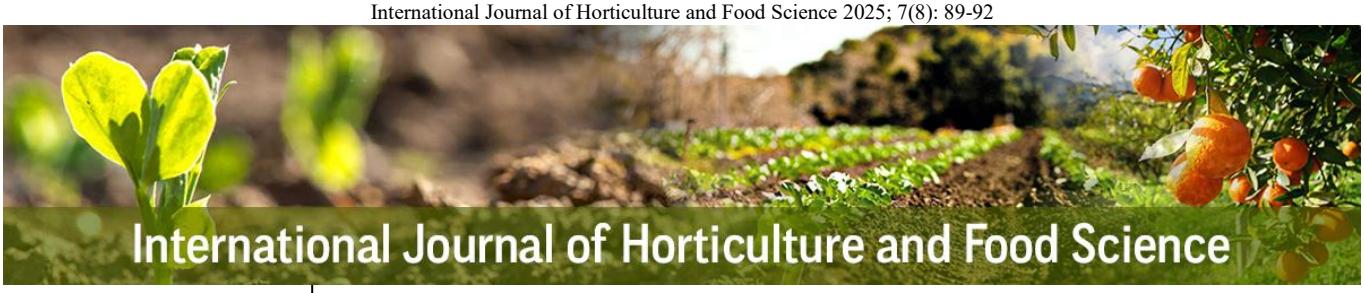

E-ISSN: 2663-1067
P-ISSN: 2663-1075
NAAS Rating (2025): 4.74
www.hortijournal.com
IJHFS 2025; 7(8): 89-92
Received: 11-06-2025
Accepted: 13-07-2025

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Evaluation of bio-efficacy of bio stimulant (AROGYA) on chilli (*Capsicum annuum* L.)

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DOI: https://www.doi.org/10.33545/26631067.2025.v7.i8b.370

Abstract
An experiment was conducted 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 AROGYA with different doses on Chili *cv*. PDKV Hirkani. The statistical design used was randomized block design with 05 treatments and 04 replications with different quantities of bio stimulant AROGYA. Bio stimulant AROGYA used, comprised of coconut fatty acids, hydrolysed polymers, natural minerals, vitamins and ultra pure water at different treatment comprises of 1.5 ml, 2.5 ml, 3.0 ml in one liter of water, control and only fertilizer treatment. From the above experiment, it may be concluded that, the treatment T_4 (AROGYA - 3.0 ml/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 (AROGYA - 2.5 ml/liter of water) treatment which wear at par. Hence T_3 -AROGYA - 2.5 ml/ liter of water treatment found best.

Keywords: Bio Stimulant, AROGYA

Introduction
Chilli (*Capsicum annuum* L.) commercially grown in India both for vegetables and spices. Origin of chilli considered as inside of South America. In 15th century (near the end), chilli was first introduced to India by Portuguese. The largest chilli growing states are Andhra Pradesh, Karnataka, Maharashtra, Orissa, Tamil Nadu, Madhya Pradesh, West Bengal and Rajasthan were more than 80% of the total area occurred. Andhra Pradesh is on top, both in area and production, 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. Due to application of commercial inorganic fertilizers, whole rhizosphere is getting polluted and drastic reduction in soil microbial population was reported by Devi *et al.* 2022 [9]. Disadvantages of chemical fertilization also reported by Selim, 2021 *viz*. continuous deterioration in soil physical properties, nutrient imbalance and rapid depletion of soil fertility. Aslam Zubair *et al*. 2022 [5] observed that, the growth, development and yield of chilli can be increased by the balanced application of N, P and K nutrients.
Exogenous application of plant growth regulations can manipulate growth regulation of any crop. But in recent years, biostimulants are being used for crop regulation instead of PGR. Dhanasekaran and Bhuvaneswari, 2005 [10] reported that, for synthesis of proteins which eventually leads to stimulated growth and yield were the synergistic and complementary effect of biostimulants and essential nutrients.
Arogya is a natural product derived from plant origin and natural mines. Highly resistance especially in environmental heat stress and cold stress. Arogya may act as a mobile signaling molecule under stress conditions. Arogya has a significant role in activation of plant immune system under biotic abiotic stress. This product rich in coconut fatty acids (28%), hydrolysed polymers (28%), natural minerals (18%), natural vitamins (8%) and ultra pure water (18%). Foliar and drip application is recommended during flowering and different stages of fruiting to plant will not hampered even condition of irregular water management, agrogya develops the number of internodes and number of branches followed by flower and fruit setting and arogya enables the plants will keep always very greenish and fresh condition.
With these facts to study the effect of biostimulant on growth, yield and quality of chilli, the

