



P-ISSN: 2349-8528  
E-ISSN: 2321-4902  
IJCS 2019; 7(5): 40-42  
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Received: 01-07-2019  
Accepted: 03-08-2019

**RR Jadhav**

Department of Agricultural Botany, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**BG Thaware**

Department of Agricultural Botany, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**MM Burondkar**

Department of Agricultural Botany, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**PB Sanap**

Department of Horticulture, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**SC Jadhav**

Department of Soil Science and Agril. Chemistry, College of Agriculture, Dapoli, Maharashtra, India

**AG Mahale**

Department of Soil Science and Agril. Chemistry, College of Agriculture, Dapoli, Maharashtra, India

**Correspondence****RR Jadhav**

Department of Agricultural Botany, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

## International Journal of Chemical Studies

# Physical changes in alphonso mango fruits during fruit development as influenced by preharvest spray of nutrients on fruit

**RR Jadhav, BG Thaware, MM Burondkar, PB Sanap, SC Jadhav and AG Mahale**

**Abstract**

To evaluate the effect of preharvest spray of nutrients on fruit quality in Alphonso mango (*Mangifera indica* L.) was conducted during summer 2016 at Central Experimental Station, Wakawali, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, District. Ratnagiri. In present investigation there were ten treatment combination which were replicated 3 times and 2 trees were taken as a unit for each treatment/replication. As per the treatment details, three sprays in seven treatments and three dipping in two treatments were taken in experiment. The required concentration of solution were prepared at the time of application of treatments. In study of fruit growth and development treatment T<sub>5</sub> (Elanta spray 2 ml/lit) was found promising treatment for increasing length, and breadth, while treatment T<sub>7</sub> (SOP @ 30 gm/lit spray) was found promising for weight and yield (59.89 kg/plant) of the fruit.

**Keywords:** Alphonso mango, Elanta spray, SOP spray, calcium spray

**Introduction**

Mango (*Mangifera indica* L.) is the oldest and 'National Fruit of India' and rightly known as 'King of Fruits' owing to its national richness, unique taste, pleasant aroma and religious and medicinal importance. Mango is believed to be originated to South East Asia, Indo-Burma region, in foot hills of the Himalayas (Mukherjee, 1951). Due to its wide adaptability, high nutritive value, richness in variety, delicious taste, pleasant flavor and attractive appearance, it enjoys the unique popularity among the masses and classes (Anon., 1998) [1].

India is the largest producer of mango in the world and ranks first in area and production. The total production of mango in India is 18.832 million MT from about 2.218 million ha area with the productivity of 8.49 MT/ha (Anon., 2015 a) [5]. India contributes about 64% of the world mango production. Other major mango producing countries are Mexico, Pakistan, Brazil, Philippines and Thailand. According to the APEDA, during the year 2014-15 India exported 42,998 tonnes of mangoes worth Rs.302 cores (Anon., 2015 b) [6]. Which is 35.8 per cent of total area and 22.1 per cent of the total production of fruit crops in the country. The other countries which followed by India in mango production (MT) are China (4.40), Kenya (2.78), Thailand (2.65), Indonesia (2.37), Pakistan (1.95) and Mexico (1.76) (Anon., 2014 a) [3].

In Maharashtra mango is occupying an area of 0.156 million ha with annual production of 0.876 million MT and productivity is 5.60 MT/ha (Anon., 2015 c) [7]. Konkan region on the West Coast of Maharashtra is one of the largest mango growing belt which contributes nearly 10 per cent of total mango area in the country, occupying 0.182 million hectare area under mango cultivation with annual production of 3.25 lakh MT. The productivity of mango in Konkan is about 2.5 t/ha which is about three times less than the average productivity of the country (Anon., 2014 b) [4]. Mango is an important foreign exchange earner with an export of 1, 74,860 metric tonnes worth Rs. 772.95 crores of processed products and 41,280 metric tonnes worth Rs. 285.43 crores of fresh fruits (Anon., 2014 a) [3].

