65	29.75	38.00	50.00
T_2	10.86	14.80	15.76	25.12	28.08	53.30	38.60	48.30	58.60
T_3	11.92	16.15	18.80	29.05	35.90	56.00	41.00	51.60	63.80
T_4	12.50	16.95	19.75	30.10	39.10	59.80	42.12	54.08	65.55
T_5	10.10	12.95	13.60	23.08	26.80	44.20	34.73	40.08	55.00
SE (M) ±	0.29	0.72	0.67	0.68	1.06	1.82	1.15	1.28	1.47
CD @ 5%	0.88	2.21	2.07	2.08	3.26	5.60	3.53	3.95	4.52
CV%	5.25	10.01	8.44	5.30	7.04	7.21	6.15	5.53	5.01

Table 2: Effect of YK STAR on yield contributing characters of chilli

Treatment	No of days required for 50% flowering (DAT)	Fruit length (cm)	Fruit width (cm)	No of Fruits plant^{-1}	Yield plant $^{-1}$ (g) (Red Chilli (Wet))	Yield ha^{-1} (q) (Red Chilli (Wet))
T_1	44.00	8.10	0.48	79.00	278.00	77.22
T_2	42.00	10.62	0.76	128.20	368.00	102.22
T_3	42.00	11.80	0.82	138.00	410.00	113.89
T_4	39.75	11.90	0.84	141.60	420.00	116.66
T_5	43.25	9.62	0.60	119.00	340.00	94.44
SE (M) ±	0.91	0.41	0.04	4.21	12.11	3.36
CD @ 5%	2.81	1.27	0.11	12.97	37.31	10.36
CV%	4.32	7.94	10.46	6.95	6.67	6.67

Note: 1. Mortality and phytotoxicity was not observed with applied concentration as per treatment. 2. No virus disease reported during trial.

Conclusion:

The result indicated that, among the various treatments, chilli responded significantly to application of YK STAR. No phytotoxicity was observed with applied concentration as per treatment and also no virus disease reported during trial. The growth and yield parameters of chilli were conspicuously higher with application of bio stimulant YK STAR as compared to control. Treatment T_4 application of YK STAR - 3.0 ml per liter of water was recorded significantly highest fruit length, fruit width, no of fruits plant^{-1}, yield plant^{-1} and yield ha^{-1} followed by T_3 application of YK STAR - 2.0 ml per liter of water which was at par. Hence T_3 application YK STAR - 2.0 ml per liter of water to chilli crop found best.

Acknowledgement

This research work is a part of the sponsored project of Y.K. Laboratories, Herbal House, Plot No. 3, East Part, Kuntloor (V), Abdullapurmet (M), R.R. Dist. Hyderabad -501 505.

