FOODCONF
SCIENCE, TECHNOLOGY & INNOVATION

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Analysis of texture properties of deep frozen ToTu dumplings

Introduction

Eggs are excellent source of protein that serves as a basis for the qualitative characterization of food proteins. Eggs are very easy to digest, rich in nutrients, which make them recommended for people suffering from diseases. From food technology's point of view both egg yolk and egg white can be used well. Egg white is often used in various foods due to its good technofunctional properties such as good gelling, foaming and emulsifying properties, moreover more egg white fractions also have antimicrobial properties. **ToTu** is a curd-like product made from egg white with an acidic process, which provides an excellent alternative to milk and dairy products. It can be consumed by both those with a milk protein allergy and those with lactose intolerance. As a valuable source of protein, it is also essential in the diet of athletes who follow a strict diet. Consuming it can reduce any muscle loss that may occur with diet.

The aim of the research was to examine the texture properties of a new frozen food product (quick-frozen ToTu dumplings) and to investigate the applicability of the texture measurement methods. The following questions were expected to be answered:

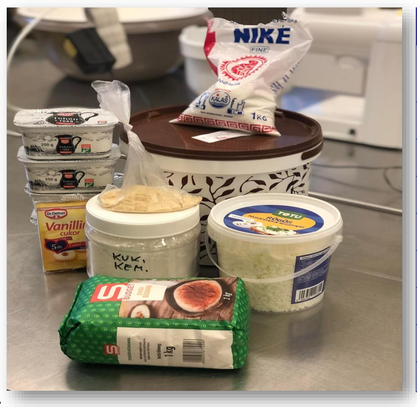
- What are the texture properties of commercially available cottage cheese dumplings?
- What are the texture properties of our hand made quick-frozen cottage cheese dumplings I make?
- What texture properties will the dumpling have if the cottage cheese is changed to ToTu?
- Are the different texture measurement methods suitable for examining the properties of cottage cheese dumplings?

Materials and methods

Control sample: deep frozen dumpling available in commercial trade

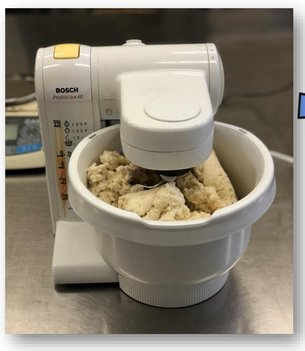
https://nadudvari.com/mirelit-termekek/desszertek/mini-turogomboc/

1. Our products: hand-made cottage cheese or ToTU dumpling



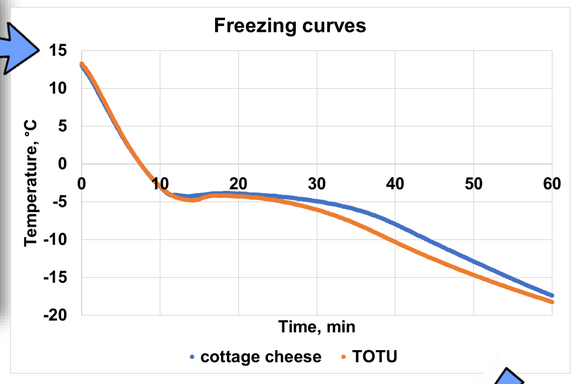
Ingredients (for 1000g product)	Weight (g)
Cottage cheese (semi fat) or TOTU	427,6
Semolina (natur)	90,9
Semolina for boiled porridge	203,6
Hot water for boiled porridge	138,5
Crystal sugar	79,4
Salt	3,3
Vanilin sugar	2,4
Lemon aroma	0,9
Corn starch	53,3

