

groups, both had a minimum vase life of 8 d (Table 1). Zinnia stems that did not receive a stem cutting and placed in floral food solution and stems that did receive a cutting in floral food solution also showed similarities between the test groups, as they also shared a similar minimum vase life of 12 d and 11 d, respectively (Table 1). There were differences between tap water and floral food solution test groups, as the vase life varies by 3-4 d between the two groups. The zinnias within the flower food solution groups were found to live longer than zinnias in the tap water groups.

Table 1 Vase life of cut *Zinnia elegans* flowers under four postharvest treatments during the first harvest

Dependent variable	No cut + tap water	Cut + tap water	No cut + flower food	Cut + flower food	df	F value	P value
Minimum days	8 ^a	8 ^a	12 ^b	11 ^b	3	9.790	0.001*
Maximum days	21 ^b	15 ^a	20 ^b	22 ^c	3	12.333	0.001*
Average days	13.56 ^b	11 ^a	15.24 ^b	16.76 ^c	3	25.395	0.001*

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

Regarding the differences in maximum vase life, it was found zinnia stems that did receive a stem cutting and placed in tap water had a maximum vase life of 15 d, while stems that did receive a cutting and placed in floral food solution had a maximum vase life of 22 d (Table 1). Untrimmed stems in tap water and untrimmed stems placed in floral food showed similarities between the groups, having similar maximum vase lives of 21 d and 20 d, respectively (Table 1).

When analyzing the average number of days flowers remained alive in each treatment group, it was found zinnia stems that did receive a stem cutting and placed in tap water and stems that did receive a cutting and placed in floral food solution were significantly different from all the other groups and each other. The zinnias that were cut and placed in tap water had an average vase life of 11 d, while the zinnias that were cut and placed in a flower food solution had an average of 16.76 d, a difference of 5.76 d.

3.2 Vase life findings for second harvest of *Zinnia elegans*

ANOVA tests were run on the data to determine any differences between the test groups, looking specifically at vase life. Significant differences were found within the second harvest treatment groups based on their maximum, minimum, and average vase life. Post hoc tests examined where these differences occurred. Test results revealed that the uncut stems in tap water and the cut stems in tap water showed similarities, as the two trials shared a minimum vase life of 7 d. The cut stems in tap water and uncut stems in flower food showed statistical similarities in the study. Uncut stems in a floral food solution and cut stems in floral food solution showed similarities, as they had a minimum vase life of 10 d and 9 d, respectively (Table 2).

Table 2 Vase life of cut *Zinnia elegans* flowers under four postharvest treatments during the second harvest

Dependent variable	No cut + tap water	Cut + tap water	No cut + flower food	Cut + flower food	df	F value	P value
Minimum days	7 ^a	7 ^{ab}	10 ^{bc}	9 ^c	3	6.202	0.005*
Maximum days	19 ^a	19 ^{ab}	21 ^{bc}	21 ^c	3	5.920	0.006*
Average days	12.04 ^a	12.40 ^a	14.16 ^b	16.16 ^b	3	13.920	0.001*

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

ANOVA also indicated differences in the maximum vase life for zinnias in the second harvest based on the treatment groups. Post hoc analysis found the uncut zinnia stems in tap water and cut stems in tap water showed similarities between the test groups. These two trials shared a maximum vase life of 19 d. The cut stems placed in tap water and uncut stems placed in a floral food solution showed similarities in their test groups as well. These two test groups had a difference between the maximum vase life of 2 d. The uncut stems and trimmed stems both placed in the floral food solution showed similarities, as their maximum vase life was both 21 d.