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Effect of Foliar Application of Modified Amrashakti Multinutrient Solution on Yield of Alphonso Mango (*Mangifera indica* L.)

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Abstract
The present investigation was designed to study the effect of foliar application of multinutrient solution (Amrashakti) on the yield of Alphonso mango during year 2022 to 2023 at Centre of Excellence for Mango, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri. The compatibility study of different water soluble fertilizers was carried out in the first phase and final 8 compatible and clear multinutrient solutions were formulated. Three sprays of multinutrient solution (Amrashakti) were done at bud bursting stage, flowering stage and marble or egg stage on mango to attain higher yield. To fulfill the object, total sixty uniform mango trees of Alphonso variety were selected. The experiment was conducted in Randomized Block Design with ten treatments and three replications. Two grafts were selected per treatment in each replication. Amrashakti multinutrient solution contains N, P, K, S, Cu, Zn, B and Mo. The results of the experiment revealed that the application of all the modified Amrashakti multinutrient solutions significantly increased the yield over the Recommended dose of fertilizer. Whereas, the application of modified Amrashakti multinutrient solution @ 0.5% (Urea, SOP, each) + 0.15% (Phosphoric acid) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate) along with RDF recorded significantly superior yield (5.56 t ha^{-1}) in comparison to rest of all the treatments.

Keywords: Amrashakti, mango, foliar application, yield

Introduction
Mango (*Mangifera indica* L.) belongs to family *Anacardaceae* is the most important fruit crop of India, where, it holds a great cultural, socio-economic and religious significance with a long history of cultivation. After departing from Goa, the Alphonso mango spread to Ratnagiri, other Konkan areas, and the southern portion of India. It is often referred as 'King of fruits' in the tropical world by virtue of its wide range of edaphoclimatic adaptability, varietal diversity, scale of production, multifarious uses and exceptional nutritional and organoleptic properties. Macronutrient and micronutrient sprays are typically supplementary to soil applications and applied to quickly alleviate nutrient deficiencies that appear suddenly, such as those induced by excessive vegetative growth or nutrient imbalances caused by improper applications of fertilizers or soil amendments. The micronutrients are often used as foliar application to reduce nutritional deficiencies and to improve the quality of mangoes (Sankar *et al*., 2013) [1]. Hence, in light of the available information, sparse related research and to overcome the nutritional problems, the present investigation was undertaken.

Materials and Methods
A research was conducted during June, 2022 to May, 2023 on a forty five years old mango orchard at Centre of Excellence for Mango, Department of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri (M.S.). For this investigation, 60 mango grafts of Alphonso variety having uniform growth and vigour grown under rainfed condition from mango orchard have been selected. The field experiment was laid out in a Randomized Block Design (RBD) comprising of ten treatments with three replications. The experimental data obtained were subjected to statistical analysis by the technique of analysis of variance by SAAS software 2.0 as applicable to randomized block design as per the procedure given by Panse and Sukhatme (1967) [2].

The modified Amrashakti multinutrient solutions were prepared after checking the compatibility of different water-soluble salts. Three sprays of Amrashakti multinutrient solution was carried out at bud bursting stage, flowering stage and marble or egg stage as per the treatment details. The spraying was carried out early in the morning by using power sprayer. Two liter of concentrated Amrashakti multinutrient solution was mixed in 18 liter of water; the 20 liter prepared solution was sprayed per tree. Each experimental tree was treated with soil application of Paclobutrazol (3 ml m^{-1} canopy diameter) to avoid the alternate bearing.

