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POSTHARVEST MANAGEMENT OF FLOWER CROPS

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Abstract: *Flowers after detaching from the plants carry all life processes at the expense of stored reserved food in the form of carbohydrates, proteins and fats for their longevity for a few more days. Two distinct physiological phases take place in flowers. They are: bud growth and development for full opening, and maturation, senescence and wilting. Extension of life of detached flowers thus involves coordination of 2 seemingly conflicting processes the promotion of growth during the first phase and retardation of senescent processes during the second phase. Several factors at preharvest stage including genetic or inherent, climatic or environmental and management; harvest factors like stage, method and time of harvesting; and postharvest factors such as watering, rehydration, pre-cooling, storage environment, packaging techniques and micro-organisms influence the postharvest quality and longevity of cut flowers. Causes of deterioration of harvested flowers are growing condition, mechanical injury, bacterial and fungal infections, plugging of xylem vessels of cut flowers, moisture content, water quality, ethylene gas, heat damage, factors affecting postharvest life of flowers, stage of harvesting, water relations, respiration, relative humidity, growth regulators, preservative solutions, pre-cooling and storage, packing and transporting, post harvest losses causes the most common causes of postharvest losses in developing countries include rough handling, inadequate cooling and temperature maintenance, the lack of sorting to eliminate defects before storage and use of inadequate packaging materials further add to the problem.*
Keywords: *Postharvest, Flowers, Rehydration, Environment and management.*

Introduction: Due to perishable nature of flowers, there is huge post harvest loss ranging from 30-50per cent. Qualitative losses like consumer acceptability of fresh produce are much more difficult to assess than are quantitative losses. Quantitative losses occur during the entire market chain in view of lack of improper post harvest handling [1]. Market strategy for flowers in the country, there are problems of frequent market gluts and price crash. Hence, there is an urgent need to evolve an appropriate packaging and storage technique for cut flowers during periods of decline and also to facilitate long term sea-shipment for export. Post harvest management and value addition can increase prices of flowers up to 9-10 times [2]. Flowers require sincere, patient, soft, affectionate as well as expert handling. Detaching of flowers from the plants, flowers carry on all life processes at the expense of stored reserved food in the form of carbohydrates, proteins and fats for their longevity for a few more days. Physiological phases take place in flowers maturation, senescence and wilting. Several factors at preharvest stage including genetic or inherent, climatic or environmental and management; harvest factors like stage, method and time of harvesting; and postharvest factors such as watering, rehydration, pre-cooling, storage environment, packaging techniques and micro-organisms influence the postharvest quality and longevity of cut flowers [3].

Constraints: In national and international markets flowers have high scope, its production and marketing can't be done successfully. Creating enabling environment and achieving competitiveness in the floriculture sub-sector require addressing of many constraints faced by the growers and exporters. These constraints are the limiting factors to attract domestic as well as

foreign direct investments [4]. These constraints are related to

1. Absence of government policies and strategies,
2. Lack of information on technology and technical experts,
3. Inadequate export management system,
4. Lack of adequate finance,
5. Inadequate infrastructures,
6. High air-freight charges, etc.
7. Lack of knowledge about post-harvest technologies.

The Post Harvest Quality of Flowers Depends upon Mainly Three Factors.

1. Pre-Harvest Factors

Genetic or Inherent Makeup: Post harvest lasting quality of flower species and cultivars vary considerably due to differences in their genetic make-up. Gladiolus varieties White Prosperity, Sancerre, Suchitra, Eurovision, Nova Lux, Rose Supreme and Trader Horn possess the better vase-life [5].

Transgenic Strategies for Extending Floral Life: The fact that the products of these efforts are now commercially available indicates the potential for using transgenic approaches to modify other features of floral crops. Floral crops offer several advantages for commercialization of transgenic approaches. The high value of floricultural crops, the diversity of taxa to which the same transgenic approaches can be applied, and the relatively short life cycle of these crops all argue for the value of a transgenic approach to plant improvement as opposed to the time-consuming approaches of conventional breeding. Consumer acceptance has already demonstrated by the transgenic "Moondust" carnations and "Applause" blue roses [6].

2. Harvest Factors: The best time of day for harvesting flowers is the coolest part of the day and when there is no surface water from dew or rain on the plants. Remove foliage on stems that will be below water. Hardwood stems should always be given slanting cut to expose maximum surface are to ensure rapid water absorption. The flowers which release latex upon cutting. To overcome such problem, stems should be given a dip in hot water (80-90^{0}C) for a few seconds. Bring flowers into the shade and place in clean buckets of clean warm water (acidified) and a biocide.

Causes of Deterioration of Harvested Flowers

Growing Condition: Inadequate nutrition, unfavourable temperature and light conditions during plant growth and flowering; incidence of insect pests and diseases; physiological disorder in plants and flowers.

Mechanical Injury: Breaking of florets or spikes during harvesting, handling, storage and packaging accelerate senescence of petals.

Bacterial and Fungal Infection: A fungus, *Botrytis cinerea*, or grey-mould forms on flowers causing irreversible damage to harvested flowers particularly under high humidity and temperature. Other fungi causing damage are *Fusarium oxysporum*, *Mucor* sp., *Penicillium* sp., *Rhizopus stolonifer*, *Aspergillus* sp. and *Alternaria alternata.* Bacteria affecting flowers are *Pseudomonas, Alcaligenes, Enterobacter, Aeromonas, Bacillus, Flavabacterium, Acetinobacter*, *Achromobacter* and *Erwinia.*

Plugging of Xylem Vessels of cut Flowers: Presence of micro-organisms like bacteria, yeasts or fungi in the holding solution, which leads to rapid deterioration of vase-life of cut flowers.