2. Mixing of ingredients

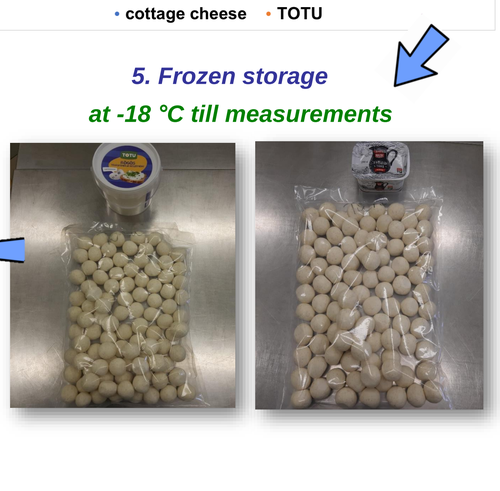


3. Forming
20 g / dumpling

4. Freezing
in an intense air flow at -24 °C

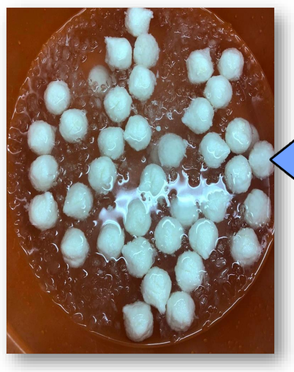


5. Frozen storage
at -18 °C till measurements



6. Cooking
in boiling hot salted water for 8 minutes

7. Cooling
in ice water to room temperature

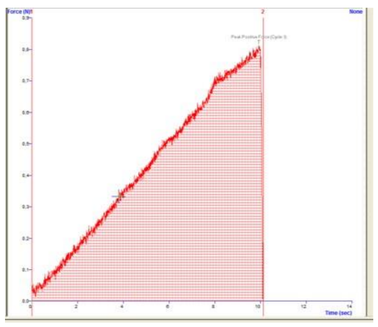


TEXTURE MEASURMENTS (SMS TA.XT Plus)

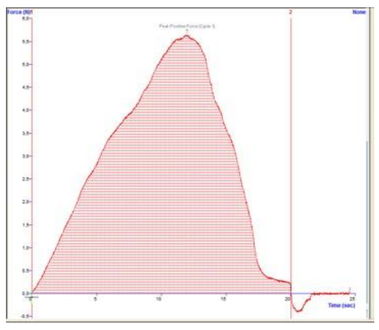
Penetration test

Warner-Bratzler blade

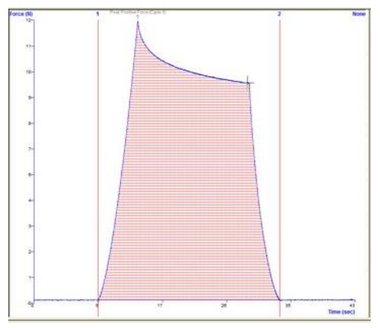
Relaxation test



A 5 mm diameter cylindrical measuring head was inserted into a depth of 20 mm of the dumplings at a speed of 2 mm / s

