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Effective Techniques

for Extended Floral Vase Life

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For centuries, the beauty of cut flowers has captivated human hearts, but their short vase life is always a matter of concern for all florists, retailers and consumers. Recent breakthroughs in post-harvest technology are dedicated to solving this problem of flower longevity. India is among the world's top producers of flowers, with a good proportion of it exported to other countries. The National Horticulture Board (NHB) reports that the floriculture sector in India has been gradually expanding, with total amount of flowers produced rising from 1.43 million tons in 2015–16 to 2.33 million ton in 2020–21. During the same period, the area under flower cultivation also increased from 0.24 million hectares to 0.34 million hectares, with states like Karnataka, Maharashtra, Tamil Nadu, Andhra Pradesh and West Bengal giving the maximum flower production.

Despite this rapid expansion in floriculture, our nation continues to experience severe post-harvest losses. According to the NHB (2020-21), post-harvest losses in flowers are estimated to be between 30 to 40% of overall production, where the losses are primarily caused by improper harvesting and handling procedures (15-20%), insufficient storage and transportation facilities (10-15 percent), poor packing and grading (5–10%) and infestations (5–10%) leading to economic losses over Rs. 15,000 crores per year .

Post harvest losses in our country is so high due to various reasons like insufficient infrastructure for flower storage, transportation and marketing. Also, lack of post-harvest management training and awareness among growers and handlers is aggravating the losses.

Conventional Approaches to Mitigate Post-Harvest Losses in Floriculture

a. *Choosing Optimum Harvesting Stage:* We should harvest cut flowers at the right stage of development to ensure that they stay fresh for longer, thereby increasing the vase life and flower quality. Flower harvesting is influenced by several factors as season, growth conditions, distance to market and buyer preferences. For distant markets, we should collect flowers at the bud stage, which is easier to handle and less affected by environmental circumstances.

b. *Proper Harvesting:* Apart from harvesting flowers at the appropriate stage, we must also give equal weightage for their proper harvesting conditions. Harvesting should be carried out at cool temperature by removing the leaves from lowermost stem with a sharp tool and immersing it immediately in cool and clean water containing bucket.

c. Pre-cooling: After water immersion of flower stem, we should immediately transfer ir

to cool and clean room in order to reduce field heat and respiration rate of harvested flowers. This helps in extending their vase life.

d. Optimal Grading and Bunching: During flower grading, damaged, bruised or infected stems shuld be removed. While grading, standard parameters like stem length, color, shape and growth stage of flower should be adopted. Flower grading parmeters and bunching varies flowers to flower. Roses, carnations and chrysanthemums are arranged in 25 flowers per bundle, whereas gerbera, orchid, and anthurium are packaged individually.

e. Effective Packaging: Usually bunched flowers are secured with loose tying of rubber bands and then packed. Individual flowers are usually sleeved or wrapped with polyfilm or cardboard and then sent to cold storage. Tropical flowers like orchids and anthuriums are kept in water containing vials. Gladiolus and antirrhinum are typically packed in plastic container and cardboard sleeve vertically due to their geotropic bending. Flower should be packed compactly to prevent bruising caused by movement or vibration during transit.

f. Provision for Cold Storage: Cold storage is suitable for slowing flower respiration and extending vase life. It provides appropriate temperature and humidity. For floral crops, ideal temperatures range from 2.2 to 4.0°C or 4.0 to 11.0°C, with a relative humidity of 85-90%. Cold storage helps us to market our products for longer duration which ultimately increases our profit.

Effective Techniques for Extended Vase Life

1. ***Impregnation:*** It is a chemical treatment of 10 to 30 minutes to protect the flower cut ends against microbial contamination. Chemicals like Nickel Chloride (NiCl2), Cobalt Chloride (CoCl2) and Silver Nitrate (AgNO3) are used for impregnation which release Ni2+, $Co2^{+}$ and Ag+ ions at stem base to prevent microbial entry into flowers.

2. ***Pulsing:*** in this process, flower stalk is treated with a chemical solution containing sugar, germicide and water to enhance flower opening, size, shape, color and longevity of cut flowers. Sucrose restores the decreased carbohydrate levels to extend the vase life of cut flowers. High concentration of sugars may invite microbe, hence optimum doses of 3 to 15% is suitable for various flowers for 10 to 15 hours.

3. Floral Preservatives: Floral preservatives improve the floral quality, fresh weight and membrane stability index of flowers. This solution comprises of water (to maintain turgidity), sugar (as a source of energy), biocide (to inhibit microbial damage), silver nitrate (5-500 ppm for different cut flowers) and an acidifying agent (to keep the pH between 3.5 and 4.5). The common types of floral preservatives being used are commercial preservatives, sugar-based preservatives, citric acid preservatives, aspirin preservatives and lemon juice preservatives.

The Indian floriculture industry, despite being one of the world's leading flower producers, faces significant post-harvest and financial losses. Conventional methods (optimal harvesting, pre-cooling, grading and cold storage), to address the post-harvest losses. Although these methods are essential but insufficient to significantly reduce such losses. More effective techniques like impregnation, pulsing, and floral preservatives offer promising solutions to enhance flower longevity. By adopting these advancements, we can minimize these losses and enhance product quality.