**Material and Methods**

The experiment was conducted during summer 2016 at Central Experimental Station, Wakawali, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri. The Village Wakawali in Dapoli Tahsil of Ratnagiri District (Maharashtra) is situated in the subtropical region having high humidity and warm climate throughout the year with the

fluctuation in daily temperatures. The place lies on 170 40' to 170 45' north latitude and 730 16' to 730 19' East longitude at elevation of 250 meters above mean sea level. The mean annual precipitation is about 3500-4000 mm, which is generally received from June to October.

The fruits were harvested in the morning hours at proper stage of maturity (i.e. 85% maturity), hard green, healthy and disease free mango. Fruits were harvested by using Dapoli harvester and as such the stalk length was kept 2.5 cm. The 30 fruits/treatments/replication were collected from Tetawali Block, Wakavali of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, during summer 2016. For present investigation twenty years old Alphonso mango trees having uniform vigour, size and maintained at normal cultural practice were selected randomly. The given treatment were T<sub>1</sub>: Arka Saka Nivaraka (Dipping): 100 ml/lit ; T<sub>2</sub>: Arka Saka Nivaraka (Spraying); T<sub>3</sub>: Amrashakti (Dipping): 125 ml/lit; T<sub>4</sub>: Amrashakti (spraying): 125 ml/lit; T<sub>5</sub>: Elanta super: 2 ml/lit; T<sub>6</sub>: Sulphate of potash (SOP): 20 g/lit; T<sub>7</sub>: Sulphate of potash (SOP): 30 g/lit; T<sub>8</sub>: Chelated calcium: 20 g/lit; T<sub>9</sub>: Calcium carbonate : 5 g/lit; T<sub>10</sub>: No spraying (control).

In present investigation there were ten treatment combination which were replicated three times and two trees were taken as a unit for each treatment/replication. As per the treatment details, three sprays of seven treatments were taken with the

foot spray on whole crown of the tree and two treatments with dipping of whole fruit into chemical for time some time interval. The required concentration of solution were prepared at the time of application of treatments.

## Result and Discussion

### Physical changes in Alphonso mango fruits during fruit development as influenced by different treatments

#### Length of fruit (Cm)

The data regarding length of fruit at various growth stages as influenced by different treatments are given in Table 1. From the table, it is clear that average length of mango fruit increased from fruit set (2.51 cm) till maturity (8.63 cm). Further it is interesting to note that the rate of growth in terms of length was rapid till 60 days after fruit set (DAFS) which was followed by steady increase till date of harvest in all the treatments under study. Further, it is observed that there was significant difference in length of fruit at 30, 60, and 90 DAFS. Among all the treatments, significantly maximum length of fruit was observed in T<sub>5</sub> (Elanta spray 2 ml/lit) at 30, 60 and 90 DAFS growth stages which was at par with treatment T<sub>3</sub> (Amrashakti dipping @ 125 ml/lit) whereas treatment T<sub>10</sub> (control) showed minimum length of fruit at all growth stages.

**Table 1:** Length of fruit at various growth stages as influenced by different treatments.

Treatment	Length of fruit			Breadth of fruit		
	30 Days	60 Days	90 Days	30 Days	60 Days	90 Days
T <sub>1</sub>	2.62	6.10	8.85	1.67	4.80	6.46
T <sub>2</sub>	2.64	6.03	8.77	1.63	4.88	6.55
T <sub>3</sub>	2.76	6.53	8.86	1.72	4.77	6.72
T <sub>4</sub>	2.73	6.40	8.83	1.74	4.84	6.84
T <sub>5</sub>	2.79	6.59	9.02	1.77	5.09	6.91
T <sub>6</sub>	2.32	6.29	8.38	1.64	4.89	6.47
T <sub>7</sub>	2.30	6.29	8.47	1.62	4.86	6.59
T <sub>8</sub>	2.32	6.24	8.45	1.60	4.23	6.39
T <sub>9</sub>	2.36	6.17	8.39	1.61	4.29	6.48
T <sub>10</sub>	2.28	5.86	8.33	1.55	4.12	6.30
Mean	2.51	6.25	8.63	1.66	4.68	6.57
S.E.±	0.04	0.09	0.10	0.01	0.09	0.03
C.D. at 5%	0.11	0.26	0.29	0.03	0.27	0.08