Table 1: Details of the treatments applied

Tr. No.	Treatments
T_1	Recommended package of practices as per university schedule
T_2	RDF+ Foliar spray @ 0.5% (Urea, SOP, SSP each) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.01% (Sodium molybdate)
T_3	RDF + Foliar spray @ 0.5% (Urea, SOP, each) + 0.067% (Phosphoric acid) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate)
T_4	RDF+ Foliar spray @ 0.5% (Urea, SOP, each) + 0.15% (Phosphoric acid) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate)
T_5	RDF + Foliar spray @ 0.35% (Urea) + 0.1% (Phosphoric acid) + 0.55% Potassium nitrate + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate)
T_6	RDF + Foliar spray @ 1% (Calcium nitrate) + 0.1% (Phosphoric acid) + 0.55% (Potassium nitrate) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate)
T_7	RDF + Foliar spray @ 0.5% (Urea, SOP, each) + 0.05% (Monoammonium Phosphate) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate)
T_8	RDF + Foliar spray @ 0.5% (Urea, SOP, each) + 0.1% (Phosphoric acid) + 0.25% ($ZnSO_4$, $CuSO_4$ each) + 0.2% (Microsil)
T_9	RDF + Foliar spray @ 0.5% (Urea, SOP, each) + 0.1% Phosphoric acid + 0.25% ($ZnSO_4$, $FeSO_4$, $MnSO_4$, $CuSO_4$ each) + 0.2% (Microsil) + 11% water soluble Calcium @ 0.2%
T_{10}	RDF + Foliar spray @ 0.5% (Urea, SOP, each) + 0.1% (Phosphoric acid) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate) along with plant protection as per university schedule

(Note: 3.0:1.0:1.0 N: P_2O_5: K_2O kg along with FYM @ 50 kg $tree^{-1}$ was applied to all the treatments; RDF-Recommended Dose of Fertilizers)
Spraying schedule:
Foliar sprays were at various stages as follows:
T_2-T_5: Before flowering, after flowering and at egg stage
T_6-T_{10}: Before flowering, after flowering and at marble stage

Results and Discussions

Effect of foliar application of modified Amrashkati multinutrient solution on number of fruits $tree^{-1}$

The data regarding no. of fruits $tree^{-1}$ are presented in Table 2. Among the treatments, the number of fruits $tree^{-1}$ of Alphonso mango ranged from 37.33 to 198.33. The treatment T_4 consisting RDF+ Foliar spray @ 0.5% (Urea, SOP, each) + 0.15% (Phosphoric acid) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate) was observed significantly superior in recording maximum number of fruits (198.33 $tree^{-1}$) as compared to all other treatments. While, treatment T_1 receiving RDF recorded the lowest number of fruits (37.33 $tree^{-1}$).

In general, the treatments receiving foliar application of fertilizers along with RDF was found to be increased in the yield of mango orchard over RDF only. These results are in harmony with the findings of Jadhav *et al.* (2019) [3], Rani *et al.* (2017) [4], Samant *et al.* (2018) [5], Dheware *et al.* (2020) [6] and Malshe *et al*. (2022) [7] also recorded increase in number of fruits due to foliar nutrition.

Table 2: Effect of modified Amrashakti multinutrient solutions on yield of Alphonso mango

Treat. No.	No. of fruits ($tree^{-1}$)	Average wt. of fruit (kg)	Yield (kg $tree^{-1}$)	Yield (t ha^{-1})
T_1	37.33	0.269	10.097	1.01
T_2	102.83	0.278	28.480	2.85
T_3	106.67	0.275	28.770	2.88
T_4	198.33	0.278	55.599	5.56
T_5	144.00	0.260	37.409	3.74
T_6	135.00	0.276	37.700	3.77
T_7	127.00	0.274	33.334	3.33
T_8	105.33	0.264	27.624	2.76
T_9	87.67	0.274	23.666	2.37
T_{10}	93.33	0.268	24.935	2.49
S.E. (m)±	17.96	0.011	3.44	0.34
CD@5%	53.36	NS	10.22	1.02

Effect of foliar application of modified Amrashkati multinutrient solution on average weight of fruit

It was observed from data that, the application of modified Amrashakti multinutrient solutions showed statistically non significant differences. These findings are in line with the findings of Talang *et al.* (2017) [8].

Effect of foliar application of modified Amrashkati multinutrient solution on yield: The fruit yield was influenced irrespective of the treatments due to the foliar application of different Amrashakti multinutrient solutions and significant differences were observed during the investigation. Among the treatments, the fruit yield of Alphonso mango varied from 1.01 to 5.56 t ha^{-1}. The

treatment T_4 consisting of RDF+ Foliar spray @ 0.5% (Urea, SOP, each) + 0.15% (Phosphoric acid) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate) found significantly superior in recording maximum fruit yield (5.56 t ha^{-1}) over all other treatments. Further, the treatment T_1 consisting RDF only recorded the lowest fruit yield (1.01 t ha^{-1}).

