

## Fresh Flower Care and Handling

### The Chain of Life

The 'Chain of Life' is a marketing and educational program sponsored by the Society of American Florists which is specifically focused on the proper care and handling of cut flowers at every level in the distribution channel. There is a long chain of handlers involved in moving the product from the greenhouse or the field to the design bench, beginning with the **grower**, often followed by a **broker** or exporter, then the **shipper**, on to the **wholesaler**, then to the **florist-retailer-designer**, and finally the **customer**. All parties involved should work at keeping this living product in a n optimum condition by following the Chain of life guidelines, and when buying fresh cut plant materials, it is important to know how they have been cared for in the various stages of distribution so that we, as designers, can continue to care for them in the correct way.

### Pre-treatments and pre-conditioning

There are a number of different chemical treatments which are beneficial to certain cut plant materials that are applied immediately after the product has been harvested. *These pre-treatments are usually carried out directly by the grower.* Pre-treatments are used to protect the plant material from harmful substances that could be present in water or in the air, to give the product an extra energy boost, or to stimulate the uptake of foods more easily. Depending on the variety of plant material, these treatments are truly necessary to achieve the maximum performance and to extend its longevity.

- **Preventing the effects of ethylene gas.**

Ethylene is a naturally occurring plant hormone which is involved in the aging process and is released as an odorless, colorless gas. Its presence can be extremely harmful to a large group of cut flowers, especially carnations, lilies, irises, and freesias. This gas is produced in large quantities by ripening fruit and vegetables, in the burning of organic materials such as gasoline, diesel fuel, firewood, and tobacco, from decomposing plant material and by bacteria. Cut flowers can be shielded from these damaging effects by using ethylene reduction treatments such as silver thiosulfate solution or 1-MPC (methylcyclopropene).

- **Rehydrating.**

A hydrating solution is best added to water immediately after harvesting plant material so as to encourage water absorption and maintain its turgidity. When cut flowers have been transported out of water in a dry pack, this treatment might be repeated after arrival at their destination. Plant material should always be rehydrated with clean, good quality water. For some plant species, a biocide and or an acidifier like citric acid or aluminum based chemical may be added.

- **Pulsing.**

Pulsing is a method of conditioning in which fresh cut plant material is stood in a particular solution for a certain time, ranging from a few seconds to several hours. Such a solution could contain sugars like sucrose or glucose to supply the product with a food source. Pulse treatment can also be given with growth regulators, such as cytokinins or gibberellins, to prevent leaf yellowing. Short pulses in a solution of silver nitrate have proven valuable in some products to inhibit bacterial growth.

These treatments are best carried out directly after harvesting to improve product quality during shipping and storage and to extend the ultimate vase life of the flowers. In some situations, however, they are often or mostly carried out upon arrival at the retail outlet. The range of treatments to be applied will vary depending on local and national markets or transportation systems. For this reason it is important to know about how the product has been cared for along its journey.

## General Guidelines on Care and Handling

It is important to remember that cut flowers and foliage are still living things, and as such, they have continuing needs that must be met in order to assure as long a life as possible. The goals of proper care and handling are to provide those essential needs—in particular, nutrition, water uptake, and retention, and a clean environment.

**1. On receiving cut plant material one should:**

- Open and unpack immediately
- Allow the produce to breathe
- Check the name, quantity, and price against the invoice
- Make a point of remembering the correct plant and variety name for future reference
- Check the quality and look for any damage

Important: If there is anything unsatisfactory about the shipment, it will be best to consult your supplier immediately.

**2. Begin re-cutting and conditioning immediately**

**3. Use properly sanitized buckets**

Bacteria and fungi, such as Botrytis, will dramatically shorten the lifespan of cut flowers and foliage. Be sure to sanitize knives, cutters, work surfaces, and coolers as well as buckets.

**4. Fill the buckets with six to eight inches of clean, lukewarm water.**

Using warm water (110 Degrees F) helps to remove potential air bubbles, providing a fast, easy flow of water up the stem. Warm water will also encourage the development and opening of the plant material.

Use good quality water. Check the pH of the water, it should be between 3.5 and 4.5. Have the total dissolved solids content of your water checked.

**5. Add a correctly measure amount of the appropriate floral preservative to clean water and make sure that it is well dissolved.**

The use of floral preservative can easily double the vase life of cut flowers. All flower foods have some sugar content for nourishing the cut plant material. However, sugars also encourage growth of bacteria. Such a mixture is carefully balanced. Improper measuring could result in not providing enough biocide in relation to sugars. All powdered foods are best dissolved in warm water.