References

1. Anonymous. Y.K. Laboratories [Internet]. Hyderabad (India); 2024. Available from: https://yklaboratories.com/Products/ORGANIC_MANURE/YKSTAR-Red-Mites-Larva-Control
2. Abdelkader MM, Gaplaev MS, Terekbaev AA, Puchkov MY. The influence of biostimulants on tomato plants cultivated under hydroponic systems. J Hortic Res. 2021;29(2):107-116.
3. Anbukkarasi V, Prabu M, Paramaguru P, Pugalendhi L, Jeyakumar. Effect of nutrients and biostimulants on growth, yield and quality of tomato (*Solanum lycopersicum*). Int J Curr Microbiol Appl Sci. 2018;6:49-55.
4. Arthur JD, Li T, Bi G. Plant growth, yield, and quality of containerized heirloom chile pepper cultivars affected by three types of biostimulants. Horticulturae. 2022;9(1):12-19.
5. Aslam Z, Ahmad A, Safdar B, Hussain S, Belliturk K, Ahmad JN, *et al*. Effect of integrated nutrient management practices on physiological, morphological and yield parameters of chilli (*Capsicum annuum* L.). Pak J Bot. 2022;54(6):2143-2150.
6. Bridgemohan P, Mohamed M, Mohammed M, Bridgemohan RS. Effect of a biostimulant, selected agronomic practices and fruit characteristics on the relative pungency in Caribbean hot peppers. Acad J Agric Res. 2017;5(10):255-260.
7. Chakravarthy GA, Mohan KK. Response of brinjal (*Solanum melongena* L.) to biostimulants in relation to growth, yield and quality. Int J Environ Clim Change. 2023;13(5):132-136.
8. Deepika, Tiwari SP. Effect of different biozyme concentrations for maximum yield potential in chilli (*Capsicum annuum* L.). Int J Chem Stud. 2021;9(2):432-436.
9. Devi R, Kaur T, Kour D, Yadav AN, Suman A. Potential applications of mineral solubilizing rhizospheric and nitrogen fixing endophytic bacteria as microbial consortium for the growth promotion of chilli (*Capsicum annuum* L.). Biologia. 2022;77(10):2933-2943.
10. Dhanasekaran K, Bhuvaneswari R. Effect of nutrient enriched humic acid on growth and yield of tomato. Int J Agric Sci. 2005;1(1):80-83.
11. Dookie M, Ali O, Ramsubhag A, Jayaraman J. Flowering gene regulation in tomato plants treated with brown seaweed extracts. Sci Hortic. 2021;276:109-115.
12. Fathima PS, Denesh GR. Influence of humic acid spray on growth and yield of chilli (*Capsicum annuum* L.). Int J Agric Sci. 2013;9(2):542-546.
13. Farouk S. Improving growth and productivity of potato (*Solanum tuberosum* L.) by some biostimulants and lithovit with or without boron. J Plant Prod. 2015;6(12):2187-2206.
14. Mahmood N, Abbasi NA, Hafiz IA, Ali I, Zakia S. Effect of biostimulants on growth, yield and quality of bell pepper cv. Yolo Wonder. Pak J Agric Sci.

2017;54(2):311-317.
15. Manas D, Bandopadhyay PK, Chakravarty A, Pal S, Bhattacharya A. Effect of foliar application of humic acid, zinc and boron on biochemical changes related to productivity of pungent pepper (*Capsicum annuum* L.). Afr J Plant Sci. 2014;8(6):320-335.
16. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. New Delhi: ICAR; 1985. p. 1-361.
17. Parimala M, Singh D. Effect of different biostimulants on chilli crop under Prayagraj agro-climatic condition. Pharma Innov J. 2023;12(5):2736-2739.
18. Perez-Caselles C, Brugarolas M, Martinez-Carrasco L. Traditional varieties for local markets: a sustainable proposal for agricultural SMEs. Sustainability. 2020;12(11):4517-4529.
19. Ruban S, Priya MR, Barathan G, SS K. Effect of foliar application of biostimulants on growth and yield of brinjal (*Solanum melongena* L.). Plant Arch. 2019;19(2):2126-2128.
20. Saraswathi T, Praneetha S. Effect of biostimulants on yield and quality in tomato. J Hortic Sci. 2013;8(1):107-110.
21. Sarhan TZ. Effect of humic acid and seaweed extracts on growth and yield of potato plant (*Solanum tuberosum* L.) cv. Desiree. Mesopotamia J Agric. 2011;39(2):19-25.
22. Sarojnee DY, Navindra B, Chandrabose S. Effect of naturally occurring amino acid stimulants on the growth and yield of hot peppers. J Anim Plant Sci. 2009;5(1):414-424.
23. Selim MM. Introduction to integrated nutrient management strategies and their contribution to yield and soil properties. J Plant Sci. 2021;9(4):139-150.
24. Tkalec M, Vinkovic T, Balicevic R, Paradikovic N. Influence of biostimulants on growth and development of bell pepper (*Capsicum annuum* L.). Acta Agric Serbica. 2010;15(29):83-88.
25. Verma SK, Rai DP, Verma LR. Knowledge and adoption of recommended chilli production technology by farmers of Raipur district. Agric Update. 2015;10(2):120-125.
26. Zarzecka K, Gugala M, Grzywacz K, Sikorska A. Agricultural and economic effects of the use of biostimulants and herbicides in cultivation of the table potato cultivar Gawin. Acta Sci Pol Agric. 2020;19(1):3-10.