

# The impact of age on perception

## Liking of sucrose and citric acid enriched apple juices in young and elderly people

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### Introduction

People over 65 are often excluded from conventional consumer testing, even though the impact of this age limit on the final results is undefined. This study focused on the following questions:

1. Does the inclusion of people over 65 lead to different results in a CLT<sup>1</sup>?
2. Are there differences in liking between younger and older consumers?
3. Do older subjects perceive intensities of given attributes differently?

These questions were answered by means of a hedonic test with apple juice that was manipulated with two levels of sucrose and citric acid.

### Materials and Methods

145 people [ $n_{(18-64)}=85$ ,  $n_{(65-83)}=60$ ] who consume apple juice at least once a month participated in a CLT. An apple juice with balanced sweetness and acidity was selected. Four of five samples were manipulated with sucrose or citric acid at different levels. The samples were tested in a serial monadic test. The samples were: P1: apple juice, P2: +2 g citric acid/L, P3: +5 g citric acid/L, P4: +2 g sucrose/L, P5: +6 g/L sucrose.

The following attributes were evaluated: liking (9-point scale): orthonasal aroma, acidity, sweetness, retronasal aroma, mouthfeel, aftertaste and overall liking. Perceived intensity (JAR<sup>2</sup>): acidity, sweetness and retronasal aroma.

Differences between the two age groups were analyzed with a Mann-Whitney-Test ( $\alpha=0.05$ ). Differences between the products of one age group were analyzed with a Friedman Test that was followed by a Nemenyis post-hoc-test ( $\alpha=0.05$ ). Results of the JAR scales were presented as relative frequencies.

### Results

1. The inclusion of 60 persons above 64 to the data set did not lead to significant differences for any attribute in any product compared to the group where people above 65 were excluded. **Figure 1** shows the overall liking of the apple juices for all participants, people between 18 and 64 and people above 65. The apple juice that contained 5 g citric acid/L was less liked by the groups between 18-83 and 18-64 years old. No differences in overall liking between the products were present in the group above 65.

2. The differences between the young and the old group (18-64 and 65-83) were rather small. The two groups gave significantly different results for the following attributes and products: aftertaste P<sup>3</sup>5 ( $p: 0.02$ ), mouthfeel P1 and P5 ( $p: 0.011$ ;  $0.02$ ), sweetness P2 ( $p: 0.025$ ) and P3 ( $p: 0.038$ ). The results of the attribute sweetness are illustrated in **Figure 2**. It shows that the younger group gave significantly higher liking scores for the products that contained citric acid.

3. The addition of citric acid had an impact on the perceived intensity of acidity in both groups (**Figure 3**). The older and the younger group were able to perceive the increased acidity and rated the two samples "slightly too sour" or "too sour" more often and selected "just right" fewer times. The response to increasing the citric acid level is reflected in the intensity ratings of both groups. The older group reacted to the increased citric acid concentration to a greater extent when 2 g citric acid/L was added, whereas the younger group reacted more sensitively when 5 g citric acid/L was added. Consequently, it cannot be said that the older group is less sensitive to changes in citric acid concentration. The different perception of the intensity was not reflected in the liking of acidity.

### Figures

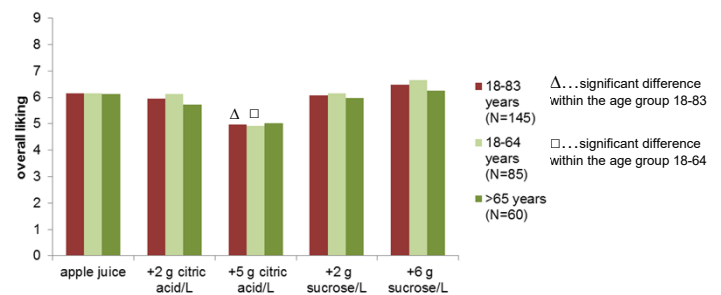


Figure 1: Overall liking of apple juices in different age groups.

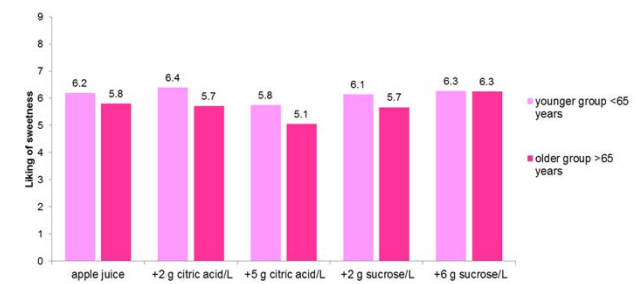


Figure 2: Liking of sweetness between age groups. \* Significant differences between the age groups.

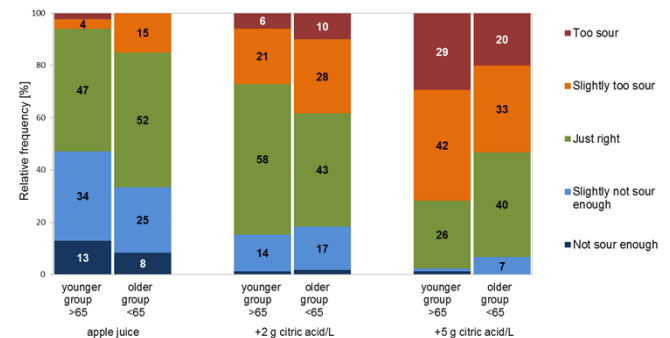


Figure 3: Perceived intensity of acidity (JAR) between age groups.

### Discussion

The results show that the inclusion of people over 65 years in age in a CLT with apple juice did not lead to significantly different results when all participants were regular consumers. When the results of participants above 65 were evaluated separately differences between the products tested that were identified by the younger group could not be detected. When the data was split into two age groups (18-64 and 65-83 years) few significant differences were observed. The JAR data for the intensity of acidity showed that the addition of citric acid (+2 or 5 g citric acid/L) was reflected in the results of both groups. The experiment leads to the conclusion that the results of a CLT might not be significantly different when older persons participate even though differences between the age groups might be present. To obtain meaningful results about perceived intensities it might be of advantage to take age into account. Differences between product groups are expected; consequently, product specific tests are required to gain further insight.

**Abbreviations:** <sup>1</sup>CLT: central location test, <sup>2</sup>JAR: just about right, <sup>3</sup>P: product