

In-package Use of Ethylene Absorbents in Nectarine

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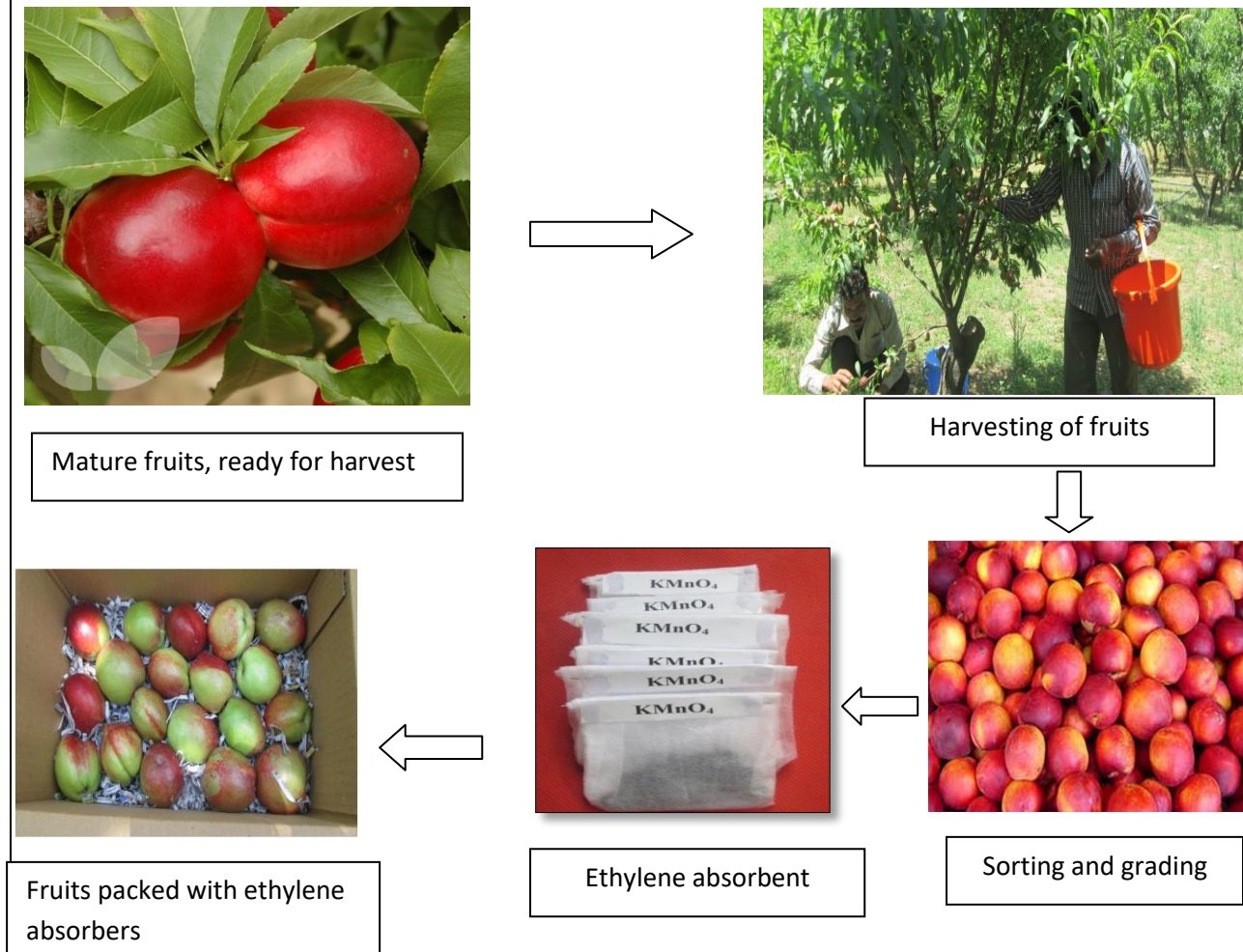
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Nectarine (*Prunus persica* var. *nectarina*) is a smooth-skinned peach belonging to family Rosaceae. Nectarines have arisen from peach tree spontaneously as bud sport. In fact, nectarine is considered as a natural mutant of peach. The expression of a recessive allele is thought to be responsible for the smooth peel of nectarine fruits. Nectarines are grown throughout the warmer temperate regions of both the Northern and Southern hemispheres between latitudes 30° and 45°N and S. Nectarines have red, yellow, or white pulp but most varieties of nectarine bear attractive red colour of varying shades. Its fruits contain fairly good amount of antioxidants vitamins such as C, A, E and flavonoids, polyphenolic antioxidants like lutein, zeaxanthin and β -cryptoxanthin.



