Special Research Report # 456: Identifying Consumer Preferences for Cut Rose Fragrances

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BACKGROUND

The fragrance that flowers emit is a very important stimuli and a trait that consumers desire when purchasing cut flowers. The results of a previous survey that we conducted indicated that flower fragrance was the most important characteristic that consumers preferred when considering floral products. This study tested the capacity of human subjects to detect fragrance intensities from several cultivars of fresh cut roses and it also identified their preference for the different rose fragrances.

MATERIAL & METHODS

Two scent panel tests were performed using individuals recruited on the University of Florida campus. The panel consisted of males and females between the ages of 18 to 24 years. All tests were conducted in the Department of Food Science and Human Nutrition Sensory and Food Tasting Laboratory at the University of Florida. Flowers for both tests were imported from commercial farms in Ecuador and arrived within 4 days of harvest.

Flowers were placed inside Styrofoam cups and sealed immediately before presenting the sample to the panelists (Figure 1). Panelists were asked to remove the lid, smell the sample, and close the lid before smelling the next sample. Differences in appearance and color among samples were minimized by presenting the cut flowers under red light conditions (Figure 2).

The first test evaluated the fragrant rose cultivars 'Allure', 'Erin' and 'Lovely Dream' and the non-fragrant cultivar 'Red Sensation'. The 99 panelists were asked to smell each sample and rate the intensity of the fragrance using a low (0) to high (10) intensity linear scale. Panelists were also asked to select how much they liked or disliked the fragrance of each flower using a 9-point balanced hedonic scale: 1=dislike extremely; 2=dislike very much; 3=dislike moderately; 4=dislike slightly; 5=neither like nor dislike; 6=like slightly; 7=like moderately; 8=like very much; and 9=like extremely for each sample. Finally, panelists were asked to describe any differences between the cultivars and to make additional comments about the fragrance of each sample.

The second test was designed to measure the ability of subjects to detect differences in fragrance intensity from cut rose cultivars at different opening stages. 'Allure' and 'Lovely Dream' cultivars were selected for this test since they received the highest fragrance intensity score from the first panel test. A side by side comparison

was performed with 82 panelists. Each of the panelists received two sets of two flowers. The first set consisted of one opened and one closed 'Lovely Dream' flower followed by one opened and one closed 'Allure' flower.   Panelists were asked to smell each sample and to rate the intensity of the fragrance using a low (0) to high (10) intensity linear scale. Panelists were also asked to describe how much they liked or disliked the fragrance of each sample using the 9-point hedonic balanced scale described previously.

Flower volatile compounds were also collected from each cultivar on the days of each panel tests to identify the volatile compounds associated with each cultivar. The samples were analyzed using gas chromatography and mass spectrometry.

Fig. 1. Preparing cut rose cultivars for floral fragrance test (left). Samples were placed in Styrofoam cups and sealed immediately before being presented to panelists (right).
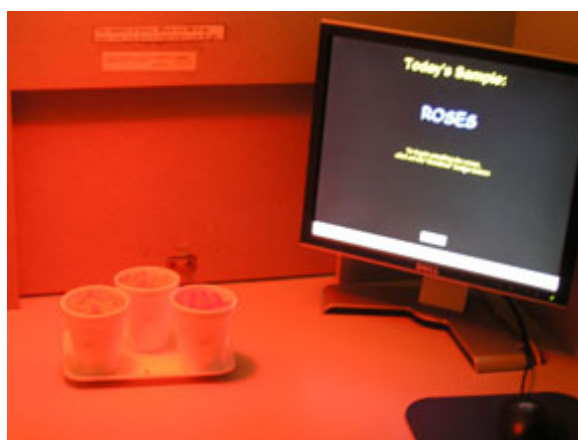

Fig. 2. Panelists signing in for cut rose fragrance test (left). Flowers were presented to panelists under red light conditions to mask flower color while panelist smelled each sample and answered questions online (right).

