

## STUDY ON THE EXTENSION OF THE SHELF LIFE OF CUT FLOWERS IN APARTMENTS

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### **Abstract**

*In order for the beneficiaries to enjoy the beauty and freshness of the cut flowers that they put in their homes in water vases, we have conducted research to find some methods and solutions to prolong their vase life.*

*The flowers' shelf life at room temperature depends on how water is absorbed by the floral stems and on how water is conducted to the flowers (Vlad I., 2011).*

*Research carried out abroad (Kohl, 2011) shows that the bent bud phenomenon in carnations and roses is due to turgidity loss in the pedicel. This phenomenon is most often irreversible (Băloiu I., 2012).*

**Key Words:** flowers, solutions for flower opening, sucrose, copper sulphate.

### **INTRODUCTION**

With the harvesting operation, by cutting flowers off the plant, under pressure water columns in the conductive tissue of the stems are disconnected and air bubbles appear, preventing water absorption and circulation (Paulin, 2009). Even after the stems have been put in water, the flowers do not regain the turgidity they had before cutting, therefore the bottom of the stems have to be freshened to eliminate the air bubbles in the conductive tissue. Alternatively, warm water can be used, as it is better absorbed than cold water.

Blocking the conductive tissue of floral stems is also linked to the presence of microorganisms in the storage water. These microorganisms block the conductive tissue either through gathering around the base of the stem or indirectly through the substances they secrete.

In order to inhibit the microorganisms in flower preservation solutions at room temperature, we have carried out research using a number of preservatives and antibiotics, the results of which will be presented in this paper.

The studies conducted by Larsen et al during 2009-2014 showed that hydroxyquinoline citrate acts in the same way as hydroxyquinoline sulphate, inhibiting microorganisms in preservation solutions and thus prolonging flower life.

Larsen shows that hydroxyquinoline citrate is a strong inhibitor for bacteria, yeasts and fungi, reducing their development in concentrations of 0.01% and completely inhibiting them in 0.03% concentrations.

Several authors show that there is also a physiological blockage of the conductive tissue in the stems. Thus, Aarts (2014) shows that physiological blockage of conductive tissue is also due to substances secreted by the cells damaged after cutting the stems.

In what concerns the physiological blockage of the conductive tissue of the stems, Durkin and Kuch (2014) show that it is due to the action of peroxidase on toxins, and Burdett (2013) shows that the pectolytic enzymes secreted by microorganisms transform the cell walls of the conductive tissue into substances that block them in the xylem, since there are no microorganisms present, but pectic substances.

Along with water, another factor that contributes to maintaining cut flower quality at room temperature is the cutting time. During their shelf life, substances consisting primarily of carbohydrates and proteins are consumed by the flowers. Once they are depleted, flowers lose their quality.

#### **MATERIAL AND METHOD**

The experiments were carried out in 2016-2017 in Sântandrei (Bihor) using flowers cut from red Scania carnations and white Apollo carnations. The experiments consisted in the following variants:

v1 – flowers kept in water

v2 – flowers kept in 5% sugar solution

v3 – flowers kept in 0.08% potassium sulphate solution

v4 – flowers kept in 0.03% potassium chloride solution

v5 – flowers kept in 0.003 3% silver nitrate solution

v6 – flowers kept in 0.1% copper sulphate solution

The flowers were kept in rooms with a temperature of 20-28<sup>0</sup>C.

#### **RESULTS AND DISCUSSIONS**

As Table 1 shows, the vase life for the carnation flowers was 12 days in variant 6, flowers kept in 0.1% copper sulphate solution, with a significant difference compared to variant 1, the control sample, flowers kept in water.

*Table 1*

Vase life duration of carnation flowers at room temperature depending on the solution used (average values) Sîntandrei 2016-2017

Variants	Vase life duration		±D	Difference significance
	Absolute (days)	Relative (%)		
v1 – flowers kept in water	5	100	-	-
v2 – flowers kept in 5% sugar solution	10	200	-	***
v3 – flowers kept in 0.08% potassium sulphate solution	8	160	3	**
v4 – flowers kept in 0.03% potassium chloride solution	9	180	4	***
v5 – flowers kept in 0.003 3% silver nitrate solution	7	140	2	*
v6 – flowers kept in 0.1% copper sulphate solution	12	240	7	***

In variant 2, flowers kept in 5% sugar solution, the vase life was 10 days, and in variant 4, flowers kept in 0.03% potassium chloride solution, it was 9 days. Both have a significant difference from the control sample (v1), flowers kept in water.

In variant 3, flowers kept in 0.08% potassium sulphate solution, the vase life was 8 days, with a distinctly significant difference from the control sample. In variant 5, flowers kept in 0.003 3% silver nitrate solution, the flowers kept for 7 days, with a significant difference from the control sample.

## CONCLUSIONS

1. Flower vases should be washed with hot water and detergent or an antimicrobial substance before use. This avoids contaminating the water and floral stems with pathogenic microorganisms that cause blocking the conductive tissue and stem rotting.

2. Avoid keeping flowers in rooms with high temperature, exposed directly to sunlight. Temperatures of 18-24<sup>0</sup>C are best suited for maintaining flower quality for a period of time corresponding to the species and soil.

3. Removing about 0.5 cm of the stem is a mandatory operation both before putting the flowers in water and daily for the duration of vase life.

4. Before putting the flower stems in water, remove the leaves at the base, since they will rot in the water and contaminate it.

5. The best results were in variant 6, flowers kept in 0.1% copper sulphate solution, where the shelf life was 12 days, followed by variant 2, flowers kept in 5% sucrose solution, with a shelf life of 10 days. Both the copper sulphate solution and the sucrose one are very easy to prepare and are available to anyone.

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