present field experiment was conducted

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 R.B.D. with four replications along with five treatments *viz.* T_1 (Control or No spraying of AROGYA and no university fertilizer dose), T_2 (AROGYA - 1.5 ml per liter of water and university fertilizer dose), T_3 (AROGYA - 2.5 ml per liter of water and university fertilizer dose), T_4 (AROGYA -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^2 to study the effects of different doses of biostimulant (AROGYA) 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 (AROGYA) 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 AROGYA in chilli.

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

Growth characters

Treatment T_4 (AROGYA - 3.0 ml per liter of water) was recorded significantly highest number of branches (19.80), plant spread (60.00 cm) and plant height (66.00 cm) at 120 DAT. Whereas they are at par with T_3 (AROGYA - 2.5 ml per liter of water) treatment.

The increase in plant height might be due to quick availability of nitrogen which is 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) [2] in tomato.

Number of primary branches increase may be due to the easier nutrient transmission, higher meristematic activity in the plant and an increased supply of photosynthates. These results were in match with the previous findings of Manas *et al.* (2014) [15] in pungent pepper, Farouk (2015) [12] in potato, Anbukkarasi *et al*. (2018) [2] in tomato and Chakravarthy and Mohan (2023) [4] in brinjal. Foliar application of biostimulants increased branches may be the result of the essential nutrients for plant growth and development which is provided by biostimulants.

Yield characters

The days required to reach 50% flowering varied significantly depending on the biostimulant dosage levels. The treatment T_4 -(AROGYA - 3.0 ml per liter of water) recorded minimum 40.00 days to reach 50% flowering followed by the treatments T_2 and T_3 (AROGYA - 1.5 and 2.5 ml per liter of water recorded 42.25 days). The maximum number of days to reach 50% flowering was recorded in control (44.25 days). The treatment T_4 was statistically at par with treatment T_2 and T_3. Early flower initiation may be due the availability of balanced nutrients and the release of growth-promoting chemicals from biostimulant. 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 AROGYA - 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} (11.95 cm, 0.85 cm, 142.50, 428.00 g and 118.89 q, respectively) followed by T_3 (AROGYA - 2.5 ml per liter of water) treatment (11.85 cm, 0.83 cm, 139.00, 415.00 g and 115.27 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). 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) [4] 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) [13] in chilli, Anbukkarasi *et al.* (2018) [2] in tomato and Parimala and Singh (2023) [17] in chilli. 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) [1] in tomato.

Table 1: Effect of AROGYA 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	8.80	10.80	11.90	20.10	20.10	39.00	29.80	39.00	51.00
T_2	10.80	14.90	15.80	25.15	28.12	50.90	38.75	49.00	59.00
T_3	11.90	16.05	18.90	29.10	36.00	56.10	41.10	52.00	64.00
T_4	12.55	17.00	19.80	30.15	39.10	60.00	42.40	54.10	66.00
T_5	10.20	13.00	13.80	23.10	26.90	45.00	34.80	41.20	56.00
SE (M) ±	0.30	0.70	0.67	0.69	1.07	1.56	1.16	1.53	1.83
CD @ 5%	0.91	2.18	2.05	2.13	3.30	4.81	3.57	4.72	5.65
CV%	5.47	9.73	8.31	5.41	7.13	6.22	6.19	6.51	6.19

Table 2: Effect of AROGYA 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	44.25	8.12	0.50	80.00	280.00	77.78
T_2	42.25	10.65	0.78	129.30	370.00	102.77
T_3	42.25	11.85	0.83	139.00	415.00	115.27
T_4	40.00	11.95	0.85	142.50	428.00	118.89
T_5	43.25	9.64	0.62	120.00	348.00	96.66
SE (M) ±	0.90	0.36	0.02	4.18	11.73	3.26
CD @ 5%	2.78	1.10	0.07	12.89	36.15	10.04
CV%	4.25	6.82	6.64	6.85	6.37	6.37

