PALM OIL SUBSTITUTION IN HAZELNUT SPREAD

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Introduction:

Hazelnut spreads are considered as a complex multiphase system, which contains different dispersed solid particles and a continuous fat phase. The characteristics of the used fat determines most of the quality factors of the products such as viscosity, texture, colour, shelf life etc. In these kind of products, the commonly used fat is palm fat, however in recent years it has had a bad press due to the negative environmental impact and health concerns. This means that the labelling of the product with “palm oil free” claim could be beneficial for the factory. To satisfy this consumer demand the food producers have to substitute the palm fat with other fats. However, the replacement could be a challenging issue.

The aim of our study was to examine the opportunities of a palm oil free hazelnut spreads. In our research we used coconut fat and milk fat for the substitution of palm fat. We investigated the effect of changing the fat in the fat phase to the apparent viscosity, colour and texture properties of the products.

Materials:

For making our hazelnut spread we used the following ingredients: 50 g sugar, 25 g fat (palm fat for control sample, or coconut fat, or milk fat), 10,2 g hazelnut, 8,5 g cocoa powder, 5 g skim milk powder, lecithin, 2 drops vanillin aroma, 2 drops lecithin and 0,3 g salt. The only difference among the samples was the type of the used fat. First, we weighed out all ingredients, we melted the fats in a microwave oven until reaching liquid state and we grinded the hazelnut in a household coffee grinder for around 2 minutes to achieve smaller particle size.

Then we mixed the liquid fats with the dry materials in a plastic bowl by a spatula and for a smoother texture we used a laboratory sized melangeur (*Figure 1*) for further mixing and texture formation of the creams. The mass was mixed for approx. half an hour. We measured the viscosity, texture and colour of the spreads.

Figure 1: Preparation of the hazelnut spreads

Figure 2: Final product

Methods:

Apparent viscosity was measured with Brookfield DV-E rotation viscometer. Shear stress and shear rate were calculated based on the configuration of the measuring unit.

The colour of the products was measured with Konica Minolta CR-310 tristimulus colour measurement device. The L*, a*, b* values were recorded for each sample. The texture properties of the creams were measured by using Stable Micros Systems TA-XT2i with a 45°cone probe.

Results:

The measured parameters were influenced by the type of the used fat. In the colour parameters (L*,a*,b*) the milk fat gave higher values than the palm fat, while the coconut fat gave smaller values in every parameter. The samples were significantly different ($p<0,05$) in all parameters, except in a* between milk fat and coconut fat.

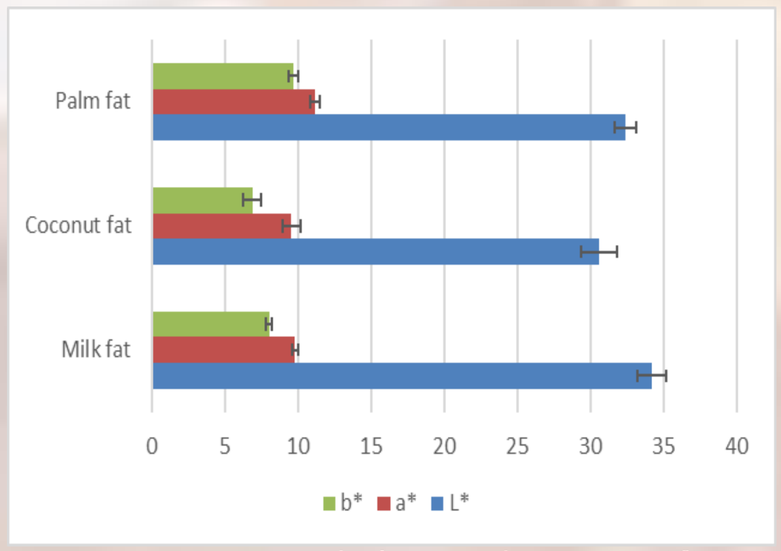

Figure 3: Colour parameters of the different samples (n=5)

In texture analyses milk fat containing spread showed no significant difference in hardness and in work of penetration to palm fat containing sample. In adhesiveness, all samples were different and the milk fat gave the highest value. The coconut fat had the lowest values in every texture attributes and it was significantly different from the other samples in all texture parameters.

