

When comparing the average vase life between the four treatment groups, ANOVA showed that uncut and cut stems placed in tap water had similarities between the trials within the second harvest test group, as did uncut and cut stems placed in a floral food solution. While there were differences between tap water and floral food trials, the variation between uncut stems versus cut stems placed in tap water had an average vase life difference of 0.36 d. The difference between the floral food solution groups, both uncut and cut stems, was 2 d. However, the two flower food groups both average higher vase life than the tap water groups by 1.76-4.12 d.

3.3 Vase life findings for combined harvest data of *Zinnia elegans*

The data from both harvests was combined and analyzed as a whole to determine if there were differences in the treatment groups based on the collective data for all 200 flowers. ANOVA tests were run on the data to determine any differences in vase life among the test groups. Significant differences were found between the maximum, minimum, and average vase life based on the treatment group the flowers were placed. Post hoc tests used to determine where these differences occurred. ANOVA revealed that the uncut stems and the cut stems across all test subjects placed in tap water showed similarities, as well as uncut stems and the cut stems across all test subjects placed in a floral food solution showed similarities. It is important to note that the differences were between the water type, tap water and floral food, rather than between the factor of if the zinnia stem was trimmed or not. In both tap water groups, the overall minimum day was 7 d, while the floral food solution test group's minimum days were 10 d for uncut and 9 d for cut stems. This is 2-3 d longer than the minimum for both tap water test groups (Table 3).

Table 3 Combined vase life from harvest one and two of cut *Zinnia elegans* flowers under four postharvest treatments

Dependent variable	No cut + tap water ¹	Cut + tap water	No cut + floral food	Cut + floral food	df	F value	P value
Minimum days	7 ^a	7 ^a	10 ^b	9 ^b	3	12.979	0.001*
Maximum days	21 ^{ab}	19 ^a	21 ^b	22 ^c	3	13.046	0.001*
Average days	12.8 ^a	11.7 ^a	14.7 ^b	16.46 ^c	3	27.096	0.001*

Note: *Significant at $P \leq 0.05$; ¹ Average over 2 replications; Means within a row followed by different lowercase letters are significantly different according to Duncan's multiple range test at $P \leq 0.05$

When analyzing the maximum vase life, it was found the uncut stems placed in tap water showed similarities between both cut stems in tap water and uncut stems in floral food solution, however, cut stems in tap water and uncut stems in floral food indicated differences from each other. Both uncut stems in tap water and uncut stems in floral food had a maximum vase life of 21 d. The cut stems and uncut stems in tap water were also found to be similar, having a difference of 2 d in maximum vase life. In this trial, the cut stems in the floral food solution were significantly different from all the other test groups, having the longest vase life of 22 d (Table 3).

ANOVA revealed that for average vase life, there were similarities between uncut and cut stems that were placed in tap water. Both the uncut stems and the cut stems that were placed in the floral food solution differed from each other as well as the tap water groups. The average vase life for uncut stems in tap water was 12.8 d and cut stems in tap water was 11.7 d, a difference of 1.1 d. Conversely, the uncut stems in the floral food solution group lived an average of 14.7 d and cut stems in the floral food solution averaged 16.46 d.

3.4 Comparison of vase life between harvest groups

ANOVA tests were used to determine if there were any differences in the vase life of the zinnias between the first and second harvest group. No statistically significant differences were found between the maximum, minimum, or average days of vase life between the first and second harvest groups, indicating that vase life between harvests was relatively the same (Table 4).