

## Use of Botanicals to Improve the Vase Life of Cut Flowers

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### **Abstract**

One of the most appealing and cost-effective qualities of cut flowers is their vase life. A longer vase life of cut flowers is viewed as a desirable quality trait for merchants and consumers in flower farming and marketing. The postharvest durability of cut flowers is critical in determining the flower crop's worth. Every year, 20–40% of cut flowers are thrown away due to inadequate post-harvest handling. The shelf life of flowers has been influenced by a variety of biotic and abiotic variables. Microbes that clog floral stock xylem channels reduce the pace at which water is delivered to flowers, shortening vase life. It can be improved with a variety of preservation chemicals. To lengthen the vase life of cut flowers, antimicrobial compounds such as plant extracts and essential oils are utilized. Botanical extracts are natural, safe, and inexpensive compounds that are essential in large-scale applications. In recent years, natural plant extracts have grown in popularity. Various natural plant extracts (Thyme oil, Rosemary oil, Geranium oil, Eucalyptus oil, Mint oil, Ajowan oil, Savory oil, Coriander oil, Dill oil, Artemisia oil, fruit and leaf extracts) display significant antibacterial potential against several diseases due to high levels of phenolic chemicals. Thyme essential oil, for example, was found to be helpful in extending the vase life of gerbera, narcissus, chrysanthemum, alstroemeria, rose and carnation cut flowers.

**Keywords:** Cut flowers, Longevity, Essential oils,

### **What is botanical**

A botanical is a plant or component of a plant that is prized for its medicinal or therapeutic characteristics, as well as its flavour and aroma. Botanicals can be extracted from a variety of plants. Various botanicals are employed in the vase life of cut flowers.

### **Different types of botanicals used in vase life of cut flowers**

- ✓ Essential oils

- ✓ Orange juice
- ✓ Coconut water
- ✓ Coconut milk
- ✓ Sour orange (*Citrus aurantium L.*) Extract
- ✓ Lemon extract
- ✓ Apple fruit extract
- ✓ Leaf extracts of *Psidium guajava*
- ✓ Leaf extracts of Piper betel
- ✓ Leaf extracts of *Jatropha curcas*

#### **How the botanicals are beneficial in cut flower vase life?**

- ✓ Fruit extracts – malic acid, citric acid, and fructose.
- ✓ Coconut water and milk – auxins, gibberellins, cytokinins, and reducing sugar.
- ✓ High polyphenols, anthocyanins content and antioxidants.
- ✓ They increase the acidity of the solution.
- ✓ They reduce the amount of ethylene produced.
- ✓ They inhibit the growth of germs and are environmentally friendly.

#### **Essential oils**

- ✓ Aromatic oil liquids produced from diverse aromatic plant materials such as flowers, buds, seeds, leaves, twigs, bark, wood, fruits, and roots are known as EOs or volatiles.
- ✓ There are approximately 3000 EOs known, with roughly 300 being economically important and designated primarily for tastes and scents on the market.
- ✓ The amount of essential oils present in these plants can range from 0.01 percent to 10% of their total weight.

#### **Important features of Essential Oils**

- ✓ Essential oils are primarily found in the aerial sections of plants, although they can also be found in the roots and woodlands.
- ✓ The Lamiaceae, Myrtaceae, Rutaceae, Compositae, Rosaceae, Umbelliferae, and Graminae groups account for the majority of commercial EO yielding plants.
- ✓ The amount of EO accumulated is determined by the plant's developmental stage. e.g. Young leaves of *Mentha arvensis* contain menthone, while adult leaves contain menthol.

- ✓ Climate and season have an impact on EO content and composition. Geranium, for example, has a high oil content in the summer (0.09-0.12%) and a low oil content in the winter (0.09-0.12%). (0.06-0.07 percent ).

#### Presence of essential oils in plant parts

Crop name	Economic part
Mentha, <i>Ocimum</i> , Lemongrass Eucalyptus, Jamarosa	Leaves
Geranium, Patchouli Cinnamon, Verbena, etc.	Leaves and Stems
Rose, Jasmine, Carnation Clove, Mimosa, Rosemary Lavender, Tuberose, etc	Flowers
Ginger, Turmeric	Rhizomes
Angelica, Vetiver, Sausurea Valerian	Roots
Cedar, Santal, Pine, etc.	Wood
Cinnamon, Cassia	Bark

#### Some of the major Essential Oils

- ✚ Lemon grass oil
- ✚ Eucalyptus oil
- ✚ Cinnamon oil
- ✚ Citronella oil
- ✚ Clove oil

- ✚ Rose oil
- ✚ Jasmine oil
- ✚ Tuberose oil
- ✚ Lavender Oil
- ✚ *Artemisia* Oil
- ✚ Oregano EOs
- ✚ Stevia EO
- ✚ EOs of *Salvia ringens*
- ✚ EOs of *Salvia tomentosa*
- ✚ EOs of *Mentha piperita*
- ✚ EOs of *Bunium persicum*
- ✚ EOs of *Lippia scaberrima*
- ✚ EOs of ajowan
- ✚ EOs of Summer savory
- ✚ EOs of *Tagetes* spp

#### Industrial uses

- ✓ Cosmetics
- ✓ Pharmaceuticals
- ✓ Perfumery
- ✓ Confectionery
- ✓ Ice-creams, etc.

