Insights into sensory changes in elderly people

"SENPAN" - Swiss panel of elderly people

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Introduction

A multidisciplinary long-term study that was initiated by the Zurich University of Applied Sciences in Wadenswil (Switzerland) studies the relationships between **sensory decline, liking, food intake, physiology** and **social aspects** in a consumer panel with people over 65 years (Swiss panel of elderly people "senpan"). Within that framework the Sensory group within the Institute of Food and Beverage Innovation designed a **set of eight tests** suitable **to study the change in sensory abilities** of elderly people over the course of time. All tests, with exception of mouthfeel were preceded by a self-evaluation test.

Materials and Methods

Eight sensory tests were designed to study vision, taste, smell, kinaesthetic and acoustic abilities. Table 1 gives an overview of the test methods for smell, taste and mouthfeel. The concentrations of Linalool and the taste agents were determined during preliminary tests. Before each taste recognition test the participants received a test sample for each substance to ensure that they were familiar with each taste. The Triangle Test and the A-not A Test were evaluated according to DIN EN ISO 4120:2007 and 10972:2003-08:2003 (α=0.05). Participants were 65-84 years old (24 women, 28 men), lived at home and did not need nursing or care services.

Table 1: Methods to evaluate the abilities of smell, taste and mouthfeel

Test for	Method
Smell recognition	Triangle Test with Linalool at different concentrations (5, 10, 100, 1000, 10000 µg/L) vs. water
Taste recognition	Monadic test with three different concentrations of sucrose (4, 6 or 8 g/L), sodium chloride (0.8; 1.1 or 1.4 g/L), citric acid (0.25; 0.35 or 0.45 g/L) and caffeine (0.225; 0.3 or 0.375 g/L)
Mouthfeel	A-not A Test with vanilla custard prepared with 32(A), 34 or 36 g maize starch/100g

Results

Figure 1 illustrates the percentage of correctly solved Triangle Tests for each aroma concentration. Aroma solutions that contained **5 µg Linalool/L** could **not be significantly distinguished from water**. All other aroma concentrations were recognized as significantly different from water. The average sensing threshold was 725 µg/L thus between the samples 3 (100 µg/L) and 4 (1000 µg/L). In two persons the threshold was beyond the tested intensities.

Figure 2 shows the percentage of correct answers in the taste recognition test. It illustrates that all taste agents were recognized to a different extent. 86% recognized sucrose at the highest level, whereas only 39% recognized the highest caffeine concentration. Generally, the **number of correct answers increased little with increasing concentration**. For some persons the sensing threshold and the recognition threshold were beyond the tested concentrations (4 and 14% for sucrose, 7 and 34% for sodium chloride, 11 and 39% for citric acid and 23 and 61% for caffeine, respectively). For the persons whose sensing and recognition threshold could be evaluated, it was 4.78 and 5 g/L for sucrose, 0.93 and 1.0 g/L for sodium chloride, 0.34 and 0.37 g/L for citric acid and 0.29 and 0.33 g/L for caffeine, respectively.

Figure 3 displays the results of the A-not A mouth feel test. It shows that the vanilla custard that contained 34 g maize starch could not be distinguished from the sample that contained 32 g. The custard sample that contained 36g maize starch was significantly distinguished from the A-sample. It shows that the male participants performed better than the female ones.
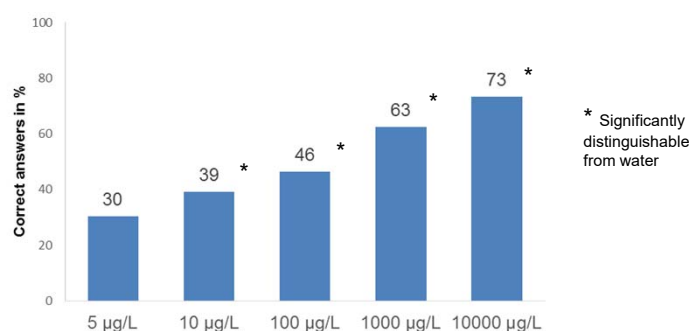
Figures

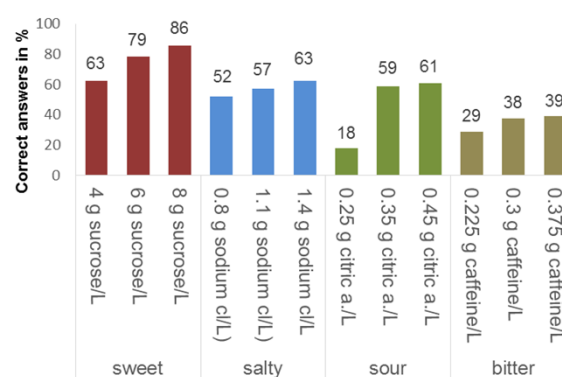Figure 1: Percentage of correct answers in the smell recognition test with Linalool (n=56).

* Significantly distinguishable from water

Figure 2: Percentage of correct answers in the taste recognition tests (n=56)
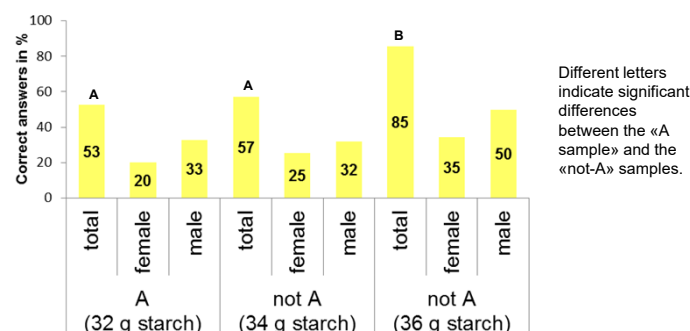
Figure 3: Percentage of correct answers in the mouthfeel test (n=55)

Different letters indicate significant differences between the «A sample» and the «not-A» samples.

Discussion

Eight sensory tests were designed to monitor the sensory abilities of people over 65 in a long-term study. The results illustrated the **prevailing taste (n=56), smell (n=56) and mouthfeel (n=55) abilities of 56 members of the "senpan".** Even though high sucrose, sodium chloride, citric acid and caffeine concentrations were used in the taste recognition test, the sensing and recognition thresholds in some people were beyond those levels. Future evaluations will identify whether taste thresholds can be determined more reliably when higher concentrations are used. They will also generate more data and give an insight in the changes of sensory abilities with increasing age in the "senpan".

Abbreviations

sodium c.=sodium chloride, citric a.= citric acid

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