Due to its smoothness and attractive colour, nectarine fruits are becoming popular among consumers and hence, peach orchards are being replaced by nectarine at a faster rate in different parts of India. It is commercially cultivated in Himachal Pradesh, Uttarakhand, Jammu and Kashmir and some regions of Meghalaya. The best quality nectarines are obtained from Ramgarh areas of Nainital (Uttarakhand) and Rajgarh areas of Himachal Pradesh. Major constraint in nectarine handling is its limited shelf life of about 3-4 days at ambient conditions which can be extended up to 2-3 weeks under cold storage condition (0-2° C, 85-90 % RH). However, such facilities are lacking in India, and if facilities are available, continuous supply of electricity is still a problem in several parts. There are several

postharvest interventions to enhance the storage life of fresh fruits but among them most convenient and economical method is the in-package use of ethylene absorbent sachets. Hence, we have attempted the use of KMnO_4 based ethylene absorbent sachets which were placed inside the packing boxes during the transportation of 'Silver Queen' nectarine.



How ethylene absorbents extend shelf life?

Being a climacteric fruit, nectarine shows a sudden upsurge in respiratory rate and ethylene production after harvest. Ethylene not only hastens ripening, but also resulted in production of cell wall softening enzymes such as poly galacturonase (PG), pectin methyl esterase (PME), cellulase and β - galacturonase. As a result of increased activities of these enzymes and senescence, shelf life of the fruits is further reduced drastically due to rough handling and poor storage conditions.

In-package use of ethylene absorbents (EAS) has been found invariably efficient in enhancing the postharvest life and quality of fruits. Commercial use of ethylene absorbents containing potassium permanganate (KMnO_4) which when placed in packaging boxes or containers oxidizes ethylene (C_2H_4) into carbon dioxide (CO_2) and water (H_2O), Due to absorption of ethylene, detrimental effects of ethylene on fruits such as enhanced fruit ripening, softening and quality degradation are reduced, which helps in enhancing postharvest shelf or storage life of fruits, thereby helping in extending the marketability of fruits.

What is the technology?

Harvest the fruits at appropriate maturity. After harvesting, remove the diseased, cull, under-developed or unattractive fruits. After grading, pack the fruits in suitable CFB boxes by placing the KMnO_4 based ethylene absorbents. Then these packages are ready for transportation/ storage. Such fruits stay for about 12 days at super market conditions ($20 \pm 1^\circ \text{C}$ and $90 \pm 2\% \text{RH}$) and for about 28 days cold storage condition ($2 \pm 1^\circ \text{C}$), having better quality than those packed without ethylene absorbents (Table 1)

Influence of in-package placement of ethylene absorbent on nectarine fruits

	PLW (%)	Firmness (N)	TSS ($^\circ\text{Brix}$)	Total antioxidant ($\mu\text{moles TE/g FW}$)	Total phenol (mg GAE/100g FW)
Ethylene absorbent	10.07	6.3	8.9	18.610	13.24
Control	14.54	3.5	9.5	16.020	11.73

Advantages of the technology

- It is a farmer friendly technology
- No technical skill is required.
- Higher efficacy in maintaining firmness than other techniques
- It is an eco-friendly technology
- No toxic effects either on fruits or human health
- Potassium permanganate is very cheap and sachets can be easily made at home.

Placing of ethylene absorbent sachets in packaging boxes is a reliable and cost effective

technology as extra investment is not required for this. By adopting this technology, quality of the fruit can be retained for a period of 28 days and hence the marketability period also gets enhanced and farmers can get better returns for their produce.

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