#### Medicinal uses

- ✓ Aromatherapy
- ✓ Inhalation
- ✓ During bath
- ✓ Compress
- ✓ Massage blend
- ✓ Humidifiers
- ✓ Diffusers
- ✓ Sprayers

### Agricultural uses

- ✓ Anti-feedent
- ✓ Repellents
- ✓ Botanical insecticides
- ✓ Natural herbicides
- ✓ Growth promoters
- ✓ Floral preservatives

### The Major Constituents of Essential oils

- ✚ Thyme oil : Thymol, Carvacrol and Rosmarinic acid
- ✚ Rosemary oil : Camphor, Cineole, Limonene, Triterpenes
- ✚ Lavender oil : Linalole, Terpinenol, Cineole, Tannins
- ✚ Clove oil : Eugenol, Gallicacid, Methylsalicylate
- ✚ Eucalyptus : Cineole, Pinenes, Sesqui terpene
- ✚ Lemon oil : Limonene, Flavonoids, Vitamin C
- ✚ Sage oil : Thujone, Borneol, Phenolic acids
- ✚ Tuberose : Geraniol, Nerol, Eugenol, Methyl benzoate
- ✚ Basil oil : Estragol, Methyl chavicol, Camphor

### Essential oil recovery percentage in different plants

- ✚ Thymol - 0.7 to 1.0 %
- ✚ Mentha oil - 0.1 to 1.0%
- ✚ Rosemary - 1.0 to 2.0%
- ✚ Lemon grass - 1.0 to 1.2%
- ✚ Carnation- 0.21 to 0.28%
- ✚ Jasmine - 0.29 to 0.34%
- ✚ Lavender -0.81 to 0.85%
- ✚ Tuberose - 0.08 to 0.14%
- ✚ Rose (Edward rose - 0.25 to 0.30%,
- ✚ Damask rose-0.030 to 0.050%)
- ✚ Marigold (*T. minuta*) - 0.196 to 1.083%

### Mode of action of Essential oils on Bacteria

- ✓ Essential oils enhance the turgor pressure in the bacterial cell membrane and have a harmful effect on it.
- ✓ Essential oils are hydrophobic in nature, which causes bacterial structures to be disrupted, resulting in increased permeability to the bacterial cell membrane.
- ✓ Degradation of the cell wall, damage to the proteins membrane, increased permeability resulting to cell content leakage, reduction of the proton motive force, and reduction of intracellular ATP generation are all effects of essential oils.

#### **Why use of Essential oils in vase life of cut flowers?**

- ✓ EOs are natural organic chemicals that are not only safe but also environmentally favourable.
- ✓ EOs can be employed as natural additions in a variety of foods due to their antibacterial, antifungal, antioxidant, and anti-carcinogenic effects.
- ✓ Flavonoids, glycosides, alkaloids, and even polyacetylenes are found in them.
- ✓ Lavender, thyme, and geranium essential oils are useful against specific germs and fungus.
- ✓ The amount of essential oils (EOs) and their components required to suppress microbiological development in vase solution; EOs are more inhibitory to Gram-positive bacteria than Gram-negative bacteria.

#### **Reasons for extending the vase life cut flowers by using Essential oils**

- ✓ Having anti-respiratory characteristics, inhibiting the production of suberin, improving the water relationship, and hydraulic conductivity.
- ✓ Keeping carbs in check.
- ✓ They reduce the amount of ethylene produced.
- ✓ Antimicrobial and antifungal properties.
- ✓ Finally, this helps to prevent vascular blockage, boost fresh and dry weight, and extend floral vase life.

#### **Why use of Essential oils in vase life of cut flowers?**

- ✓ Botanicals and essential oils (EOs) are natural, nontoxic, and biodegradable chemicals with significant antioxidant and antibacterial capabilities against a variety of microbes, reducing the number of bacteria in the vase solution.

- ✓ The use of several essential oils and natural preservatives significantly increased the vase life of diverse cut flowers.
- ✓ Botanicals and essential oils (EOs) include carbohydrates and other phenolic components that can extend the vase life of cut flowers.
- ✓ According to the findings, adding 100-150 mg/l of thyme, geranium, mentha, and lavender oil to cut flowers extends their vase life.
- ✓ The use of 50 percent coconut water and 4% sour orange extract extends the vase life of cut flowers.

### Conclusion

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