SOME EFFECTS OF FLORAL PRESERVATIVES ON CARNATION KEEPING LIFE

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Two new materials for preserving keeping life of carnations, thiabendazole (1) and physan-20® (2) have been reported in recent literature. We did not find thiabendazole to be an adequate material for improving cut flower life of open carnations. However, Physan-20® was as good as, or slightly better than, 8-hydroxquinoline citrate (8HQC) when used at concentrations of 200 to 500 ppm Physan-20® and 5% sugar. 8HQC, commonly called the "Cornell Solution", as reported by Larsen and Scholes (3) has been one of the better preservatives available to the industry. Physan-20® performed better in hard water than 8HQC.

Methods

Cut flower carnations, standard and fancy grade, 8 flowers per treatment were placed in various solutions (Table 1) in glass jars. The testing room was maintained at 70 to 75°F, with approximately 50 ft-c light intensity with fluorescent lamps. Keeping life in days was determined by subtracting one day from the number of days from start to when the petals began to show obvious sleepiness. For Treatment 5, hard water was made up, consisting of 3 meq/l (370 ppm) magnesium sulfate, 6 meq/l (504 ppm) sodium bicarbonate and 5 meq/l (278 ppm) calcium chloride.

Results

TBZ (thiabendazole) did not increase carnation keeping life when used with or without sugar (Fig. 1A, B and C). While differences between the distilled water control and TBZ were often not statistically significant, there was a tendency to reduced keeping life with TBZ. When sugar was added, the cut flowers with TBZ kept nearly 2 days less than the control. 'CSU White' kept significantly better than 'CSU Red' (Fig. 1A). In all treatments, there were significant differences between repetitions. It was not unusual to find one to two days difference from one group of flowers to another treated identically except as to dates when cut.

Physan-20®, when combined with 5% sugar, was as good as, or slightly better than, 8HQC (Fig. 1C). Flowers in both solutions kept 4 days longer than the distilled water control. Optimum concentrations appeared to be 200 to 300 ppm Physan-20®, with 400 ppm definitely reducing keeping life (Fig. 1D).

The literature has indicated that a preliminary precaution in handling cut carnations should be to use distilled or deionized water. A hard water, based upon previous Denver analaysis, was made up to test the effect of hard water on keeping life (Fig. 2). The results showed that Physan-20® appeared to be superior to 8HQC when hard water had to be used. Flowers in 8HQC and hard water did not keep longer than the tap water control. Flowers in Physan-20® plus 5% sugar kept nearly 3 days longer.

[1]*Undergraduate student and professor respectively.*

Table 1: Treatments for determining effectiveness of various cut-flower preservatives.

Treatment No.	Treatment	Variety	Repetition of Treatments
1.	a. Distilled water b. 100 ppm TBZ[1] c. 200 ppm TBZ d. 300 ppm TBZ e. 400 ppm TBZ	'CSU Red' and 'CSU White'	4 times
2.	a. Distilled water b. 200 ppm TBZ c. 200 ppm 8HQC[2] d. 200 ppm TBZ + 5% sugar e. 200 ppm 8HQC + 5% sugar	'CSU White'	2 times
3.	a. Distilled water b. 200 ppm Physan-20® c. 200 ppm Physan-20® + 5% sugar d. 200 ppm 8HQC + 5% sugar e. 200 ppm TBZ + 5% sugar	'CSU White'	4 times
4.	a. Distilled water b. 100 ppm Physan® + 5% sugar c. 200 ppm Physan® + 5% sugar d. 300 ppm Physan® + 5% sugar e. 400 ppm Physan® + 5% sugar	'CSU White'	2 times
5.	a. Tap water only b. Hard water + 200 ppm 8HQC + 5% sugar c. Hard water + 200 ppm Physan® + 5% sugar d. Tap water + 200 ppm 8HQC + 5% sugar e. Tap water + 200 ppm Physan® + 5% sugar	'CSU White'	2 times

