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### Influence of CPPU on fruit set, quality and storage potential of “Alphonso” mango

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**Abstract:** The present experiment was conducted to study the, “Influence of CPPU on fruit set, quality and storage potential of ‘Alphonso’ mango” in the Department of post harvest management of Fruit, Vegetable and Flower crops, Post Graduate Institute of Post Harvest Management, Dr.B.S.K.K.V. Dapoli during the year 2013-2014. In mango Cv. Alphonso fruits set and retention were analysed for changes in physical and chemical parameters, PLW. The experiment result indicated that fruit retention, days required for harvesting and physico chemical properties of mango Cv. Alphonso were influenced by different concentration of CPPU spray. Significantly higher fruit set, retention and yield of mango Cv. Alphonso was observed in CPPU treated plants over control plants. However, there was no significant difference was noticed in terms of TSS, acidity, reducing sugar and total sugars CPPU treated plants over control plants.

**Key words:** mango, CPPU, quality, PLW, physical and chemical parameters

#### INTRODUCTION

Mango (*Mangifera indica* L.) is a member of Anacardiaceae family. The genus *Mangifera* contains several species that bear edible fruit. Most of the fruit trees that are commonly known as mango belong to the species *Mangifera indica*. The other edible *Mangifera* species generally have lower quality fruit and are commonly referred to as wild mango. Mango

is one of the major fruit crops of Asia and has developed its own importance all over the world. Being a useful and delicious fruit. Besides taste and good qualities, it is called “The King of Fruits”. Mango is one of the oldest tropical fruits and originated in Indo-Burma region. It has intimate association with cultural, religious, aesthetic and economic lives of Indians since time immemorial and hence it is a national fruit of India

(Chatopadhyay, 1976). Konkan is the major and famous Alphonso mango producing region on the west coast of Maharashtra, crop occupying the area of 1.80 lakh ha which is (7.2%) of total area in country. Ratnagiri and Sindhudurga districts are mango baskets of Maharashtra. Almost 80 % per cent area is covered by the single cultivar i.e. Alphonso Which is locally called as “Hapus”. The warm and humid climate throughout the year and rain free season from November to May prevalent in Konkan region is ideal for mango in general and Alphonso in particular. It enjoys virtual dominance both in domestic as well as in international markets due to its typical sugar-acid blend and taste. Thus, farmers get premium prices. A full-grown Alphonso tree in bearing season (on year) produces panicles in thousands, each of which bears about 1000- 6000 flowers, but only 11-13 per cent of them are hermaphrodite of which only 0.13 per cent reach maturity (Gunjate 1985). Overall final retention in Alphonso mango is reported to be one fruit per 2-5 panicles, which is the lowest compared to other commercially cultivated varieties. However, it is observed that there is heavy fruit drop at various stages of fruit development (pea-nut stage, marble stage and egg stage) is a serious problem and has become a limiting factor for optimizing production. Along with that, alternate bearing habit has handicapped the productivity of mango crop. Due to these problems, productivity of Alphonso mango in konkan region is 2-3 times less than average mango production of the country. Also, natural season for Alphonso in Konkan region is April-May and thus glut of produce comes in market at same time. The induction of early and regular flowering will help in lowering the severity of these problems. Many plant growth regulators like  $GA_3$  have been used for inducing flowering but were not found effective. Taking this into account, the present study relating “Influence of CPPU on fruit set, quality and storage potential of ‘Alphonso’ mango” was undertaken with objectives to evaluate effect of foliar spray of CPPU on fruit set.