RESULTS

Results from the first test showed that the panelists were able to detect different fragrance intensities among the four rose cultivars (Table 1). 'Allure' and 'Lovely Dream' had the highest intensity scores. In comparison, 'Erin' and 'Red Sensation' received much lower intensity scores. The non-fragrant variety 'Red Sensation' had a nearly undetectable intensity score of 1.6 while 'Erin' had an intensity score of 4.1.

The likeability rating, which ranged from 1 (extremely dislike) to 10 (extremely like) was highest for 'Lovely Dream' (7.0) followed by ''Allure' (6.5) and 'Erin' (6.1). The non-fragrant cultivar 'Red Sensation' had the lowest likeability score of 4.8.

The fragrance intensity score of each flower paralleled the total amount of volatiles produced (Table 1). 'Allure' had the highest intensity score and produced 13.8% more total volatiles than 'Lovely Dream', 30.7% more than 'Erin', and 97.4% more than 'Red Sensation'. Panelists preferred the higher producing volatile flowers. 'Lovely Dream' which received the highest likeability score of all the cultivars also produced the highest amount of a volatile (2-phenylethanol), which is one of the major constitutes of commercial rose oil.   The panelists commented that 'Red Sensation' presented negligible fragrance. This suggests that volatiles produced in amounts of 26 ng $Kg^{-1}s^{-2}$ are below the level of detection by human subjects.

Table 1. Flower fragrance intensity scores, likeability scores, and total volatile production of the fragrant cut rose cultivars 'Allure', 'Erin', and 'Lovely Dream' and the non-fragrant rose cultivar 'Red Sensation'.

	Flower fragrance parameter		
Cultivar	Intensity score[1]	Likeability score[2]	Total volatiles produced (ng $Kg^{-1}s^{-1}$)
Allure	6.2 a	6.5 ab	989.7
Erin	4.1 b	6.1 b	686.1
Lovely Dream	5.5 a	7.0 a	853.1
Red Sensation	1.6 c	4.8 c	26.0

[1] Intensity rating score: low=0 to high=10.
[2] Likeability rating score: 1=extremely dislike to 9=extremely like.

The second panel test showed no difference in the intensity score between open and closed flowers of 'Allure'. However, differences were observed between the different flower stages of 'Lovely Dream' (Figure 3).   The open flowers of 'Lovely Dream' had a significantly higher intensity rating compared to its closed flowers. In contrast open flowers of 'Lovely Dream' were not significantly different compared to both flower stages of 'Allure'.

The likeability scores ranged from "like slightly" to "like moderately" for both flower stages and cultivars. The exception was the closed flowers of 'Allure', which had a slightly lower (5.8) likeability score (Figure 4). Even though the open and closed flowers of 'Allure' received similar intensity scores, panelists preferred the fragrance from open 'Allure' flowers over the fragrance of closed 'Allure' flowers.
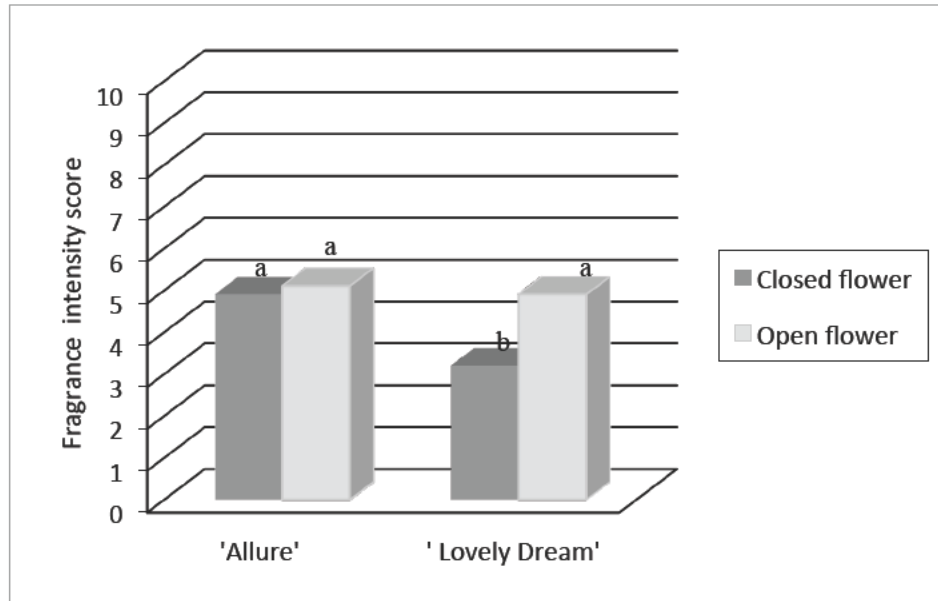