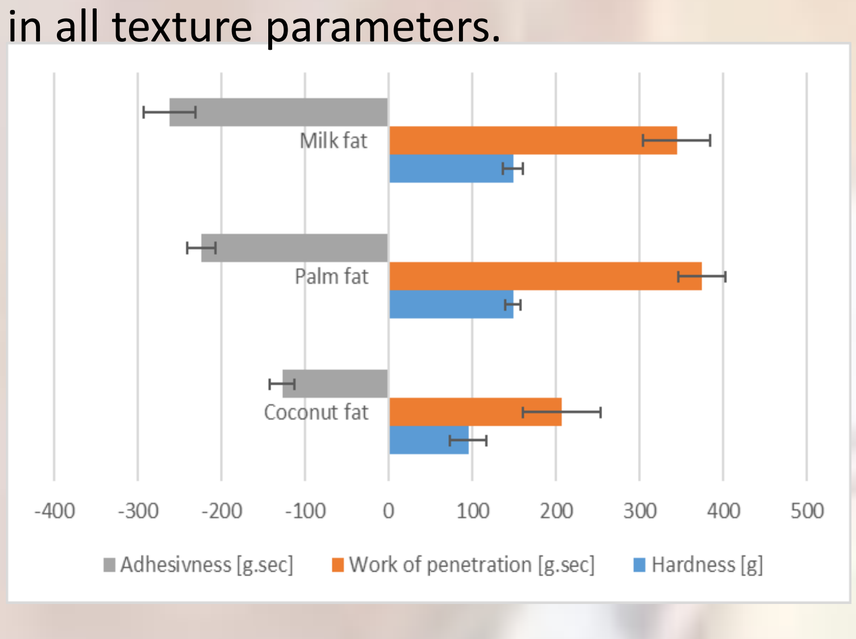

Figure 4: Texture parameters of the different samples (n=7)

In the case of viscosity, the palm fat substituted samples gave lower values (*Figure 5*). The observed differences in every measured parameters could be due to the different physical properties of the applied fat, e.g. solid fat content, colour.

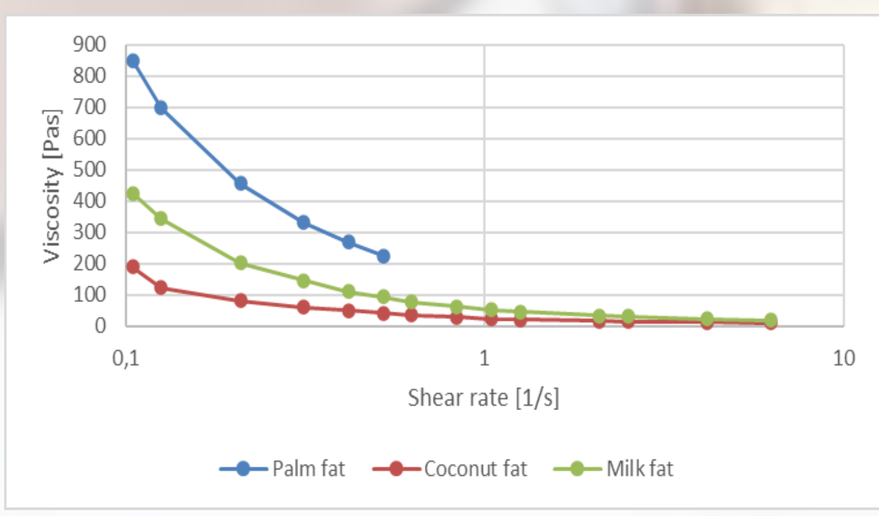

Figure 5: Viscosity results (n=3)

Conclusion:

In conclusion, we could see that the changing of one ingredient in a food matrix could influence the different properties of the final product. However, to determine the suitability of a different fats for hazelnut spread production further research is needed about the sensory characteristic and the self-life of the products.

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