

What do they tell us?

Descriptive and consumer evaluation of structure engineered food products

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Introduction

An EU-financed project has been carried out to develop novel enzymes that contribute improved functionality to food products. At the same time, consumer attitudes and buying intentions were investigated in relation to food products containing these novel enzymes. The studies were conducted with the aid of analytical and affective sensory analysis.

The objective of the consumer study was to investigate how direct product experience affects attitudes to enzymes and enzyme production methods along with consumer intentions to buy food products produced using enzymes.

Research has shown that consumers form attitudes to GM foods in a top-down rather than a bottom-up manner (Scholderer & Frewer, 2003). In the top-down process, consumer attitudes towards, for example, GM technology reflect their general socio-political attitudes, while in the bottom-up process consumers form attitudes based on information about the potential risks and benefits of the technology or direct product experience. The two attitude-forming processes illustrated in figure 1 are not mutually exclusive but usually occur simultaneously (see the results of an earlier study in Søndergaard, Grunert & Scholderer 2005).

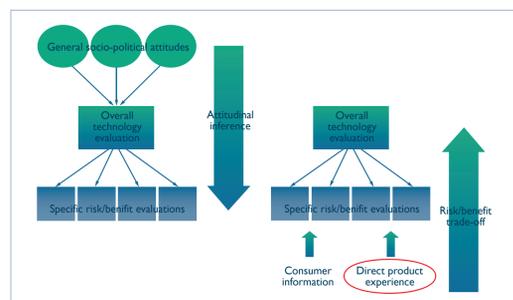


Figure 1. The formation of attitudes to food technologies (based on Scholderer, Bredahl & Frewer).

Products

The products should ideally have been produced with texturing enzymes from the CROSSENZ project. However, the amounts of enzymes produced by this project were as yet too small for this type of study and still required approval for food use. For set yogurt and margarine/table spread, knowledge of texturing enzymes is still not sufficient to obtain consistent results on product functionality. Instead products were made with and without various stabilisers. The functionality provided by the stabilisers is believed to resemble that provided by texturing enzymes. During the consumer study, it was important that the test subjects believed the products were made with enzymes. After the test, they were debriefed.

For this project, four yogurt samples were produced in the pilot plant. The project also covered five margarine samples - three commercially available products and two samples from the pilot plant. For the consumer tests, two samples of each were chosen on the basis of the results from the descriptive sensory analysis.

Methods

The descriptive sensory analysis was carried out according to ISO 11035, using a trained panel of eight members. For each product, four three-hour sessions were dedicated to vocabulary development, attribute scaling and panel calibration. All products were analysed in a balanced block design with three repetitions. The evaluation was carried out in a sensory lab with separate booths for each panel member. FizzNet was used for data acquisition.

It was important that respondents in the consumer test experienced clear product differences when tasting the two product samples, one of which was said to be produced with enzymes and the other without. The results of sensory analysis determined which product samples were used for the consumer study and served as a pre-test of the product evaluation.

The consumer results are based on 540 computer-aided personal interviews in Germany and Italy. Respondents were selected in accordance with quotas for gender and age, and three sample points were used in each country. All respondents were responsible for shopping and cooking (jointly or sole) in their household. Furthermore, all respondents consumed yogurt or margarine/table spread at least once a week, and all had heard of gene technology. The yogurt samples were tested in Italy, and the table spread samples in Germany.

The respondents were given information about enzymes and asked to taste and evaluate two products (respondents were told that the second product was produced with enzymes). Subsequently, they were asked a number of questions regarding their attitude towards enzymes, gene technology and the enzyme production method used. The experimental sequence is illustrated in table 1.

Information mode	Part A: Information	Part B: Product trial, liking and buying intention	Part D: Attitudes
Product testing mode	Part B: Product trial, liking and buying intention	Part A: Information	Part D: Attitudes
Control group	Part A: Information		

Table 1. The experimental sequence in the consumer study.

Results

The results from the descriptive sensory test were primarily used to describe the perceivable sensory attributes of the tested products and, subsequently, choose the two products for the consumer test. The attribute differences between margarine/yoghurt products are shown in figure 2.

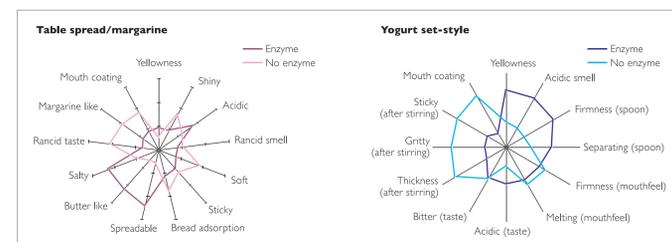


Figure 2. The results from the descriptive sensory test of the two margarine and yogurt products chosen for the consumer tests. The figure shows the attribute differences among the products.