## **MATERIAL AND METHODS**

The experiment was conducted in the Mango Orchard Plot no. 14, Horticulture nursery, College of Agriculture Dapoli, Dist. Ratnagiri. Dapoli is situated on the West Coast (Arabian Sea) of the Konkan region of Maharashtra at an altitude of 280 meters above from MSL. It is located in tropical region at 17°45 North latitude and 73°12 East latitude. The climate of Dapoli is warm and humid with average annual rainfall is 3500-4000 mm, which normally distributed from June to September. The average relative humidity is about 78 per cent while average minimum and maximum temperature are 18.5°C and 30.8°C, respectively. The topography of experimental orchard is fairly uniform with a gentle gradient towards the eastern side. The orchard soil is red lateritic, fairly homogenous with good drainage and moderate acidic in reaction. For conducting the aforesaid two objectives, experiment material consist of cultivar alphonso trees having 30 years old of age was used. The plant having uniform growth and vigour at the same site were selected randomly for the study. The CPPU (Forchlorofenuron) solution of 0.5% concentration at different levels as described in the treatment were used. The experiment was laid out in RBD with four replications and five treatments, viz.  $T_1$ :1 ml of CPPU in 1 lit. water,  $T_2$ :2 ml of CPPU in 1 lit. water,  $T_3$ :3 ml of CPPU in 1 lit. water,  $T_4$ :4 ml of CPPU in 1 lit. water,  $T_5$ :control. Alphonso mango trees were selected and tagged at peanut stage of mango panicle. The first spraying were given at the time of flowering (1ml/lit.) and subsequent spraying of CPPU were applied twice, i.e. at peanut stage size of fruits and second at marble stage of fruits with different concentrations as per treatment details. The tagged fruits of uniform size were harvested for the post-harvest quality of Alphonso mango fruits were selected proper at maturity stage i.e B stage of physiological maturity (85% maturity). The observation on various traits recorded in Pre-harvest studies (Number of fruit set/ tree, yield per plant) and Post-harvest studies. Fruits

were brought to laboratory in plastic crates and pre-cooled to remove field heat. Then stalk of all these fruits were cut in at 2.5 cm. All these fruits were cleaned with carbendazim (35%WP) and dried with dry muslin cloth and allowed to ripe at ambient temperature. Fruits were sorted according to treatment and kept in CFB boxes. For studying physical parameters twelve fruits were randomly selected and observations were recorded on the physical characteristic i.e. fruit weight, volume and specific gravity. The various chemical constituents of ripe mango fruits harvested at each treatment. For this study five fruits were randomly selected and observation were recorded on the chemical composition viz. TSS, Titratable acidity (%), Reducing sugar (%), Total sugars (%) was determined by method of Lane and Eynon (1923) as reported by Ranganna (1986), A.O.A.C. (1975). The PLW was determined by weighing ten fruits at four days interval. The data were recorded and analysed by the method suggested by Panse and Sukhatme (1967).

## RESULTS AND DISCUSSION

### Fruit set and retention

The data on Effect of foliar sprays of CPPU on fruit set of mango Cv. Alphonso are presented in Table 1. From the data it was revealed that the fruit set varied due to foliar sprays of CPPU. At Grain stage, there was no significant effect of CPPU sprays on fruit set and retention. Similarly, no significant effect of CPPU sprays on fruit set and retention at peanut stage. At Marble stage, there was significant effect of CPPU sprays on fruit set and retention. The maximum fruit set recorded in T<sub>3</sub> (3.38) and minimum T<sub>4</sub> (1.48). The highest fruit retention of mango was obtained with application (3ml and 4ml/lit CPPU spray) at egg stage. Both the treatments were significantly superior over control. In this respect, this might be due to fact that CPPU has a promoting effect of fruit set and retention by ABA

content as found by Guirguiset.al (2010) in persimmon. At Mature stage, the number of fruits per panicle was highest in T<sub>3</sub> (CPPU- 3ml) and T<sub>4</sub> (CPPU- 4ml). Increase number of fruits in these treatments might be due to higher fruit set, treatments having CPPU registered higher fruit retention than control. Similar enhancements in fruit retention have been reported by Suranant Subhadrabandhu and Kusol Iamsub (1996) in Cv.Nam Dok Mai, Smith (2008) in Grapes, Yasuyoshi Hayata and Yoshiyuki Niimi (1995) and T. Susila *et.al* (2013) in water melon.

### Fruit yield

The pattern of variation in fruit yield on mango Cv. Alphonso was affected by foliar sprays of CPPU. The data presented in the Table 1 showed that the difference for fruit yield was significantly increased the yield in terms of fruits/plant due to application of CPPU foliar spray 3ml (321.50/plant) followed by 2ml (302.50/plant) over the treatments. These findings were also reported by S. Notodemagio (2008) in case of mango Cv. Arumanis, Katsuaki Sasaki and Naoki Utsunomiya (2012) in mango Cv. Irwin, Guirguiset.al (2010) in persimmon and T. Susila *et.al* (2013) in water melon.

### Physical parameters

The data on effect of foliar sprays of CPPU on weight of the fruit in mango Cv. Alphonso are presented in Table 2. The results for weight (g) revealed that the fruit weight didn't vary due to foliar sprays of CPPU. At harvest, no significant effect of CPPU on fruit weight of mango was observed at harvest. Based upon the observations of volume (ml) no significant effect of CPPU was found. No significant effect of CPPU on specific gravity of mango at harvest was recorded. Identical observations were recorded by Joshi and Roy (1985), Padhye (1997) and Kaspe and Katrodia (2008).

