

# Measures of sensory satisfaction and food satisfaction lead to a more detailed understanding of consumers' affective product perception than the measure of liking alone

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## Introduction

Affective responses to foods and beverages are often measured by liking alone. However, food perception depends on multiple factors before, during and after intake, which may not be fully covered by the sole assessment of liking. The present poster contains data from three different studies investigating peri- and post intake factors and their relation to Sensory Satisfaction (SS) and Food Satisfaction (FS).

SS measures the hedonic response to the products' sensory properties, whereas FS covers a general product appreciation after perceiving post intake body feelings and well-being, and is measured at several time points after intake. SS and FS are hypothesised to imply a more discriminative measurement of how products are perceived by consumers than liking alone.

Three different approaches were used:

- 1) A sensory descriptive analysis - evaluating sensory differences in fruit drinks
- 2) A consumer study - concerned with how peri- and post intake variables related to liking, SS and FS
- 3) An electrogastrographic (EGG) study: investigating gastric myoelectric activity (GMA) for fruit drinks with and without added fibre.

## Fruit drinks

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



Four apple/cherry blended fruit drinks were used varying in sweetener type, added aroma and fibre. The table above shows how the fruit drinks differ.

## Conclusion

This study illustrates sensory satisfaction and food satisfaction as more discriminative measures of hedonic product perception than the measure of overall liking alone.

The consumer study found that fruit drink "D" differed from fruit drink B, S and A in ratings of drinkability, drinking pleasure, liking of texture and fullness. These findings can be seen as a result of added fibres in fruit drink D leading to a more intense creamy mouth feel and thickness, when compared to the other fruit drinks. These differences were only reflected in SS and FS, not in liking.

The EGG study found that GMA power was significantly higher in the first minute after intake, than it was at all other time points (except for minute 2) and that power values were higher for fruit drink D than B. This indicates that the addition of fibre to the fruit drinks resulted in more activity in the gastro intestinal tract, possibly implying a positive effect of fibre on satiation and food intake. Further investigations into fibre and gastrointestinal activity are suggested.

## Procedure

### Sensory descriptive analysis

4 products (S, A, B, D), 9 assessors  
15 attributes, 5 repetitions

Trained assessors from an external panel participated in sensory profiling of fruit drinks.

PCA bi-plot was obtained on level corrected sensory data to illustrate the span in sensory attributes and variation among the products. All attributes significantly separated the products, except: sweet taste, sour taste and liquorice after taste.

## Consumer Study

Cross-over design, N=66  
(♀=29, ♂=37), 4 products (S, A, B, D)

Consumers answered questionnaires at baseline and at time 0, 10, 20, 30 and 40 minutes post intake

Variables at time 0 include:

- Liking, SS and FS
- drinkability and drinking pleasure
- liking of: taste, texture and aftertaste
- hunger and fullness

Variables at time 10-40 include:

- FS
- hunger and fullness

Repeated measures ANOVA and Tukey HSD was applied to data to study product differences

## Electrogastrographic Study

Cross-over, N=11♂,  $\mu$ (age) = 28  
(±4.3) years, 2 products (B and D)

Subjects lay in a supine position and had three electrodes placed on the abdominal skin (fig. 6 right).

A schematic timeline in fig. 5 show the experimental procedure.

Data was recorded on a Refa8 amplifier (ANT, The Netherlands), sampling rate of 256 Hz.

Data resampled to 32 Hz, band pass filtered [0.005-2 Hz], then baseline corrected.

Data periods of 1 minute were transformed by Fast Fourier Transformation (FFT) and the resulting power values were averaged within standard frequency bands (fig. 6 left).

Two-way ANOVA and Tukey HSD were applied for statistical analyses to study product and time differences.