Consumer testing

The results of the consumer test show a significant preference for the enzyme-based margarine with regard to texture and buying intention in Germany, and a significant preference for the enzyme yogurt on all parameters (figures 3-4). In Italy the difference between the mean scores of the two products was higher than in Germany. Italian respondents generally gave a lower score than the Germans, although Italian respondents more often preferred the enzyme product to the non-enzyme product (figure 5). Attitudes to enzymes and gene technology are at a similar level in both countries (figure 6).

When the results of attitude testing in the product test are compared with the results of an earlier project study (figure 7), a significantly more positive attitude toward gene-technology is seen.

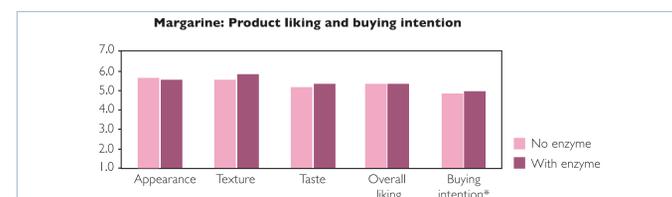


Figure 3. The results of the margarine tests in Germany only show significant differences in the evaluations of the enzyme margarine's texture and of buying intentions. However, the level of liking is high for both margarine products.

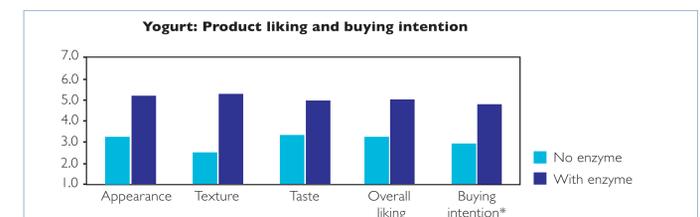


Figure 4. The results of the yogurt test in Italy show that the respondents like the enzyme yogurt significantly more overall than the non-enzyme yogurt. Levels of liking are lower than in Germany.

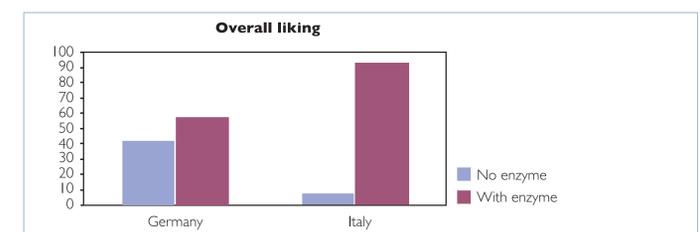


Figure 5. In the forced preference test of overall liking, significantly more respondents in both countries preferred the enzyme product to the non-enzyme product.

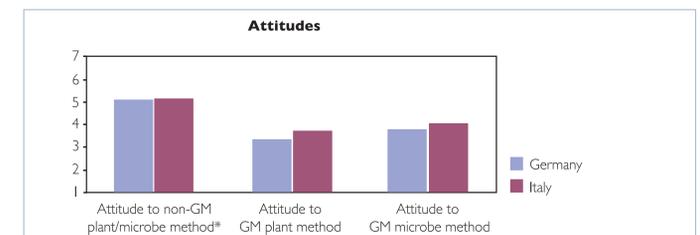


Figure 6. Result of attitude test on the use of gene modification in enzyme production.

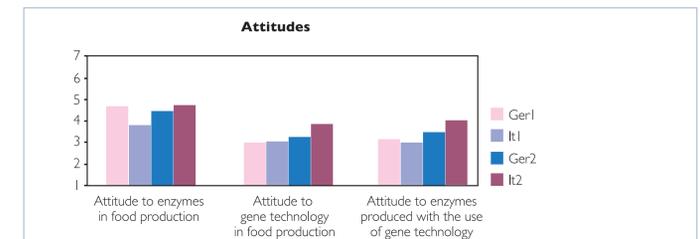


Figure 7. Comparison of the results obtained from the attitude test on the use of enzymes in food production. The first test involved attitude testing only. A significantly more positive attitude was seen when the test included actual product testing.

Conclusion

- Respondents prefer the enzyme product in both countries, although respondents in Italy in the forced preference test significantly more often choose the enzyme product than the Germans.
- Attitudes to enzymes and gene technology are at a similar level in both countries
- Compared to results from an earlier study with no product test, the level of acceptance towards genetic modification in the second study is higher, which indicates that attitudes to genetic modification tend to improve because of product trial.
- Actual "positive" product attitudes tend to overrule negative attitudes.

References

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