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Effect of chemicals and biomix on quality parameters of Kesar Mango

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Abstract
The present investigation conducted at Fruit Research Station Aurangabad, during the year 2021-22. The trial conducted in randomize block design with eleven treatments replicated thrice. Two foliar application of plant growth regulators, humic acid, and biomix given at peanut and marble stage of fruit development. The result of PGR's, humic acid and biomix on physiochemical observation, However, there were significant differences were recorded in Physiological loss of fruit weight, titratable Acidity, TSS, total sugars, reducing sugars, non-reducing sugars (%), TSS: Acid Ratio. The increase TSS, total sugars, reducing sugars, non-reducing sugars (%), with corresponding decrease in acidity and reduces physiological loss of fruit weight. The maximum TSS (20.90%), total sugars (16.70%), reducing sugars (4.30%), non-reducing sugars (13.00%) and TSS: Acid Ratio (99.52) was recorded in the treatment T_8 (Humic acid). The minimum acidity (0.21%) and minimum physiological loss of fruit weight percentage (1.70%) was recorded in the treatment T_8 (Humic acid).

Keywords: Quality, NAA, tricontanol, humic acid, Kesar, biomix

Introduction
Mango is a favourite fruit of tropical and subtropical regions of the world. It belongs to the family mangiferae. India is the largest producer of mango *i.e.* production of 20336 thousand MT from an area of 2339thousand ha having productivity of 8.69 MT/ha (Gunadal *et al.*) and Maharashtra state production of 439.08thousand MT from an area of 168.15 thousand ha having productivity of 2.61 MT/ha, (Anonymous 2021) [1].
Mango flowering habits, sex expression, yield and physico-chemical characteristics are crucial drivers of how well they function. Mango productivity is greatly impacted by flowering, which is largely a varietal trait that is influenced by the weather. Hence foliar spraying of plant growth regulators, humic acid, and biomix (microbial consortium) in manipulation of flowering behavior of mango is need of quality mango production under adverse climatic condition in India.

Materials and Methods
The research trial was carried out at Fruit research station, Aurangabad during the year 2021. The trial was laid out in Randomized block design with eleven treatments replicated thrice. The PGR's with different conc., biomix (microbial consortia) and humic acid were included as treatments *viz.* NAA 15ppm(T_1), NAA 20ppm (T_2), NAA 25ppm (T_3), NAA 30ppm (T_4), Triacontanol 700ppm(T_5), Triacontanol 750ppm(T_6), Humic acid 1.5% (T_7), Humic acid 2% (T_8), Biomix 1% (T_9), Biomix1.5% (T_{10}) and Control *i.e.*T_{11}. Two foliar application of all the treatments were applied at pea and marble stage of fruit development.

Results and Discussion
The data regarding TSS is present in Table 1 from the data it is reported that, TSS was significantly influenced by different chemicals and biomix. The maximum TSS (20.90%) was recorded in the treatment T_8 (Humic Acid 2%) which was at par with the treatment T_7 (20.20%) (Humic Acid 1.5%). The minimum TSS percentage (17.50%) was recorded in the treatment T_{11} (control). The maximum TSS reported under treatment T_8 (Humic Acid 2%) i.e. (20.90%). This might be due to, during ripening hydrolysis of polysaccharides, conversion of organic acid in soluble sugars and enhanced solubilization of insoluble starch and pectin present in cell wall and middle lamella. Similar finding by Bhalekar *et al.* (2016) [2] in Kesar cultivar of mango, Sharma *et al.* (2008) [9] in apple fruit.

The minimum acidity (0.21%) was recorded in the treatment T_8 (Humic Acid 2%) which was at par with the treatment T_7 (0.23%) (Humic Acid 1.5%) and T_6 (0.25%) (Tricontanol 750ppm). The maximum acidity (0.36%) was recorded in the T_{11} (Control). The maximum total sugars (17.30%) was recorded in the treatment T_8 (Humic Acid 2%). The increase in total sugars with humic acid application might be due to the increase in carbohydrate accumulation in leaf and fruit tissues, which ultimately converted to glucose and sucrose, as well as the breakdown of starch into sugars during ripening (Hermans *et al*., 2006) [4]. Similar results were reported by (El-Kosary *et al*., 2011) [3] in mango.

Treatment T8 (humic Acid 2%) showed maximum reducing sugar (4.30%) This might be due to conversion of starch and polysaccharides into simple sugar with the advancement of storage was responsible for the increases the reducing sugar, The increase in total sugars with humic acid application might be due to the increase in carbohydrate accumulation in leaf and fruit tissues, which ultimately converted to glucose and sucrose, as well as the breakdown of starch into sugars during ripening (Hermans *et al*., 2006) [4]. Similar results were reported that humic acid increased fruit total sugars of 'Ewais' mango fruit (El-Kosary *et al*., 2011) [3]. The minimum non reducing sugar (10.49%) was noticed under treatment control. similar result was finding by Kulkarni S (2017) [5]. The maximum TSS: Acid Ratio (99.52) was recorded in the treatment T_8 (humic acid 2%) which is followed by T_6 and T_7. The minimum TSS: Acid Ratio (48.61) was recorded in the treatment T_{11} (control). Similar result were found by Mosa *et al*. (2015) [7] that humic acid improved TSS: Acid ratio.

The maximum physiological loss of fruit weight percentage (11.40%) was recorded in the treatment T_{11} (control) According to Makwana *et al*. (2014) [6], weight loss is associated with reduced respiration rate and evapotranspiration, and delayed maturation by limiting ethylene accumulation in treated fruit. Similar results are consistent with Thupten Tsomu (2019) [10].

Table 1: Effect of plant growth regulators, humic acid and biomix (Microbial consortium) on fruit quality of mango variety Kesar

Treatments	Treatment details	Physiological loss of weight (%)	TSS (%)	Titratable Acidity (%)	Total Sugar (%)	Reducing Sugar (%)	Non Reducing Sugar (%)	TSS: Acid Ratio
T_1	NAA 15ppm	7.00	18.00	0.31	15.75	3.95	11.8	58.06
T_2	NAA 20ppm	6.30	18.20	0.30	15.98	4.03	11.95	60.67
T_3	NAA 25ppm	5.50	18.50	0.29	16.08	4.08	12.00	63.79
T_4	NAA 30ppm	4.60	18.75	0.28	16.32	4.12	12.20	66.96
T_5	Triacontanol 700ppm	3.00	18.80	0.28	16.50	4.15	12.35	67.14
T_6	Triacontanol750ppm	1.70	19.71	0.25	16.60	4.21	12.39	80.12
T_7	Humic acid 1.5%	4.40	20.20	0.23	16.70	4.26	12.44	87.82
T_8	Humic acid 2%	3.60	20.90	0.21	17.30	4.30	13.00	99.52
T_9	Biomix 1%	9.55	17.75	0.33	15.00	3.80	11.2	53.79
T_{10}	Biomix 1.5%	8.60	17.98	0.32	15.39	3.89	11.5	56.19
T_{11}	Control	11.40	17.50	0.36	13.39	3.45	10.49	48.61
	S.E±	0.43	0.38	0.02	0.32	0.084	0.27	1.30
	CD at 5%	1.28	1.12	0.06	0.96	0.25	0.80	3.87

Conclusion

The application of T_8 Humic acid 2%) produced beneficial effects on quality attributes of mango fruit. The increase in TSS, total sugars, reducing sugars, non-reducing sugars (%), with corresponding decrease in acidity and reduces physiological loss of fruit weight.

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