## Results

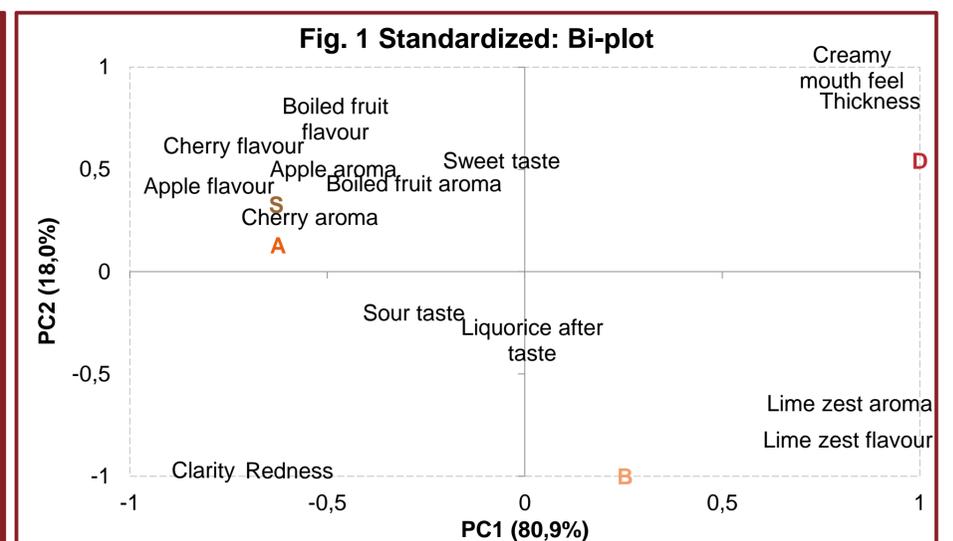


Fig. 2 Liking (time 0)

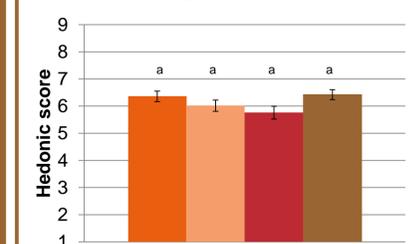


Fig. 3 Sensory Satisfaction (time 0)

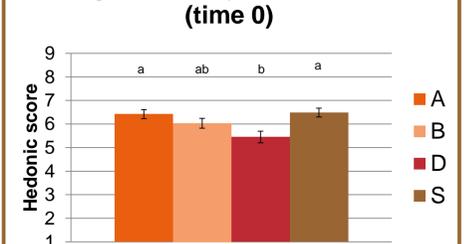
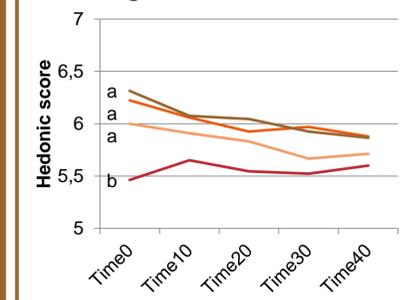


Fig. 4 Food Satisfaction



### Results at time 0

Fruit drink "D" resulted in: significant lower; drinkability, drinking pleasure (not sig. from "B") and liking of texture, and higher fullness (not illustrated).

These differences were only reflected in SS and FS, as a significant product effect, with fruit drink D rated lower, was found for SS and FS, not for liking (fig. 2-4).

### Results at time 10-40

No significant difference between fruit drinks in hunger, fullness and FS.

Fig. 5 Timelines for studies

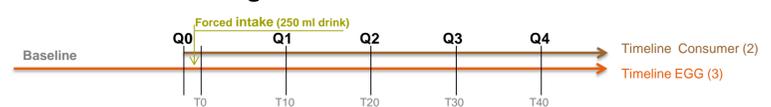


Fig. 6 Frequencies & electrode placement

Definition	F	cpm	Hz
Bradygastrica	F1	0,23-2,1	0,003-0,035
Normal	F2	2,3-4,2	0,039-0,07
High Normal	F3	4,45-6,32	0,074-0,105
Low Tachygastrica	F4	6,65-8,43	0,109-0,14
Medium Tachygastrica	F5	0,144-0,175	8,67-10,5
High Tachygastrica	F6	0,179-0,210	10,78-12,65

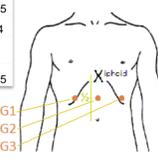


Fig. 7 EGG/frequency bands with significant power differences

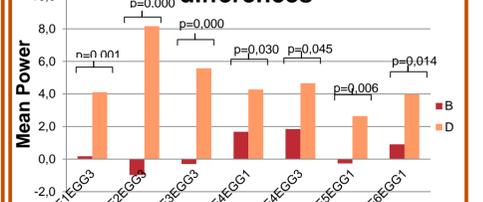
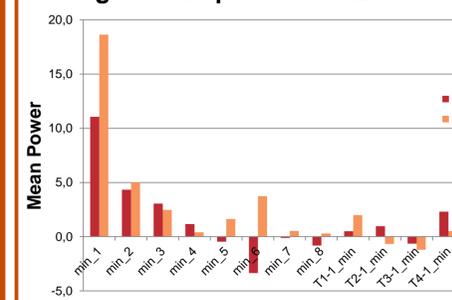


Fig. 8 Mean power in F1EGG1



### Results

Significant time effect was found with higher power at min1 (min2 was intermediate), e.g. for F1EGG1 is shown in fig. 8

Fruit drink D gave significant higher power in 7 EGG/frequency combinations.

Significant combinations show that the right side abdomen is dominated by lower frequencies and the left side is dominated by higher frequencies, congruent with earlier studies.