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## Effect of different chemicals on the shelf life of Nagpur mandarin orange

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### Abstract

Citrus is an important fruit crop in the world for fresh fruits owing to its relatively long storage life. The experiment was conducted during of 2009-2010 in the laboratory Department of Horticulture, BAU, Kanke, Ranchi. The objectives of the present studies were to enhance the shelf life of Nagpur Mandarin oranges under ambient storage condition by treating them in different chemicals at different concentration. It is concluded that among different levels of different treatment evaluated in the experiment for short term storage, treatment with 1 per cent citric acid was best in controlling *penicillium* attack while treatment with KMS 1000 ppm followed by sodium benzoate 2000 ppm was found suitable throughout the storage life of 40 days.

**Keywords:** mandarin orange, shelf life, chemicals

### Introduction

India ranks sixth among world's top citrus producing countries contributing 4.8 per cent of the world's total citrus production. Mandarin Oranges are the most common citrus fruits occupying nearly 50 percent of the total citrus area in India followed by sweet orange and lime /lemon. Mandarin occupies 3.8 percent of total fruit area and 2.5 percent of total fruit production with the productivity of 6.7 tones hectare<sup>-1</sup> (Indian Horticulture Data base, 2005) Nagpur Mandarin (*Citrus reticulata* Blanco), an easily peelable loose jacket orange, is a major citrus fruit produced in central India and inspite of more than 0.5 million tones of annual production only about 1 per cent is processed. In the market for the very short period it is available which cannot fullfil the consumers demand. The objectives of the present studies were to enhance the shelf life of Nagpur Mandarin oranges under ambient storage condition by using different novel compound.

### Material and Methods

The experiment was conducted during of 2009-2010 in the laboratory Department of Horticulture, BAU, Kanke, Ranchi The fresh fruits lots of almost similar maturity stage retaining stalks were purchased from Ratu road (Khatal), washed properly with clean tap water, wiped and dried properly and were dipped in the solution of different novel compounds for half an hour. The experiment was laid out in CRD with the following treatments.

**Table 1**

Treatment no	Treatment name	Concentration
T <sub>0</sub>	Control	Dipped in distilled water
T <sub>1</sub>	Calcium chloride	0.5%
T <sub>2</sub>	Calcium chloride	1.0%
T <sub>3</sub>	Gibberellic acid	100ppm
T <sub>4</sub>	Gibberellic acid	150ppm
T <sub>5</sub>	Citric acid	1.0%
T <sub>6</sub>	Citric acid	2.0%
T <sub>7</sub>	Sodium Benzoate	2000ppm
T <sub>8</sub>	Sodium Benzoate	3000ppm
T <sub>9</sub>	Potassium meta-bisulphate	1000ppm
T <sub>10</sub>	Potassium meta-bisulphate	1500ppm

Percentage of infection is determined by diameter of total fruit and diameter of the diseased area of the fruit were measured using slide calipers and the area was calculated using formulate of area of sphere and area of spherical segment.

$$\text{Rotten area (\%)} = \frac{\text{Rotten fruit area}}{\text{Whole fruit area}} \times 100$$

In this experiment 20-25 per cent infected fruits were considered marketable in this region, Beyond 40 days of storage fruits in all treatment had recorded more than 25 per cent infection, thus the infection data were taken only up to 40 days of storage.

### Result and Discussion

During 10 days of ambient storage 1 per cent citric acid was found to be the best treatment in preventing disease advancement with per cent infection of 7.91 followed by sodium benzoate 2000 ppm (8.18%) and KMS 1000 ppm (8.87%) while highest Percentage of infection was noticed in 1 per cent CaCl<sub>2</sub> (23.51%) followed by fruits under control (19.87%) and 0.5 per cent CaCl<sub>2</sub> (19.41%) all treatment were found significantly different at 5 per cent level. After 20 days of storage, lowest infection per cent was found 1 per cent citric acid (9.28%) followed by sodium benzoate 2000 ppm (10.88%) and GA<sub>3</sub> 100 ppm (14.7%) while 0.5 pre cent CaCl<sub>2</sub> (30.36%) recorded highest infection followed by 1 per cent CaCl<sub>2</sub> (23.81%), fruits under control (21.67%) and GA<sub>3</sub> 150ppm (20.7%) After 30 days of storage. Sodium benzoate 2000 ppm (12.57%) was noted with lower infection followed