The fruit yield in mango orchard was generally shown to be higher than control treatment as a result of foliar application of nutrients through different treatments. The increase in fruit yield in treatment T_4 is a cumulative effect of increase in number of fruits. This indicated that, increase in the phosphorus level influenced the fruit yield in mango by enhancing the flowering. Patil *et al.* (2010) [9] also reported the increase in the yield of mango due to increasing doses of foliar nutrient spray on Alphonso. These observations were in conformity with the results obtained by Thakur *et al.* (1983) [10], More (2013) [11], Joshi (2015) [12], Puranik (2015) [13] and Patil (2017) [15].

Conclusions

The application of modified Amrashakti multinutrient solution @ 0.5% (Urea, SOP, each) + 0.15% (Phosphoric acid) + 0.25% ($ZnSO_4$, Borax, $CuSO_4$ each) + 0.0075% (Ammonium molybdate) (T_4) was responsible for achieving an increased yield of Alphonso mango.

References

1. Sankar C, Saraladevi D, Parthiban S. Effect of foliar application of micronutrients and sorbitol on fruit quality and leaf nutrient status of mango cv. Alphonso.Asian J Hort. 2013;8(2):714-719.
2. Panse VG, Sukhatme PV. Statistical methods for Agricultural workers, I.C.A.R., New Delhi, 1967.
3. Jadhav Sayali, Salvi VG, Deshmukh Utkarsha, Jadhav SC. Effect of foliar application of nutrients on flowering, fruit set and yield of alphonso mango in lateritic soil. International Journal of Chemical Studies.2019;7(5):1465-1468.
4. Rani Sohnika, Sharma A, Wali VK, Bakshi P, Bakshi M, Gupta S. Effect of foliar nutrition on yield, quality and shelf-life of mango (*Mangifera indica* L.) cv. Dashehari under Jammu sub-tropics. Indian Journal of Agricultural Sciences.2017;87(2):185-90.
5. Samant Deppa, KundanKishor, Singh HS. Assessing effectiveness of 'Arka Mango Special' for improving yield and quality of mango variety 'Banganpalli' in lateritic soils of Odisha. Int.JCurr.Microbiol.App.Sci. 2018;7(01):168-173.
6. Dheware RM, Nalage NA, Sawant BN, Haldavanekar PC, Raut RA, Munj AY, *et al*. Response of micronutrient on the quality yield of mango cv. Alphonso under Konkan agro-climatic conditions. Journal of Pharmacognosy and Phytochemistry.2020;9(3):2004-2006.
7. Malshe KV, Salvi BR, Salvi VG. Influence of post flowering foliar nutrient application on yield and quality attributes of mango (*Mangifera indica* L.) cv. Alphonso under south Konkan conditions. Journal of Eco-friendly Agriculture.2022;17(1):62-64.
8. Talang HD, Dutta P, Mukhim C, Patil S. Effect of calcium, boron and sorbitol on fruit-set, yield and quality in mango cv. Himsagar. Journal of Horticulture Sciences.2017;11(2):166-169.
9. Patil KD, Salvi BR, Chavan AS. Effect of Foliar Application of Nutrients to Alphonso Mango in Lateritic Soils of Konkan.J Indian Soc. Coastal agric. Res. 2010;28(1):40-43.
10. Thakur RS, Samra JS, Chadha KL. Assessment of micro-nutrients status in the foliage of mango trees around Malihabad. Lucknow. Indian Journal of Horticulture. 1980;37:120-123.
11. More SS. Effect of Application of Chemical fertilizer in Combination with Silicon on Yield and Nutrient Content of Mango (*Mangifera indica* L.)Leaves in Lateritic Soil of Konkan Region. Ph.D. (Agri) Thesis submitted to Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra, 2013.
12. Joshi NS. Periodical changes in soil and leaf nutrient content and its effect on time of fruit maturity and yield of Alphonso mango under Konkan conditions. M.Sc. (Agri.) Thesis submitted to Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra; c2015.
13. Puranik UY. Periodical Nutrient Content in Soil and Leaf of Alphonso Mango Orchards from Ratnagiri and Devgad and their effect on Yield and Quality. M.Sc. (Agri) Thesis submitted to Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra, 2015.
14. Patil.Occurrence of spongy tissue in Alphonso mango in relation to nutrient management. Ph.D. (Agri) Thesis submitted to Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra, 2017.