#### Breadth of fruit (cm)

The data regarding breadth of fruit at various growth stages as influenced by different treatments are given in Table 1. It is evident from data that there was rapid increase in breadth of fruit up to 60 DAFS. After that there was slow increase in breadth of fruit up to harvest in all the treatments. There was a significant difference in breadth of fruit at 30, 60 and 90 DAFS due to different treatments. At all growth stages, significantly maximum breadth of fruit was found in treatment T<sub>5</sub> (Elanta spray 2 ml/lit) which was at par with treatment T<sub>4</sub> (Amrashakti spray @125 ml/lit) except at 60 DAFS and minimum breadth of fruit was found in T<sub>10</sub> (control) treatment.

#### Weight of fruit (g)

The data pertaining to effect of treatments on weight of fruit is given in Table 2. From the data, it is observed that initially increase in weight of fruit was slow but rapidly increased between 60 and 90 DAFS. There was significant effect of different types and doses of treatments on weight of fruit at DAFS. During growth and development of mango fruit, treatment T<sub>5</sub> (Elanta spray 2 ml/lit) showed maximum weight of fruit at 30 DAFS and treatment T<sub>7</sub> (SOP spray @ 30 g/lit) at 60 and 90 DAFS whereas minimum weight of fruit in all growth stages was found in treatment T<sub>10</sub> (control).

**Table 2:** Weight of fruit at various growth stages as influenced by different treatments.

Treatment	Weight of fruit			Number of fruits per tree	Yield (kg/plant)
	30 Days	60 Days	90 Days		
T <sub>1</sub>	7.33	79.85	200.17	182.67	43.88
T <sub>2</sub>	7.37	79.84	202.30	185.72	45.81
T <sub>3</sub>	7.61	82.64	204.65	193.32	46.10
T <sub>4</sub>	7.69	83.09	206.49	214.70	48.82
T <sub>5</sub>	7.75	84.35	209.54	185.69	45.04
T <sub>6</sub>	7.71	84.33	206.87	232.67	52.80
T <sub>7</sub>	7.73	86.23	210.67	235.72	59.89
T <sub>8</sub>	7.26	76.65	183.77	163.76	42.27
T <sub>9</sub>	7.30	74.20	187.24	163.72	41.56
T <sub>10</sub>	7.21	73.13	181.10	160.09	35.56
Mean	7.50	80.43	199.28	191.80	46.17
S.E.±	0.04	0.84	1.93	3.30	2.24
C.D. at 5%	0.12	2.49	5.72	9.80	6.67

### Number of fruits per tree

The data revealed that there is significant effect of treatments on number of fruits per tree was presented in Table 2. Treatment T<sub>7</sub> (Sulphate of potash (SOP): 30 g/lit) showed significantly maximum number of fruits per tree (235.72) and which was at par with the treatment T<sub>6</sub> (Sulphate of potash (SOP): 20 g/lit) (232.67) and minimum number of fruits per tree (160.09) was found in treatment T<sub>10</sub> (control).

### Yield of fruit

The data pertaining to yield of Alphonso mango fruit as affected by different treatments is given in Table 2. There was significant difference on yield of fruit due to application of treatments. In case of yield in kg per plant, significantly highest yield (59.89 kg/plant) was obtained in treatment T<sub>7</sub> (SOP spray @ 30 g/lit) next best treatment found to be T<sub>6</sub> (SOP spray @ 20 g/lit) (52.80 kg/plant). The lowest yield was obtained from the treatment T<sub>10</sub> (control) (35.56 kg/plant).

### Conclusion

On the basis of these results following conclusions can be drawn.

In study of fruit growth and development treatment T<sub>5</sub> (Elanta spray 2 ml/lit) was found promising treatment for increasing length, and breadth, while treatment T<sub>7</sub> (SOP @ 30gm/lit spray) was found promising for weight of fruit, number of fruits per tree and yield of the fruit.

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