by KMS 1000 ppm (12.86%) and 0.5 pre cent CaCl<sub>2</sub> (31.71%) recorded highest percent infection. GA<sub>3</sub> 150 ppm and fruits under control were statistically at par at 5 percent level during 30 days of storage, sodium benzoate 2000 ppm (12.57%) was noted with lower infection followed by KMS 1000 ppm (12.86%) and 0.5 present CaCl<sub>2</sub> (31.71%) recorded highest percent infection. GA<sub>3</sub> 150 ppm and fruits under control were statistically at par at 5 percent level during 30 days of storage Treatment with 0.5 percent CaCl<sub>2</sub> (32.05%) recorded highest disease infection followed by fruits under control (31.38%) after 40 days of storage while KMS 1000 ppm (16.92%) was observed with minimum disease infection. For short term storage, 1 percent citric acid was found to be best in controlling penicillium attack while KMS 1000ppm followed by sodium benzoate 2000 ppm was found suitable throughout the storage life of 210 days. Similar type of work was carried out by many Scientists <sup>[1]</sup> observed the grapes treated with 2g KMS were free from moulds up to 9 days of storage. However, <sup>[2]</sup> observed the maximum decay loss (49.5%) in Aonla (*Emblica officinalis* G.) fruits cv. Chakaiya treated with GA<sub>3</sub> at 25ppm, followed by GA<sub>3</sub> at 10ppm on 24<sup>th</sup> day of storage due to infection of *Aspergillus spp.*, *penicillium spp.* and *colletotrichum spp.* <sup>[3]</sup> found that sodium benzoate 2000ppm was found superior for controlling post harvest decay caused by penicillium. Over all, it is concluded that among different levels of different treatment evaluated in the experiment for short term storage, treatment with 1 per cent citric acid was best in controlling *penicillium* attack while treatment with KMS 1000 ppm followed by sodium benzoate 2000 ppm was found suitable throughout the storage life of 40 days.

**Table 2:** Effect of different treatments on disease advancement at different interval under ambient storage.

Treatments	Infection (%) after 10 day interval	Infection (%) after 20 days interval	Infection (%) after 30 days interval	Infection (%) after 40 days interval
T <sub>0</sub>	19.87	19.87	22.32	31.38
T <sub>1</sub>	19.41	30.36	31.71	32.05
T <sub>2</sub>	23.51	23.81	25.3	28.48
T <sub>3</sub>	11.87	14.7	20.6	20.81
T <sub>4</sub>	18.53	20.7	22.23	25.45
T <sub>5</sub>	7.91	15.28	19.15	26.52
T <sub>6</sub>	14.96	15.84	17.09	18.85
T <sub>7</sub>	8.18	10.88	12.57	17.49
T <sub>8</sub>	9.52	16.51	19.71	19.87
T <sub>9</sub>	8.87	9.28	12.86	16.92
T <sub>10</sub>	12.52	17.39	21.72	29.27
S.E (m)	0.06892	0.05273	0.0704	0.05954
CD at 5%	0.20214	0.15466	0.20649	0.17462

### References

1. Mangasuli NS, Raddy BS, Patil DR. Effect of packages and chemicals on mould growth and selflife of Thompson seedless grapes under different storage condition: Karnataka J Agril. Sci. 2000; 13(1):220.
2. Singh Rajpal, Surinder Kumar, Singh Rajpal R, Kumar S. Studies on the post harvest treatment on decay loss and biochemical changes during storage of Aonla (*Emblica officinalis* G.) fruits cv. Chakaiya: Haryana-J. Hoti. sci. 2000; 29(3):178.
3. Paule L, Smilanick JL, Usall J, Vinas I. control of postharvest blue and green molds of oranges by hot water sodium carbonate, and sodium benzoate: Plant Dis. 2000; 85:371.