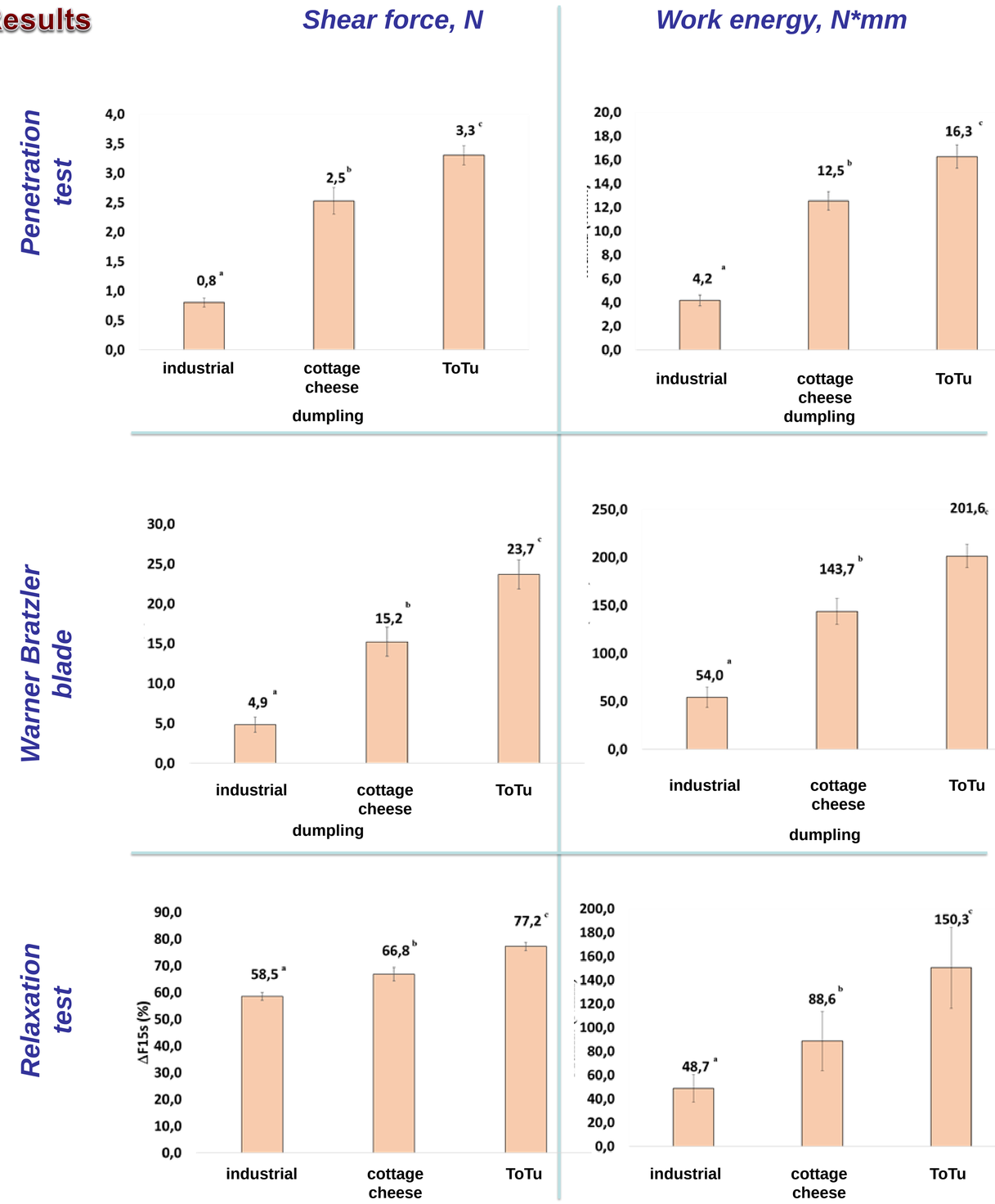


Dumplings were cut by a blade with a length of 100 mm and an edge thickness of 2 mm moving at a speed of 2 mm / s.



Dumplings were compressed to 75% deformation with a 35mm diameter cylinder probe and held in this state for 15 seconds.

Results



The results of measurements are shown in Figures. The left part of the figures shows the maximum force values and the right part shows the magnitude of the work energy, except for the figure showing the results of the relaxation measurement, where due to the nature of the measurement not only the maximum force value is important but also the extent to which the body regained its original size after compression. The results of the texture measurements indicate that the texture properties of commercially available quick-frozen mini-cheese dumplings differed significantly from the the other two groups studied. In case of all measurement mode the ready-made dumplings had the least hardness and the least value of the invested work values.

The difference between the texture of the two self-made quick-frozen dumplings was significant, however, this difference was not as significant as it was between the industrial product and our own products. The cottage cheese version was the most similar to the industrial version from our own samples. TOTu product showed the highest resistant in case of all measurement probes.

As a **conclusion**, it can be stated that all three samples were well distinguishable by all three measurement methods. Our ToTu version was very hard compared to the industrial cottage cheese sample with pleasant texture characteristics, and to the self-made cottage cheese version. ToTu dumpling became a rubbery, hard, compact product with little enjoyment value. Presumably, the reason was the fat-free nature of the ToTu product. It is recommended to increase the fat content during the further developments, possibly coconut fat can be added. In addition, consideration should be given to reducing or replacing component ratios, such as the amount of semolina.

The egg flavor was too dominant in the product, which can be offset by the addition of larger amounts of lemon flavor and vanilla sugar. The modifications make it possible to improve the organoleptic properties of the developed quick-frozen product for consumers.

ACKNOWLEDGEMENTS

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