**Table 1**  
**Effect of foliar sprays of CPPU on fruit set and yield in mango**  
**Cv. Alphonso**

Treatments	Grain stage	Peanut stage	Marble stage	Egg stage	Mature stage	Fruit yield
T <sub>1</sub>	10.4	8.17	1.51	1.34	1.21	180.75
T <sub>2</sub>	10.05	7.95	1.76	1.50	1.22	302.50
T <sub>3</sub>	10.05	7.85	3.38	2.70	2.11	321.50
T <sub>4</sub>	9.77	7.67	1.48	1.53	1.30	276.25
T <sub>5</sub>	10.65	7.47	1.69	1.46	1.11	133.50
Mean	10.19	7.83	1.97	1.71	1.39	242.80
S.Em ±	0.85	0.66	0.16	0.11	0.06	36.05
C.D. at 5%	NS	NS	0.49	0.32	0.18	111.07

**Table 2**  
**Effect of foliar spray of CPPU on physical parameter of mango**  
**Cv. Alphonso at harvest**

Treatments	Fruit weight (g)	Fruit Volume (ml)	Specific gravity
T <sub>1</sub>	245.53	237.20	1.0355
T <sub>2</sub>	229.35	221.80	1.0327
T <sub>3</sub>	238.32	227.87	1.0487
T <sub>4</sub>	237.91	228.03	1.0432
T <sub>5</sub>	228.37	219.87	1.0399
Mean	235.89	226.87	1.0400
S.Em ±	15.13	14.92	0.0065
C.D. at 5%	NS	NS	NS

### Chemical composition of fruit

The Total soluble solids (<sup>o</sup>B), Titratable acidity (%), Reducing sugar (%) and Total sugars (%) of mango fruit at ripe stage were not influenced by CPPU spray as shown in Table 3. Results of the analysis variance showed that CPPU application did not change chemical content of ripe fruit of mango significantly, also was no significant difference was found among the treatments. The similar observations of chemical composition were also reported by Verma and Bijpal (1971), Laxminarayan (1973), Kapseet *al.*(1979) in Neelum, Malde and Mulgoa in mango fruits.

### Storage behaviour

The data on physiological loss in weight of mango Cv. Alphonso fruits during storage are presented in Table 4. It was noticed from the data that physiological loss in weight of mango fruits increased continuously throughout the 20 days period and there was no significant effect of CPPU on PLW. The steady increase in physiological loss in weight throughout the storage period could be due to continuous loss of moisture through respiration and transpiration of fruits. Similar observations were recorded by Najundaswamy *et al.*(1966) in Mulgoa, Vanraj and Nadsuli, Pandey and Tandon (2007) in Chausa and Mallika.

**Table 3**  
Effect of foliar spray of CPPU on chemical parameter of mango Cv. Alphonso at harvest

Treatments	TSS °B	Acidity (%)	Reducing sugar (%)	Total sugar (%)
T <sub>1</sub>	22.12	0.30	2.60	9.35
T <sub>2</sub>	24.97	0.22	2.45	9.60
T <sub>3</sub>	22.12	0.21	2.21	11.82
T <sub>4</sub>	21.52	0.19	2.19	9.52
T <sub>5</sub>	24.15	0.18	2.27	9.90
Mean	22.98	0.22	2.34	10.04
S.Em ±	1.07	0.02	0.08	0.56
C.D. at 5%	NS	NS	NS	NS

**Table 4**  
Physiological loss in weight (PLW) in per cent of mango Cv. Alphonso fruits during storage

Treatments	Storage period (days)					
	0	4	8	12	16	20
T <sub>1</sub>	0	2.80	6.62	10.93	14.05	18.44
T <sub>2</sub>	0	2.94	6.44	10.57	14.54	18.12
T <sub>3</sub>	0	3.36	6.17	10.38	14.59	18.74
T <sub>4</sub>	0	2.83	6.35	10.74	15.13	19.51
T <sub>5</sub>	0	4.99	7.30	11.63	15.71	19.56
Mean	0	3.38	6.57	10.85	14.80	18.87
S.Em ±	0	0.65	0.81	0.83	0.79	1.08
C.D. at 5%	NS	NS	NS	NS	NS	NS

### CONCLUSION

Findings of the present study revealed that application of CPPU spray at different concentration had influence over fruit set, fruit retention, fruit yield and physiochemical properties on mango Cv. Alphonso. In which fruit retention and yield were significant while no significant differences was noted in terms of physical and chemical properties.

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