Moisture Content: Excessive loss of moisture of the harvested flowers reduces their life.

Water Quality: The water of fresh cut flowers should have a pH of 3.5–4.5, since acidic solutions move more readily up the stems than neutral or alkaline solutions. The optimum amount of total dissolved solids in water for cut flowers should be less than 200 ppm, otherwise these can block the strands through which water travels up to the stem.

Ethylene Gas: It is a hormone which speeds up senescence process of flowers. It causes flower and petal drop, retards flower development, shrivels up flowers, and result in premature yellowing and loss of foliage.

Heat Damage: Apart from external heat, flowers themselves also generate heat. Once they have reached a certain temperature, heat build-up increases. High temperature encourages production of ethylene gas as well as postharvest diseases.

3. Post Harvest Factors

Respiration: The rate of respiration depends on quantity of carbohydrates available in the harvested flowers, temperature and the use of certain chemicals to regulate it. With higher temperature, there is faster rate of respiration and burning of the tissue. Consequently, the life of flowers is shortened.

Relative Humidity: It has, bearing on the transpiration rate. Higher the humidity in the air less is the transpiration rate and vice-versa.

Growth Regulators: Cytokininsdelay senescence of some cut flowers. Depending upon the concentrations, GA in some cases promotes

longevity of flowers, while this is also used in bud opening solution. The IAA promotes ethylene production of isolated carnation petals. In contrast, the senescence and abscission of poinsettia flowers is delayed by auxin.

Preservative Solutions: Various types of conditioners are sugar andbiocide, antiethylene compound, and hydrated compound. The flowers like gladiolus, carnation, chrysanthemum and freesia are benefited most by the pre-treatment. Antiethylene compounds in preservative solutions reduce the action of ambient ethylene as well as autocatalytic production of ethylene by fresh cut flowers. Greatest improvement in cut flower quality and longevity is obtained when DICA or DDMH were combined with sucrose.

Special Treatments to Improve the Post Harvest Life and Quality of Flowers

Precooling: Precooling is a treatment given to flowers to remove the field heat immediately after harvest. It can be done with ice cold water, cold water or forced air.

Conditioning/ Hardening: It restores the turgor of flowers wilted after harvest, storage or transport. Conditioning is done with demineralized water supplemented with germicides and acidified with citric acid. Some wetting agents like tween 20 @ 0.01-0.10% can be used for this purpose.

Impregnation: Loading of flowers with high concentration of silver nitrate or nickel chloride of cobalt chloride for a short period of time is known as impregnation. It is helpful in reducing the attack of microbes and synthesis of ethylene.

Pulsing: Treating the flowers with high concentration of sucrose and germicide for a short period of time, in order to improve the shelf life and to promote flower opening. Pulsing is beneficial especially for flowers destined for long storage period or long distance transportation.

Bud Opening: Use of germicides, sucrose and hormonal solution to promote the opening of immature buds in crops like chrysanthemums, rose, carnation, gladiolus, and snapdragon.

Grading, Bunching and Packaging: After harvesting the flowers should be graded according to various grades as per specification for local and distant market. Then these should be pulsed and made into bunches of 5,10,20,50,100. Cut flower should be packed in corrugated cardboard boxed or sleeves. Packaging must ensure protection of flowers against physical damage and for this cotton or news paper can be used as cushion.

Cold Storage: Controlled atmospheric (CA) modified atmospheric (MA) or hypobaric (LP) storage method can be used to enhance the post harvest life of flower.

Transport: Flower should be transported in corrugated cardboard boxes. The flowers which are sensitive to ethylene, ethylene scrubbers containing KMnO should be added to those boxes. Flowers like gladiolus and snapdragon are sensitive to geotropic bending, so these should be transported in upright position.

Holding: After pulsing and storage flowers are held in a solution containing sucrose, germicide ethylene inhibitor and growth regulator. The flowers can be kept in holding solution either at wholesaler, retailer or consumer level.

Conclusion: These will be the key to future strategies for improving the postharvest life of flowers. In addition to improved application of tools such as Pre-Harvest Factors, Harvest Factors, Post Harvest Factors, the industry will be improved by a focus on breeding ornamentals with better postharvest characteristics, using the huge genetic variability in the wild populations of most ornamentals. Although transgenic ornamentals are presently limited to blue carnations and roses, transgenic ornamentals will quickly play an important role in the ornamental market place.

References

1. Bhattacharjee, S.K. (2006). Advances in Ornamental Horticulture, Vol. 6, Pointer Publishers, Rajasthan, India.
2. Srivastava, R., Sharma,G. and Chand, S. (2017). Post-Harvest Life of Cut Chrysanthemum Cultivars in Relation to Chemicals, Wrapping Material and Storage Conditions. *J Hort*, ISSN: 2376-0354.
3. Chadha, K.L. (2001). Handbook of Horticulture, ICAR, New Delhi.
4. Imger, B. (2014). A Review paper on post harvest life of cut flower. https://regmibhishma. wordpress.com/ 2014/12/20/ a-review-paper-on-post-harvest-life-of-cut-flower/
5. Anonymous. (2012). Indian Horticulture Database 2011.Ministry of Agriculture. Government of India. Aristo Printing Press, New Delhi.
6. Reid, M.S. and Jiang, C.Z. (2012). Postharvest Biology and Technology of Cut Flowers and Potted Plants eds. Jules Janick, *Horticultural Reviews*, 40 (1).