

Size matters

Does serving size affect the result when conducting acceptance tests?

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Introduction

Within sensory science methods are divided into analytical and consumer tests. Within analytical tests principles of good practice exist for how to obtain valid data. With special attention to serving size, the guideline stress representativeness and standardization of servings. However, serving size when conducting consumer tests are not well defined, and very often taste samples are used instead of full size servings.

In this study we hypothesized that liking of sensory attributes depends on serving size, as taste samples may not allow the full hedonic experience to develop compared to full size servings.

Fruit drinks

Fruit drink	Sweetener	Aroma	Fiber
S	Sucrose 26g/liter	-	-
A	Stevia 0,09g /liter	-	-
B	Stevia 0,09g /liter	1ml /liter	-
D	Stevia 0,09g /liter	1ml /liter	10g/ liter



Bottles
250 ml

Taste samples
25 ml

Aim

The aim was to study the effect of serving size on hedonic evaluation of sensory attributes

Method

As a part of a larger cross-over consumer study, 66 subjects rated "overall liking", "liking of flavor" and "liking of texture" and "sensory satisfaction" of four apple-cherry fruit drinks varying in sweetener, added lime aroma and added fibers. Stimuli were served as taste samples and as bottle sized servings on four separate days, in a randomized order.

Mixed model with subjects as random effect was applied to study main effect of serving size. Paired t-tests were applied to study differences between taste samples and bottle sized servings for each fruit drink separately.

Sensory Descriptive Analysis was used to discriminate products. 9 trained and tested assessors from an external panel participated in sensory profiling of the four fruit drinks. The fruit drinks were analysed based on 15 attributes evaluated with 5 repetitions.

Data was analysed using Panel Check to study panel performance and the attributes that significantly separated the products. PCA bi-plot was obtained on level corrected sensory data to illustrate the span in sensory attributes and variation among the products.

Results: consumer study

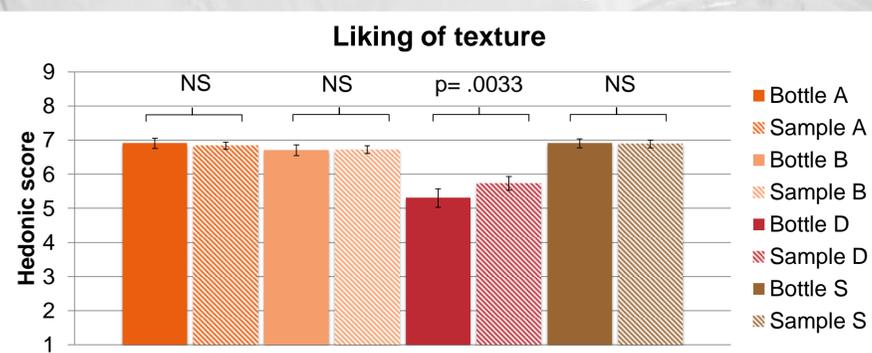


Fig. 1 Hedonic score of bottle and samples respectively

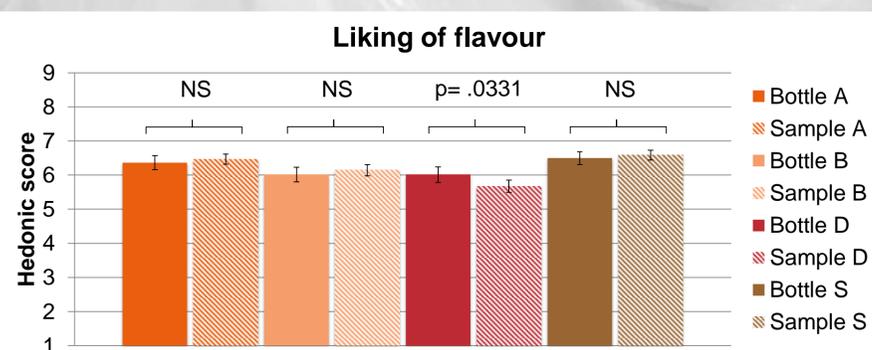


Fig. 2 Hedonic score of bottle and samples respectively

Mixed model showed significant main effect of fruit drink ($p < .0001$) on liking of sensory attributes across fruit drinks, with fruit drink "D" receiving lower scores than "A", "B" and "S". No main effect of serving size, or product*serving size interaction were found (not illustrated).

When analysing fruit drinks separately, a significant effect of size was seen for liking of texture (fig.1) and flavour (fig.2) for fruit drink "D", but not for "A", "S" or "B".

Serving size was not found to affect evaluations of "overall liking" and "sensory satisfaction" for any of the fruit drinks (not illustrated).

Results: sensory descriptive analysis

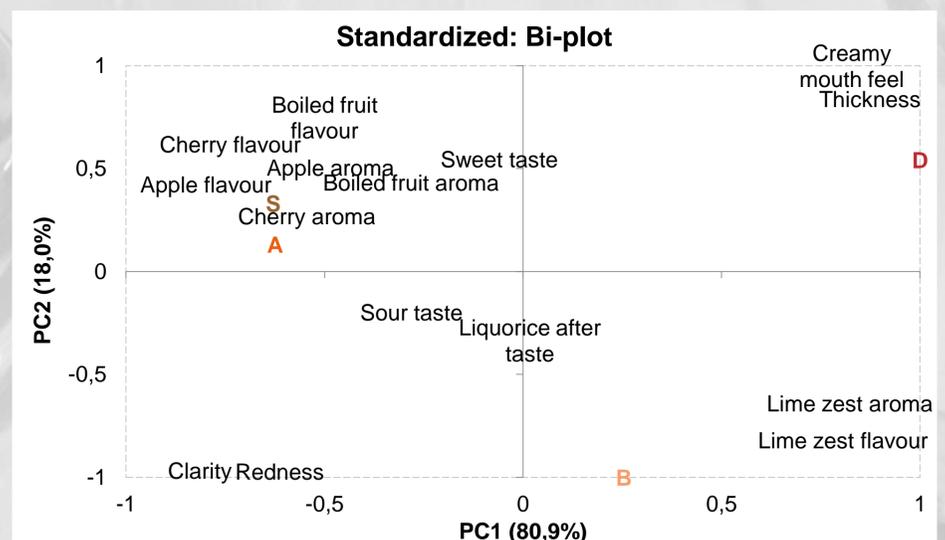


Fig. 3 PCA bi-plot of fruit drinks (= scores) and attributes (= loading)

Sensory Descriptive Analysis showed a significant fruit drink effect for all attributes except: sweet- and sour taste and liquorice after taste.

Fig. 3 shows that fruit drink S and A were perceived most similar. Fruit drink B and D was characterised by an increased lime aroma and flavour compared to S and A. Fruit drink D differed from fruit drink A, B and S by being perceived as having a more creamy mouth feel and thick texture. Fruit drink D further differed from fruit drink A, S and B by having less clarity and redness.

Conclusion

This study stress the importance of using full size servings when conducting consumer tests, as serving size has a potential effect on hedonic evaluation of sensory attributes. This study shows that creamy mouth feel and thick texture may not be perceived hedonically equal when a taste sample and a bottle sized serving of a fruit drink is consumed.