[1]Thiabendazole
[2]8-Hydrozyquinoline citrate

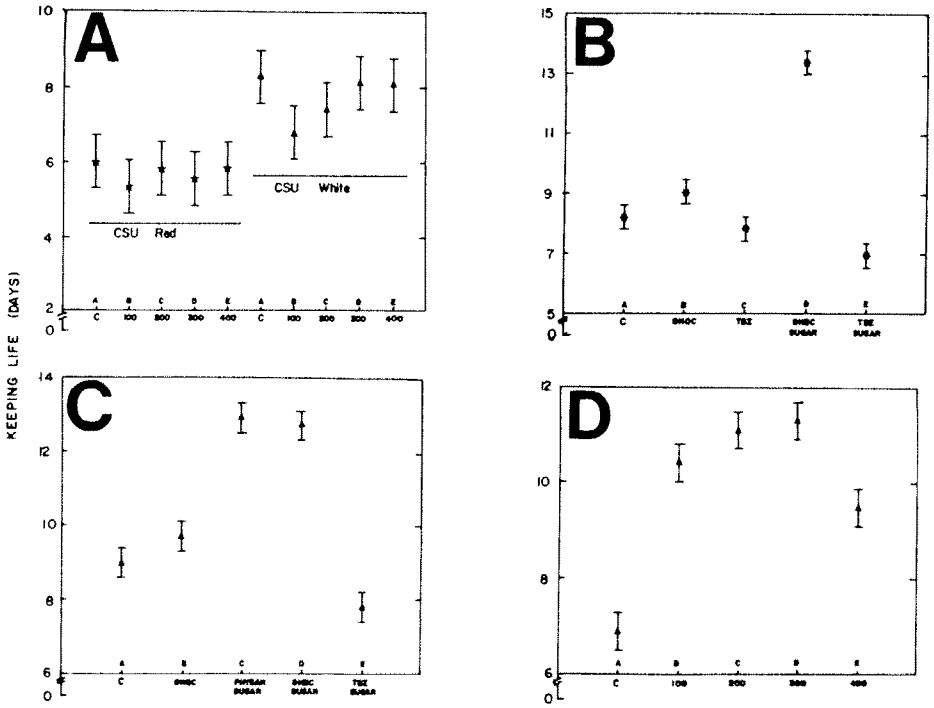

Fig. 1: Effect of floral preservatives on carnation cut flower keeping life.
A - Effect of various concentrations (ppm) of thiabendazole (TBZ) on keeping life of 'CSU Red' and 'CSU White' carnations, without sugar, compared with distilled water control (C). Experiment repeated 4 times for each variety.
B - Comparison between TBZ and 8-hydrozyquinoline citrate (8HQC) with 5% sugar on keeping life of 'CSU White' carnations. Control (C) was distilled water.
C - Comparison between Physan-20®, TBZ and 8HQC with 5% sugar on keeping life of 'CSU White' carnations.
D - Effect of different concentrations of Physan-20® plus 5% sugar on keeping life of 'CSU White' carnations, compared with a distilled water control.

Vertical bars show differences required for statistical significance between means.

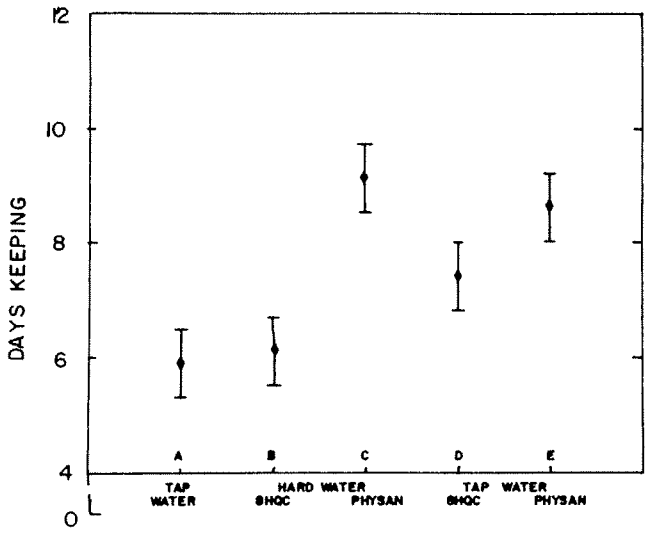

Fig. 2: Effect of hard water on keeping life of 'CSU White' carnations, comparing 8HQC and Physan-20® with 5% sugar. Vertical bars show difference required for statistical significance between means.

Thiabendazole (2-(4-thiazolyl)benzimidazole) is a broad spectrum fungicide, essentially insoluble in water, the latter probably contributing to its ineffectiveness in our experiments. It is distributed in this country by the Merck Chemical Division of Merck and Co., Inc.[2] According to other investigators (1), using thiabendazole glycolate, TBZ was found to be significantly better than 8HQ. However, they used a glycolate 8HQ, rather than citrate, and it may be that these differences in formulation led to our results. Physan-20® is distributed by Consan Pacific, Inc.[2], Box 208, Whittier, CA, and consists of several benzyl ammonium chlorides. It is also a broad spectrum fungicide.

References

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