Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 04, Issue: 05 (SEP-OCT, 2024)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Factors Affecting Shelf Life in Flowers

(Dr. C. Venkatesh, *C. Nandhakumar and A. Periyasamy)
J.K.K. Munirajah College of Agricultural Science, T. N. Palayam, Gobi, Erode-638506
*Corresponding Author's email: nandhakumarkumar2702@gmail.com

To ensure that flowers last longer, post-harvest life must be extended. We should research the pre-, harvest, and post-harvest aspects of flower crops that eventually impact the bloom life in order to extend vase life. Post-harvest handling is the process of getting flowers ready for the market after they are harvested. Harvesting, conditioning, pre-cooling, pulsing, grading, bunching, wrapping, packaging, storing, transporting, and selling are some of these processes. To create the ideal environment for plant growth, all the elements that influence a flower's post-harvest life should be appropriately controlled. To extend the viobmphase life of lowers, various biocide, holding, pulsing solution, growth regulators, and storage temperatures are employed.

Key words: Shelf life, post harvest, preservatives, storage.

Introduction

Cut flowers are highly perishable, with a limited shelf life that significantly impacts their quality, aesthetic appeal, and market value. The vase life of flowers can vary greatly depending on various factors, including pre-harvest conditions, harvesting techniques, post-harvest handling practices, storage conditions, and intrinsic flower characteristics. Understanding the factors influencing shelf life is crucial for growers, wholesalers, retailers, and consumers to maintain flower freshness, reduce waste, and ensure a longer enjoyment period. This examination of factors affecting shelf life in flowers aims to identify critical elements impacting their longevity, providing insights for optimal flower care and handling practices that enhance quality, customer satisfaction, and profitability in the floral industry.

Environmental factors

Light: Controls a number of physiological functions, including photosynthesis, which establishes the amount of carbohydrates in flowers. Flowers with comparatively higher carbohydrate content—particularly sugars—last longer in the vase. Excessive light intensity that results in petal senescence, leaf drop, and scorching of the foliage and flower buds Low light causes the stems of Gerberas to bend and the petals of roses to blue or discolour.

Temperature: Various crops require various temperatures. For instance, roses need a daytime temperature of 20 to 25 °C and a nighttime temperature of 16 °C. It is thought that the best temperature differential for growth and bloom production is 10 °C between day and night. Low respiration rates at low temperatures reduce the usage of sugars, boosting the net accumulation of carbohydrates in the petals. This makes low nighttime temperatures beneficial. Poor post-harvest life results from high temperatures because they speed up respiration, which lowers net carbohydrate stores. Additionally, too-low temperatures harm buds by freezing them.

Humidity: Varying crops require varying levels of humidity. For instance, roses need 60–65% relative humidity. While low humidity causes thin leaves and browning of the leaf margins, high humidity causes bacterial and fungal infections. A 24-hour photoperiod and increased air humidity (90%) shorten the post-harvest life of a number of rose varieties. The decrease was ascribed to the leaves' accelerated rate of water loss as a result of the stomata's inability to seal.

Season: Reports of variations in cut flower longevity brought on by seasonal impacts. During hot seasons, chrysanthemums are picked. displayed a longer vase life than those grown in the winter. Higher photosynthetic activity is linked to higher light intensity, which prolongs the life of cut flowers. Petal sugar content rises in the fall and slightly falls in the summer, but chlorophyll intensity progressively rises in the spring and falls in the summer. All ambient atmosphere's composition also affects the cut flowers' longevity and quality. Cut flowers were most negatively impacted by ethylene. Ethylene is initially generated in the gynoecium of carnations.

Carbon dioxide: CO_2 levels in the atmosphere are extremely low, around 0.03%. It is necessary for the process of photosynthesis. Enhancing quality, productivity, and vase life are all benefits of CO_2 enrichment in greenhouses.

Post harvest factors

Temperature: Higher temperatures speed up the opening of flower buds and the rate of senescence. Low temperatures reduce respiration, reduce the quantity of ethylene produced by the flower, and accelerate the rate of microorganism growth. Respiration is the primary metabolic activity, and it rises as the temperature rises.

Humidity: In order to preserve turgidity, or the ability to extend the vase life of cut flowers after harvest, they should be stored at 90–92% relative humidity.

