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APPLICATION OF TEXTURE ANALYZER IN THE QUALITY ANALYSIS OF BAKERY PRODUCTS

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INTRODUCTION

Bread is a basic foodstuff for the Center European people. There are several traditions on bread making in Hungary but the consumers and the industrial bread production requires a stable product quality. Because of the different quality parameters of the applied flours several additives used in production to stabilize bread quality, both in taste and texture.

Texture analysis is primarily concerned with the evaluation of mechanical characteristics where a material is subjected to a controlled force from which a deformation curve of its response is generated. These mechanical characteristics in food can be further sub-divided into primary and secondary sensory characteristics which have proven to be correlated to sensory perception. The primary characteristics parameters are the hardness, springness, adhesiveness and cohesiveness (Figure 1.) (Szczesniak et al (1963). Bourne (1978))

Texture analysis is an objective physical examination of baked products and gives direct information on the product quality, oppositely to dough rheology tests what are inform on the baking suitability of the flour, as raw material (Baik and Chinachoti, 2000; Charson and Sun, 2001; Szczesniak, 2002). This is why the texture analysis is one of the most helpful analytical methods of the product

development, as it is suitable to quantify the effects of flour blends and additives on physical properties of crust and crumb of the breads. It is also suitable to examine the effects of storing and freezing on different sensory properties of these products and thence it is suitable to analyze the results of different recipes in product development.
In this study we have examined the possibilities of texture analysis on different (commercial and experimental) bread products to explore the possibilities of this equipment in product development.

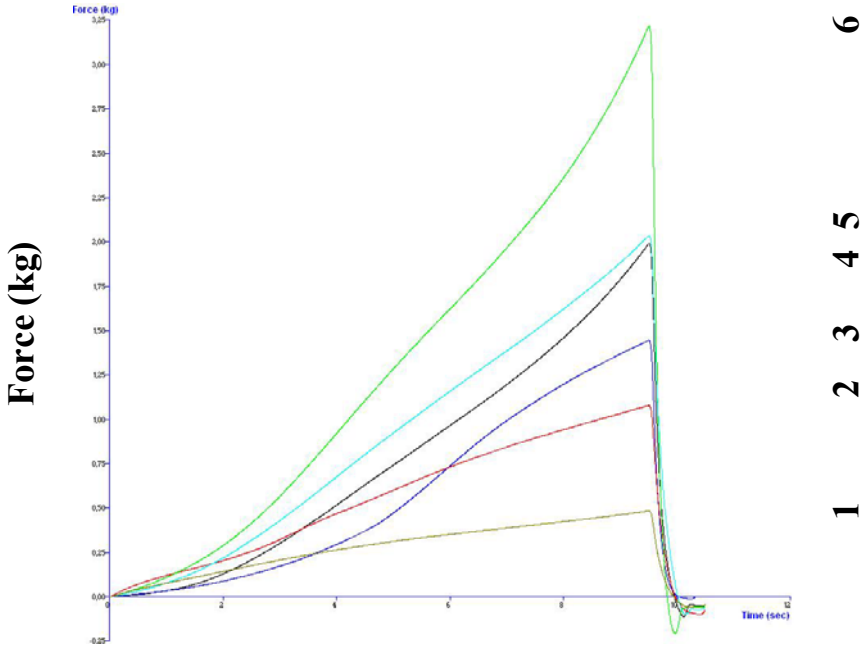

Figure 1
Results of texture analysis on commercial bread samples.

biscuit flour	**(6)**
strudel flour	**(5)**
bread from BL55	**(4)**
test loaf from BL80	**(3)**
white bread from shop	**(2)**
semi-brown bread from supermarket	**(1)**

MATERIAL AND METHODS

The analysed commercial bread and other bakery products were from a shop of an international hypermarket and from a shop of an entrepreneur. Six different samples were examined in this case: bread from BL55 (aestivum wheat flour with 0,55% ash content, recommended for pie) and BL80 (aestivum wheat flour with 0,8% ash content, recommended for white bread) flour, cake flour, white bread from a small shop, white and semi-brown bread from a hypermarket. In the second case a by product, dried apple pomace was milled to flour and added in 10, 20 and 30 % ratio to white bread flour to increase the fiber content of bread made from it. The crude protein content of these samples was determined by MSZ EN ISO 5983-1:2005., crude fiber, starch, dextryne, all and soluble carbohydrate and sugar content were determined by MSZ 6369-12:1979., crude fat content was determined by MSZ 6830-6:1984.Texture analysis was made by TA-XT Texture analyzer (Stable Micro Systems Ltd, Surrey UK).

RESULTS AND DISCUSSIONS

The results of texture analysis of different commercial bread products can be seen on Figure 1. In Hungary the bread from white flour (BL80) is the commonly consumed bread. It is visible that it has relatively low hardness. More than 25% hardness was shown by the test loaf made from BL80 what verifies that the industrially used flour additives decrease the hardness of crumb. In accordance to our expectations the application of smaller degree of meal results much harder dough and much harder bread crumb structure; so the breads made from BL55 wheat flour (recommended for pie) and from strudel flour have twice hardness as white bread has. The biscuit flour resulted bread with the highest hardness from the examined raw materials; its crumb has threefold hardness as white bread had. The 6th examined sample was a semi-brown bread made in the bakery of an international supermarket. This sample has the much weaker crumb; its hardness was half of the white bread made in a local bakery.

In the second experiment our aim was to increase the fiber content of bread by the addition of a low price by-product of juice processing. We have tried to find that apple pomace concentration what is high enough to decrease significantly the energy content of bread but low enough to keep the original structure of crumb.

These results had agreed to the results of sensory analysis: the 10% pomace addition did not caused significant sensory effect on the test consumers, but 20 and 30% addition increased the density of crumb as much as the reaction of consumers was negative. On the other hand, chemical analysis proved that 10% pomace addition has almost the same effect on energy content as 20% addition

while the increase of carbohydrate and protein content continuously decreased, fiber and fat content continuously increased by the percentage of added apple pomace.

Conclusions

Texture analysis is suitable analytic method to compare bakery products and, after several reference data, may be suitable to determine the type of unknown samples. The results of instrumental measures are comparable to sensory analysis and it can result numerical results for the further statistical analysis.

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FOOD SAFETY AND FOOD PHYSICS – ASPECTS IN FOOD PROCESSING AND QUALITY CONTROL

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ABSTRACT

The paper deals with some special questions of aspects of food safety and application of methods of food physics in food processing and in food quality control and assurance, as well (Figure 1). The role of food safety has developed