Fig. 3. Comparison of fragrance intensity scores (low=0 to high=10) of closed and open flowers of cut rose cultivars 'Allure' and 'Lovely Dream'.
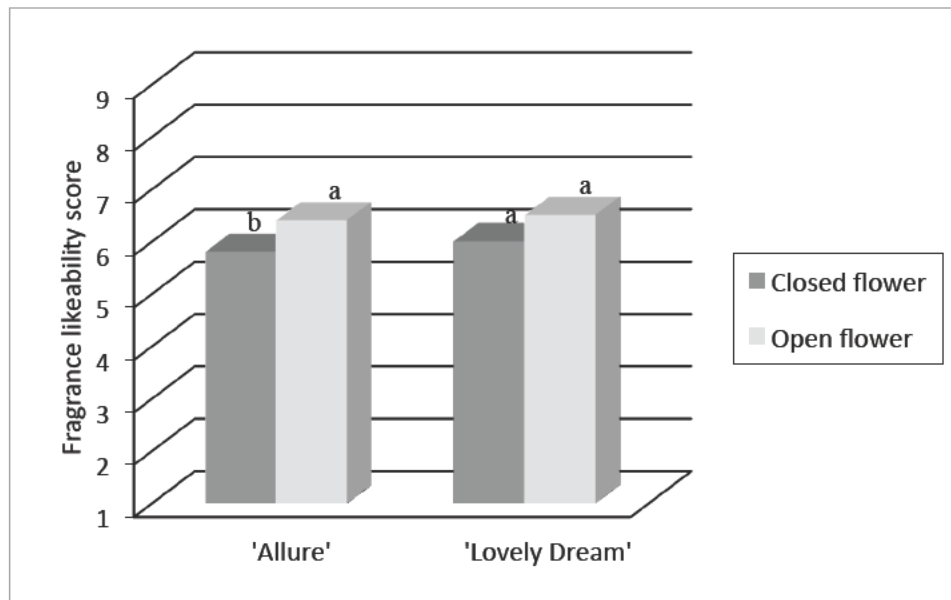

Fig. 4. Comparison of fragrance likeability scores (1=extremely dislike to 9=extremely like) of closed and open flowers of cut rose cultivars 'Allure' and 'Lovely Dream'.

CONCLUSIONS

Fragrant and non-fragrant fresh cut rose cultivars produced different types and quantities of volatiles and produced different fragrant intensities that were detected by panelists. The fragrance intensity score of each flower paralleled the total amount of volatiles produced. Panelists preferred the cultivars with the higher intensity fragrances. 'Lovely Dream' which received the highest likeability score in both panel tests also produced the highest amount of a volatile (2-phenylethanol), which is one of the major constitutes of commercial rose oil.   These preliminary results aid in understanding the types of rose floral scents that are detected and preferred by human subjects (Consumers).

INDUSTRY IMPACT

Identifying which rose fragrances are highly appealing to consumers will assist breeders in selecting for specific and preferred fragrances. Utilizing 'Consumer-Assisted Selection' test results will allow the industry to deliver rose fragrances preferred by consumers and, thus, increase sales and profits.

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