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 AROGYA. 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 AROGYA as compared to control. Treatment T_4 application of AROGYA - 3.0 ml/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 AROGYA - 2.5 ml/liter of water which was at par. Hence T_3 application AROGYA - 2.5 ml/ 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. Abdelkader MM, Gaplaev MS, Terekbaev AA, Puchkov MY. The influence of biostimulants on *tomato* plants cultivated under hydroponic systems. Journal of Horticultural Research. 2021;29(2):107-16.
2. Anbukkarasi V, Prabu M, Paramaguru P, Pugalendhi L, Jeyakumar. Effect of nutrients and biostimulants on growth, yield and quality of *tomato* (*Solanum lycopersicon*). International Journal of Current Microbiology and Applied Sciences. 2018;6:49-55.
3. Anonymous. FAOSTAT. 2022. [cited 2025 Aug 19]. Available from: https://www.fao.org/faostat/en/
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.
5. Aslam Z, Ahmad A, Bashir S, Hussain S, Belliturk K, Ahmad JN, *et al*. Effect of integrated nutrient management practices on physiological, morphological and yield parameters of chilli (*Capsicum annum* L.). Pakistan Journal of Botany. 2022;54(6):2143-50.
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. Academic Journal of Agricultural Research. 2017;5(10):255-60.
7. Chakravarthy GA, Mohan KK. Response of *Brinjal* (*Solanum melongena* L.) to Bio-stimulants in Relation to Growth, Yield and Quality. International Journal of Environment and Climate Change. 2023;13(5):132-6.
8. Deepika, Tiwari SP. Effect of different *Biozyme* concentration for maximum yield potential in chilli (*Capsicum annuum* L.). International Journal of Chemical Studies. 2021;9(2):432-6.
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 annum* L.). Biologia. 2022;77(10):2933-43.
10. Dhanasekaran K, Bhuvaneswari R. Effect of nutrient enriched humic acid on growth and yield of *Tomato*. International Journal of Agricultural Sciences. 2005;1(1):80-3.
11. Dookie M, Ali O, Ramsubhag A, Jayaraman J. Flowering gene regulation in *tomato* plants treated with brown seaweed extracts. Scientia Horticulturae. 2021;276:109-15.
12. Farouk S. Improving growth and productivity of *potato* (*Solanum tuberosum* L.) by some biostimulants and lithovit with or without boron. Journal of Plant Production. 2015;6(12):2187-206.
13. Fathima PS, Denesh GR. Influence of humic acid spray on growth and yield of chilli (*Capsicum annuum* L). International Journal of Agricultural Sciences. 2013;9(2):542-6.
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*. Pakistan Journal of Agricultural Sciences. 2017;54(2):311-7.
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.). African Journal of Plant Science. 2014;8(6):320-35.
16. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. New Delhi: ICAR; 1985.
17. Parimala M, Singh D. Effect of different biostimulants on chilli crop under Prayagraj agro-climatic condition. The Pharma Innovation Journal. 2023;12(5):2736-9.
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.
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 Archives. 2019;19(2):2126-8.
20. Saraswathi T, Praneetha S. Effect of bio stimulants on yield and quality in *tomato*. Journal of Horticultural Science. 2013.

21. Sarhan TZ. Effect of humic acid and seaweed extracts on growth and yield of *potato* plant (*Solanum tubersum* L) cv. *Desiree*. Mesopotamia Journal of Agriculture. 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. Journal of Animal and Plant Sciences. 2009;5(1):414-24.
23. Selim MM. Introduction to the integrated nutrient management strategies, and contribution on yield and soil properties. Journal of Plant Sciences. 2021;9(4):139-50.
24. Tkalec M, Vinkovic T, Balicevic R, Paradikovic N. Influence of biostimulants on growth and development of bell pepper (*Capsicum annuum* L.). Acta Agriculturae Serbica. 2010;15(29):83-8.
25. Verma SK, Rai DP, Verma LR. Knowledge and adoption of recommended chilli production technology by the farmers of Raipur district. Agriculture Update. 2015;10(2):120-5.
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 Scientiarum Polonorum Agricultura. 2020;19(1):3-10.