Relationship with water: Water intake and transport, water loss, and the flower tissue's ability to hold onto water all affect how long the harvested flowers last. When transpiration surpasses water absorption, wilting and a water deficit occur. Water deficit is also caused by air embolism disrupting the water columns in stem veins and by resistance to water flow in stems. Water uptake of cut flowers is significantly improved by acidifying the water and adding wetting agent and flower food to the holding solution. Gladiolus' vase life reduces when the concentration of salts in the water reaches 700 ppm, and 200 ppm is detrimental to chrysanthemums and carnations.

Pre cooling: Use refrigeration or hydrocooling to eliminate extra field heat. There should be as little time between harvest and pre-cooling as feasible. It lowers the rate of breathing. The pre-cooling temperature needed for roses is 1-3^0 C, 0.5-4^0 C for chrysanthemums,1 ^{0}C for carnations, and 4^0C for gladiolous.

Additives (preservation): The potential of thidiazuron, a phenyl-urea molecule with cytokinin-like activity, to enhance iris flower opening and longevity was investigated by Macnish et al. (2010). In comparison to control (0 mM thidiazuron) stems in water, a post harvest pulse containing 0.2–1 mM thidiazuron for 6–24 hours at 0 or 20^0 C increased the vase life of flowers by up to 1.5 days. Salicylic acid increases the antioxidant activity of enzymes while inhibiting the activity of ACC-oxidase, which is the primary precursor of ethylene. Additionally, salicylic acid appears to work as a germicide by reducing the number of bacteria that obstruct the xylem vessels in the area that has been cut and disrupt the regular flow of water through the stem. Salicylic acid improves membrane stability by lowering bacterial populations in the vase flower preservative solution of the carnation cut flowers as well as MDA levels and ACC-oxidase activity.

Methods of storage

Easy storing in a refrigerator: Cut flowers are the main application for it. There are two kinds of basic refrigerated storage: The stems are kept between 2 and 4 degrees Celsius in moist storage, with the base of the stems submerged in water or a preservative solution. The flower is only kept in wet storage for a brief period of time. Dry storage, or modified atmospheric storage: Flowers sealed in plastic bags have lower O2 and higher CO2 levels because of tissue respiration (5-7 % CO2 and 1-2 % O2). The flowers can be kept for a longer period of time in dry storage.

Storage under control of atmosphere: The levels of CO2 and O2 are regulated. features a storage compartment with constant air circulation and discharge. The RH is kept high and the temperature is kept low. The main drawback of CA flower storage is: It is not possible to keep multiple flowers in the same chamber at the same time because individual flowers have varied optimal amounts of CO2 and O2 needed for storage.

Grading

Flowers that are harmed, diseased, or pest-infested are thrown out during the sorting process. Bud size and stem length are used to rate good flowers. In numbers 10, 15, or 20, uniform buds with stem lengths of a specific grade range are grouped together. Usually, bud or bloom regularity, stem length, and straightness are used to grade flowers based on their quality. The following lists the grades of gladioli and roses that are most commonly traded internationally.

Packing

The package guarantees the preservation of quality throughout storage and transit. Throughout transportation and storage, the package must be able to endure shocks, drops, vibrations, compression, and refrigeration. In order to comply with the regulations of importing nations, package specifications differ depending on flower crops, cultivars, mode of transportation, storage, and market outlet. Packages are thought of as silent salesmen that subtly sway buyers' decisions by projecting a sense of quality and encouraging purchases. The flowers should also be cushioned by the inner layer of the packaging. Cellophane paper, newsprint, fluted card board paper, polypropylene, and other materials are frequently used for packaging.

Conclusion

The shelf life of cut flowers is significantly influenced by a combination of pre-harvest, harvest, and post-harvest factors. Temperature, humidity, water quality, ethylene sensitivity, handling practices, and storage conditions all impact the vase life and quality of flowers. Additionally, flower variety, maturity at harvest, and nutritional factors also play crucial roles. Understanding and optimizing these factors enables growers, wholesalers, and retailers to extend shelf life, reduce waste, and provide high-quality flowers to consumers. By implementing best practices in flower care, handling, and storage, the floral industry can improve customer satisfaction, increase sales, and maintain the beauty and freshness of flowers.