

RESPONSE OF PRE HARVEST CHEMICALS SPRAY AND STORAGE ON SHELF LIFE OF MANGO CV. KESAR

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Abstract: A field experiment was conducted during 2015-16 and 2016-17 on mango cv. Kesar to determine the effect foliar application of different chemicals and different storage conditions on shelf life of fruits at NAU, Navsari. The experiment was carried out in Completely Randomised Design with Factorial concept consisting eleven levels (*i.e.*, T₀: Control, T₁: CPPU 5ppm, T₂: CPPU 10ppm, T₃: GA₃ 25ppm, T₄: GA₃ 50ppm, T₅: NAA 30ppm, T₆: NAA 60ppm, T₇: CaCl₂ 1.0%, T₈: CaCl₂ 2.0%, T₉: ZnSO₄ 0.5% and T₁₀: ZnSO₄ 1.0%) in first factor (foliar spray) and two levels (*i.e.*, S₀: Ambient temperature and S₁: 12±1°C) in second factor (storage condition). The maximum shelf life was recorded in foliar application of CaCl₂ 2.0 % (T₈). Moreover, storage of fruits in cold temperature also found beneficial to increase shelf life compared to fruits store in ambient condition.

Keywords: Mango, Kesar, PGRs, CaCl₂, ZnSO₄, Foliar spray, Shelf life.

Introduction

In India, post-harvest loss of mango has been estimated to be 25–40% from harvesting to consumption (Rekha and Goswami, 2007). A fruit decay, due to the rapid ripening and less shelf life which limits the storage, handling and transportation potential (Hoa *et al.*, 2002). However, It is reported that application of growth regulators such as auxin, gibbrellins, cytokinin and some chemical compounds may help to not only regulate fruit set but also improve shelf life in many fruit crops. Further, proper storage environment has great impact on reducing postharvest losses, and extension of postharvest life of fruits. It was found that under steady state storage condition the rate of respiration and heat of respiration was increased with increase in temperature whereas decreased with time for all storage conditions (Patel *et al.*, 2016). Hence, study through this research will help to investigate the possibilities of pre harvest chemicals spray and storage conditions to extend the post harvest life of mango fruits cv. Kesar.

Material and Methods

The present investigation was carried out in 2015-16 and 2016-17 at College farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari. 22 years old grafted trees of mango cv. Kesar at spacing 7.5m × 7.5m with uniform size were selected for the experiment. The experiment was laid out in Completely Randomised Design with Factorial concept consisting eleven levels (*i.e.*, T₀: Control, T₁: CPPU 5ppm, T₂: CPPU 10ppm, T₃: GA₃ 25ppm, T₄: GA₃ 50ppm, T₅: NAA 30ppm, T₆: NAA 60ppm, T₇: CaCl₂ 1.0%, T₈: CaCl₂ 2.0%, T₉: ZnSO₄ 0.5% and T₁₀: ZnSO₄ 1.0%) in first factor (foliar spray) and two levels (*i.e.*, S₀: Ambient Temp. and S₁: 12±1°C) in second factor (storage condition). All the treatments were repeated thrice. Trees were sprayed on the appearance of inflorescence and it was repeated at pea stage of the fruits. Shelf life of fruits was recorded by keeping the sample of fruits at room temperature and at cold storage. The shelf life of fruits was noted as the days taken from harvesting to optimal eating stage. The recorded data on shelf life were tabulated and were subjected to statistical analysis.

Results and Discussion

Effect of pre harvest chemicals spray: The perusal data presented in table 1 clearly indicated that the shelf life (day) was noted higher under pre harvest spray of CaCl₂ 2.0 % (T₈) during both the year and pooled (32.04, 32.12 and 32.08 days, respectively) which was statistically at par with treatments T₇, T₄ and T₃. The minimum shelf life was noted in treatment T₀ (Control) during both year of study and pooled (28.65, 28.75 and 28.70 days, respectively). Irrespective of in vivo calcium content of tissue cell wall, substantially increased concentration might have provide additional strength facilitating delayed degradation followed by increased permeability of cell wall and hence reduce the spoilage and delayed the ripening process of fruits. These results are in confirmation with result obtained by Sakhale *et al.* (2009), Chauhan *et al.* (2014), Karemera and Habimana (2014), Karemera *et al.* (2014), Peter and Edwin (2014) and Karemera *et al.* (2013).

Effect of storage condition: The data presented in table 1 indicated that there were significant differences among the storage conditions in respect to shelf life (day). The shelf life (day) was recorded significantly higher under cold storage @12±1°C (S₁) during both the year of experiment and pooled (41.26, 41.32 and 41.29 days, respectively), while the minimum shelf life was recorded under ambient storage (S₀). The enhancement of shelf life under low temperature condition (cold storage) was due to delayed senescence, which was the result of

low physiological activity at low temperature (Khanbarad *et al.*, 2013). The obtained results are in harmony with Thinh *et al.* (2013), Miguel *et al.* (2013) and Shahnawz *et al.* (2012).

Interactions: The interactions among treatment (T), storage (S) and year (Y) failed to show significant effect with respect to shelf life (day) during both the year and in pooled.

Table 1: Effect of pre harvest chemicals spray and storage condition on shelf life (day) of mango fruit cv. Kesar

Treatments	Year 1	Year 2	Pooled	
Foliar application				
T ₀ : Control	28.65	28.75	28.70	
T ₁ : CPPU 5ppm	29.28	29.37	29.33	
T ₂ : CPPU 10ppm	29.68	29.76	29.72	
T ₃ : GA ₃ 25ppm	30.73	30.94	30.83	
T ₄ :GA ₃ 50 ppm	31.25	31.33	31.29	
T ₅ : NAA 30ppm	30.07	30.16	30.12	
T ₆ : NAA 60ppm	30.47	30.55	30.51	
T ₇ : CaCl ₂ 1.0%	31.65	31.72	31.68	
T ₈ : CaCl ₂ 2.0%	32.04	32.12	32.08	
T ₉ : ZnSO ₄ 0.5%	28.76	29.00	28.88	
T ₁₀ : ZnSO ₄ 1.0%	29.01	29.15	29.08	
S.Em. ±	0.643	0.508	0.388	
C.D. @5%	1.835	1.450	1.092	
Storage condition				
S ₀ : Ambient Temp.	19.03	19.20	19.11	
S ₁ : 12±1°C	41.26	41.32	41.29	
S.Em. ±	0.274	0.217	0.174	
C.D. @5%	0.782	0.618	0.489	
Interaction				
T × S	S.Em. ±	0.909	0.719	0.558
	C.D. @5%	NS	NS	NS
C.V. %		5.23	4.11	4.70

Note: Year (Y) and its interaction with T and S were found NS

Conclusion

Preharvest application of CaCl₂ 2.0 % was beneficial to improve shelf life of mango fruits. Furthermore, fruits stored in cold storage (12±1°C) extend the shelf life of fruits compared to store in ambient condition.

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