**6. Remove any foliage that will be below the water line so as to discourage the development of bacteria. Rinse away any remaining soil from the stems.**

When stripping thorns or leaves from plant stems, avoid damaging the stem's skin. By damaging the outer plant cells, juices will be released into the water which causes extra bacterial growth, polluting the water. Therefore, never flatten or pound stems; do not break off stems; never scrape off the outer surface of the stems.

**7. Cut at least one, or when possible, up the three inches off the bottoms of the stems.**

When cut flowers have been transported out of water, the exposed outer cells surrounding the cut have dried out. A callus will have formed, air will have entered the stem vessels, bacteria will have developed, and debris may have entered, polluting the vascular system of the stem. This of course will obstruct water absorption. Re-cutting the stem removes this dried, polluted section and exposes fresh, healthy tissue which is better able to take up water.

It is common practice to cut stems under water to prevent an embolism, which is an airlock caused by bubbles of air obstructing the vessels. However, repeated cutting under the same water can actually pollute it with accumulating debris and bacteria.

It is best to cut the plant stem at a 45-degree slant using a sharp-bladed instrument, such as a knife or specially designed shears. Cutting stems with blunt, dull shears will squeeze the plant cells shut and have the opposite effect. Slicing diagonally through the stem with a sharp blade will expose a maximum area of clean, open cells through which the plant can absorb water and nutrients. Perhaps more importantly, the angle cut will help keep the bottom of the stem from resting flat on the bottom of the bucket, further impeding water uptake.

**8. If a product has not been pre-treated, do so by placing or dipping into an appropriate hydrating solution.**

**9. Place the flowers into buckets containing the warm, pre-mixed nutrient solution.**

**10. Prevent unnecessary handling as this will increase the chances of damage.**

Dirt or salt and sweat on the hands can easily stain and leave permanent damage on delicate plant surfaces.

**11. Condition the product**

After placing the plant material into the warm water and nutrient solution, leave it to recover and acclimatize for several hours. Conditioning allows the product to become fully hydrated and encourages bud development.

**12. Store product at the right temperature and humidity**

A lower temperature will slow the respiration rate of cut plant material, increasing the storage time and extending the life span of the product. For most plant material the ideal storage temperature is around 36-38 degrees F. Clean and disinfect storage and display coolers regularly, and avoid any fluctuation in temperature.

Tropical plant materials such as orchids, anthurium, heliconia, ginger, tropical foliage, etc., are an exception to low temperature storage. Never store these products in a cold storage cooler, but instead keep these materials at a temperature of around 55-60 degrees F.

The relative humidity of a flower cooler should be 80 percent or higher, and the air velocity should be low as to prevent water loss through transpiration and desiccation.

At all times, one should prevent contact with ethylene gas. Therefore, never store flowers in the same space with fruit and vegetables.

**13. Rotate stock**

Always practice the 'First In, First Out' rule.

**14. Maintain proper care and handling practices at the design bench**

- Use plant material sensibly and pay attention to its needs and its destination.
- Soak floral foam and bouquet holders in clean water with nutrient solution
- Keep cut flowers in water rather than laying them on the bench as you are working with them.
- Include a packet of floral preservative with wrapped flowers and hand tied bouquets.
- Include care instructions with flowers that are delivered.

## 15. Keep up with regular maintenance

- Remove dead flowers
- Remove empty buckets and clean carefully
- Change the water in the buckets and replace with the correct cut flower food
- Re-stock partly filled buckets from flower stock

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The American Institute of Floral Designers. The AIFD Guide to Floral Design. Terms, Techniques, and Traditions. The Intelvid Group 2005.

### Other Helpful Care and Handling Information:

**Vase Life**-length of time flowers remain beautiful

**Senescence**-flower death

#### Why flowers wilt and die prematurely

- Stem diameter and thickness
- Genetics
- Inability of the stem to absorb water
- Lack of carbohydrates
- Excessive transpiration
- Bacterial growth and disease
- Ethylene gas
- Improper surrounding conditions

#### Floral preservative ingredients

- Sugars (carbohydrates to nourish)
- Biocides (inhibits the growth of microorganisms)
- Acidifiers (lowers pH levels)
- Growth regulators (to increase the vase life of some flowers)
- Wetting agents (to aid in water absorption)

#### Care and handling of floral arrangements

- ◆ Care tag
- ◆ Replenish water preservative solution
- ◆ Misting
- ◆ Remove wilted and recut or discard
- ◆ Keep away from ethylene sources
- ◆ Keep out of direct sunlight
- ◆ Avoid warm sources (TV, microwave)
- ◆ Avoid drafts