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Characteristics of potato-based seasoned flavoured sticks concerning the used oil

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Abstract

Vegetable oils play a major functional role in the oxidative stability of foods, thus, it is important to understand the comparative shelf stability of oils that are used in producing different food products. There were significant changes in the product's textural characteristics, however there were no differences between the two oil sources.

Keywords

substitution, palm fat, NIR, texture analyses

1. Introduction

Fat is an important ingredient in baking products and it plays many roles in providing desirable textural properties of baking products, particularly biscuits (H. Mamat & Sandra E. Hill, 2012). Of the raw materials used, the amount of fat and water affects the structure of bakery products (Michael H. Tunick et al, 2013). The compression tests are suitable for determining several mechanical and rheological characteristics of different foods with special respects to consumer perception (T. Kaszab et al.; 2012). There are only a limited number of publications dealing with NIR spectroscopy and chemo metric analysis of snack products. (E. Benes et al., 2020).

2. Aim

The objective of our study was to used in the production of potato-based seasoned sticks (produced in Intersnack Hungary Ltd., Győr, Hungary), of different oils in the dough of the product or sprinkled on the surface of the product after baking. A further objective was to study if the change in oil had any effect on the textural attributes or the NIR spectra of the products.

3. Materials and methods

The vegetable oils used in this study are shown in Table 1 with some of their physicochemical properties. Except Refined high oleic rapeseed oil (HORO), which contained two antioxidants (Ascorbyl Palmitate [E304] and Tocopherol-rich extract [E306]), Palm oil (PO) and high oleic Sunflower oil (HOSO) were without any additives.

HORO and PO were used as the base oil (ingredients used in the dough). HOSO and HORO were used as the oil used in preparing seasoning slurries (oil and flavour), which was later sprinkled on the products after being baked. Therefore, three manufacturing methods were used for the production of the same sticks with different selection of oils, which is shown in Table 2.

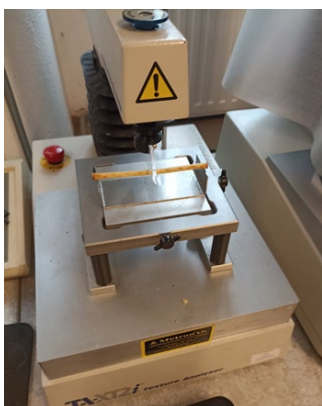
The three-point bending test. The applied test method was very similar to the 'bending force test' in the former Salty stick standard (MSZ-08-1391:2004). The sticks were placed on a U shaped stand. The support points were not larger than 5 mm, 100 mm apart from each other. We continued the force loading - in the centreline of the stick - until the stick broke. Test equipment: Stable Micro System TA XT 2i texture analyzer.

We were examined 15 samples using a texture analyzer (TA.XT. Plus, Stable Microsystems Ltd., Godalming, UK) in each sample group as described below. The results of the tests performed with the texture analyzer were recorded and evaluated by the Texture Expert 1.22 software. The variables and parameters were calculated by macros written in the same software and the processing and evaluation of the data were performed with statistical analysis (ANOVA) analysis of variance and post-hoc test (Bonferroni-Holm method) by MS Excel 2016 software. Based on this, we could state which samples (use of fat types) there was a significant difference.

NIR spectroscopy. We carefully broken to small pieces each sample with hand and the collected samples were placed in a rotating cuvette (0.85 mm) and after that a MetriNIR spectrophotometer (range: 740-1700 nm, resolution: 2nm) was used for the measurement. We collected seven spectra from each sample. We rotated the samples with 90° between measures for the data balancing.

4. Results

Based on the statistical analysis the difference of *hardness*, *fracturability* and *fracture work* were significant between of PSD and other samples (RSD and RRD) but in this cases the difference between of RSD and RRD were not significant. The NIR spectrogram results are seems to be very similar but the statistical evaluation is necessary in next step yet.



The experiment layout with Stable Micro System TA-XT2 Texture Analyzer



5. Conclusion

The study revealed that palm oil showed the highest stability among all oils and it can be used in the dough of the final products to reduce the final cost of the product and increase the shelf life of the final product. Using high oleic sunflower or high oleic rapeseed oil also has benefits, however, they showed different results for the measured parameters. According to these accelerated tests, all oils could be used in the production of potato-based salty sticks, however, organoleptic tests have to be conducted to test consumer acceptance.

6. References

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