NEW ERA AGRICULTURE MAGAZINE

Bagging for High-Quality Fruit Production

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Introduction:

Bagging is a horticultural practice used in fruit production to protect developing fruits from various external factors and improve their quality. This technique involves enclosing the fruits in protective bags while they are still on the tree. Here are some key aspects of bagging in fruit crops:

Benefits of Bagging

1. **Pest and Disease Control**: Bagging can effectively prevent insect pests and diseases from reaching the fruit, reducing the need for chemical pesticides.
2. **Improved Fruit Appearance**: It helps in producing blemish-free fruits by protecting them from physical damage, sunburn, and bird attacks.
3. **Reduced Chemical Residues**: By minimizing the need for pesticides, bagging can help produce fruits with lower chemical residues, which is beneficial for both the environment and consumer health.
4. **Enhanced Fruit Quality**: Bagging can lead to better coloration, texture, and overall quality of the fruit by creating a microenvironment around it.
5. **Protection from Environmental Factors**: It shields the fruit from adverse weather conditions like heavy rain, hail, and strong winds, which can cause damage.

Types of Bags Used

1. **Paper Bags**: Commonly used for apples, mangoes, and grapes. They are breathable and biodegradable but may not be durable in wet conditions.
2. **Plastic Bags**: Often used for bananas and papayas. They provide better protection against moisture but can lead to humidity buildup if not properly ventilated.
3. **Cloth Bags**: Used for various fruits,

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offering good breathability and protection. They can be reused but are more expensive.

4. **Polyethylene and Waxed Paper Bags**: Used for high-value crops needing specific moisture and air balance.

Method of Bagging

1. **Timing**: Bagging should be done at the appropriate stage of fruit development, typically when the fruits are small and have just started developing.
2. **Technique**: The bags should be properly secured to avoid gaps that pests can exploit. It's essential to check the bags periodically to ensure they are intact and replace any that are damaged.
3. **Removal**: Bags should be removed at the right time before harvest to allow the fruits to acclimate to natural conditions, improve coloration, and develop final flavors.

Factors affecting the quality of fruits

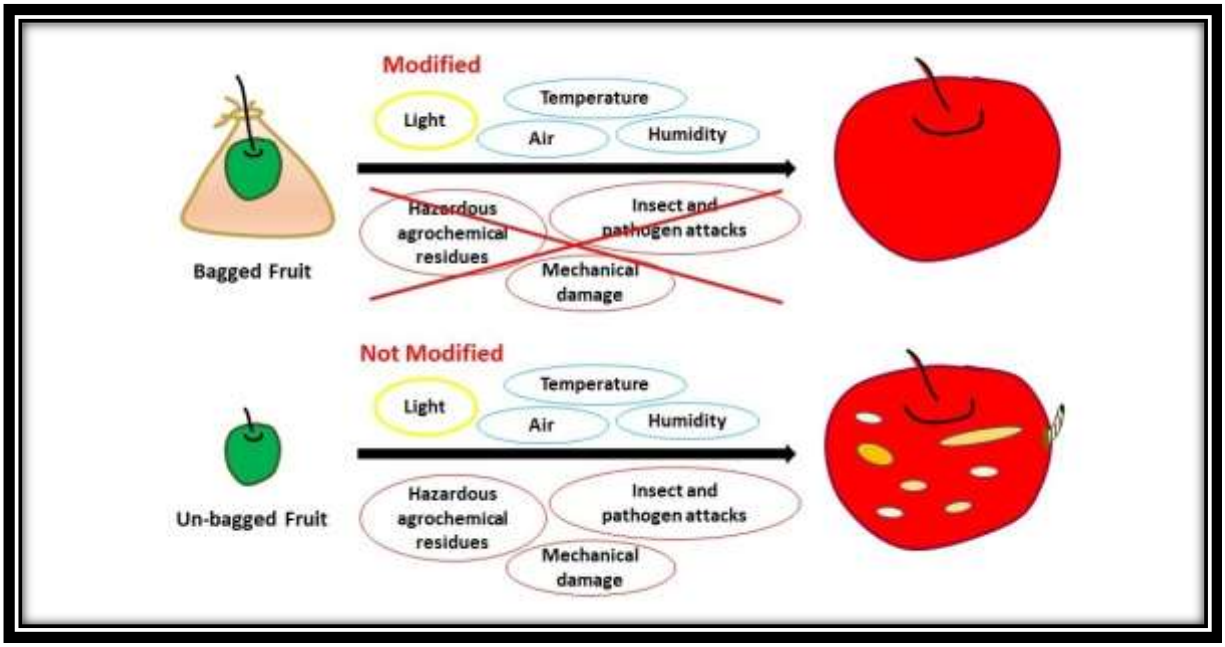
There are numerous pre and post-harvest factors, which affect the quality of fruits. Quality means "degree of excellence or superiority". It includes appearance of fruits, fruit shape and texture, fruit colour and chemical quality attributes.

Pre-harvest factors

Several pre-harvest biotic and abiotic factors such as genetics, cultural practices and environmental factors influence fruit growth, development, maturation as well as have physical effect on fruit quality.

Biotic factors

- Insect-pests - Apple codling moth, lemon butterfly, pomegranate butterfly, mango fruit borer, fruit fly, aphid, litchi



nut borer etc.

- Diseases - Anthracnose, fruit rot, brown spot of apple, stem-end rot of mango etc.

Abiotic factors

- Abiotic factors include genetic factors, environmental factors and cultural practices.

Effect of bagging on fruit quality parameters

Banana: Not adverse effect on total soluble solids, acidity and fruit firmness, Improves finger length and finger quality and also provide protection from mechanical damage.

Guava :- Increase in TSS content

Red pitaya :- Bagged fruit (7 days after anthesis) shows positive effect on fruit quality, Increases TSS, peel thickness and acidity.

Loquat :- Increase in TSS with reduced titratable acidity.

Effect of bag types on the quality of fruits

Fruit	Bag Colour	Quality
Banana	Blue Polyethylene bags	Increases fruit size and enhances fruit maturity
Guava	Yellow colour Polythene	Complete control on fruit fly
Mango	Single white layer polythene	Enhances the sensory quality and chemical content of fruits
Pomegranate	White colour Polyethylene bags	Reducing fruit disorders with improving fruit quality
Apple	Light yellow-coloured bags	Improves colour, fruit firmness and reduces storage disorders
Litchi	Brown and butter paper bags	Improves fruit colour and internal quality of the fruits
Peach	White bags	Improves pulp colour

Mango: Increases TSS, ascorbic acid, titratable acidity, Increases internal quality of the fruit with acidity, sugar and carotenoid contents in cultivar Zill, Bagging with newspaper bag and brown paper after 30 days fruit set enhances the fruit quality like TSS, fruit retention, total sugars, Bagging with green polyethylene bags showed maximum TSS, sugars, ascorbic acid with minimum acidity.

Plum :- Reduces soluble solid content

Apple :- Increases sweetness of the fruit, Reduces TSS content , Increases TSS and vitamin C.

Pear:- Reduction in total soluble solids and increase in titratable acidity, Opposite effect on sorbitol and sucrose content.

Considerations

1. **Cost and Labor**: Bagging can be labour-intensive and increase production costs. The benefits need to

outweigh these costs for it to be economically viable.

2. **Suitability for Crop and Climate**: Not all fruits or climates are suitable for bagging. It is more commonly used in high-value crops where quality improvement justifies the added expense.

Bagging is a proven method to enhance the quality and marketability of fruit crops, offering significant advantages in integrated pest management and organic farming systems.