Pre-harvest Fruit Bagging Technology for Apple

Dr. R.R. Sharma
Principal Scientist (Hort.)
Division of Food Science & Postharvest Technology
ICAR-IARI, New Delhi-110012

Apple is considered as the most important fruit crop of the world. In India, it is grown in hilly states like Himachal Pradesh, Jammu and Kashmir, Uttrakhand, northern-eastern states and to some extent in hilly regions of south India. From hills, the fruits are transported to plains for storage or marketing. Red coloured apple are preferred in the market as red colour is the central point of attraction of the consumers. At lower hills, colour development in apples is not adequate, and hence majority of the farmers use ethrel (2-Chloroethyl Phosphonic Acid) as pre-harvest foliar spray for colour enhancement of the fruits. Ethrel, although, helps in development of attractive red colour in apple fruits but it causes several adverse effects, such as, it enhances fruit drop, pre-mature leaf-fall, besides the harvested fruits are of poor keeping-quality. Further, ethrel-treated apples need to be harvested at a stretch to get desirable price in the market. Moreover, the residues of ethrel, if any, may be injurious to human health. Further, during storage, apples suffer from several diseases and disorders for which various chemicals and pesticides are used, which are also injurious to human health. Hence, efforts world over have been started to find out some non-chemical approaches to reduce the incidence of diseases and disorders in fruits including apple. Fruit bagging has been proved to be very useful practice in studying anthocyanin synthesis pathway in apple and reducing the incidence of insect-pests, sun scorching, fruit splitting in several other fruits. Bags of different colours have given different results in fruits crops. Considering these points in mind, Scientists of the Division of Post Harvest Technology, Indian Agricultural Rsearch Institute, New Delhi has standardized

fruit bagging technology for apple.

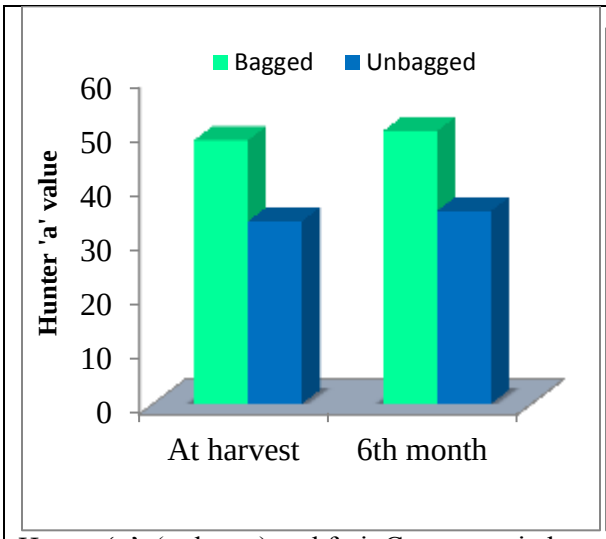
The Technology

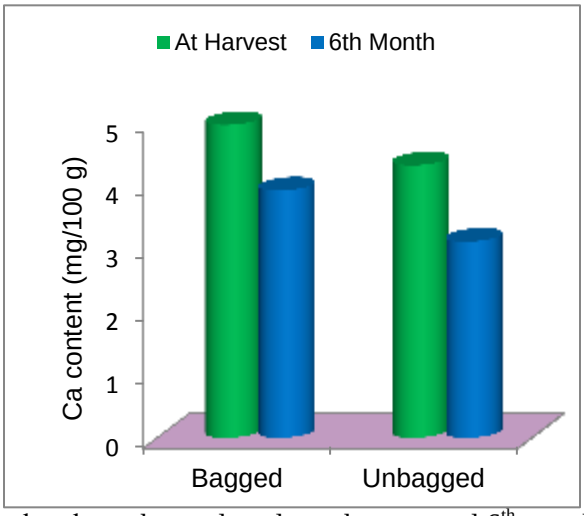
In this technology, apples should be bagged on-the-tree with spun-bounded light-yellow, single layered coloured bags. In this technology, individual or group of 2-3 apples are covered with bags about 45-60 days before the expected date of harvesting. During this period, all routine cultural practices are carried out. The bags should be removed atleast 3-5 days before the expected date of harvesting.

Advantages of the technology

- It is a probable alternative to ethrel treatment in lower hills.
- Bagging improves appearance of apples significantly, which helps in getting good price in the market.
- Bagging reduces residues of pesticides significantly.
- Bagging reduces the incidence of insect-pests and diseases, thereby reduces the expenses. involved in purchasing insecticides, fungicides and other chemicals.
- Fruit bagging can be an integral part of organic apple production.
- Bags are recyclable, can be used for 3-4 successive seasons.
- Farmers can additionally earn Rs. 30-35 thousands per ha.
- Bagging improves eating quality of apples.
- Bagged apples have higher shelf-life.
- Bagged fruits are nutritionally better as they contain higher levels of calcium and that is retained during storage also.
- Incidence of storage disorders is reduced to minimum by bagging.

Based on these observations, it can be concluded that fruit bagging is a simple, cost-effective and eco-friendly technology, which has multifarious effects on apple fruits.





Hunter 'a' (redness) and fruit Ca content in bagged and non-bagged apples at harvest and 6th month after cold storage

Effect of bagging on quality attributes of Royal Delicious apples

Quality attribute	Bagged		Non-bagged	
	At Harvest	After 6 months	At harvest	After 6 months
Firmness (N)	38.6	16.5	32.0	14.2
TSS (%)	13.6	7.5	13.4	7.2
Ascorbic acid (mg/100g pulp)	28.6	18.5	28.2	17.5

Effect of fruit bagging on diseases at harvest and physiological disorders during cold storage of Royal Delicious apples

Bag colour	Fly speck and sooty blotch (%)	Storage disorders		
		Bitter pit (%)	Cork pit (%)	Brown core (%)
Blue	1.6	1.9	1.5	1.2
Yellow	0.0	1.8	1.1	0.8
Green	3.9	5.7	1.9	3.6
Red	1.9	4.8	1.8	1.8
Control (Unbagged)	22.6	14.6	4.8	7.8

Bearing tree of Royal Delicious apple

Bagging of fruits by a woman

A view of fruit bagging in apple

Non-bagged apples **Bagged apples**

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