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The use of lentils in the cookies production

Olga Boestean, Viorica Bulgaru, Aliona Ghendov-Mosanu, Natalia Netreba, Rodica Sturza

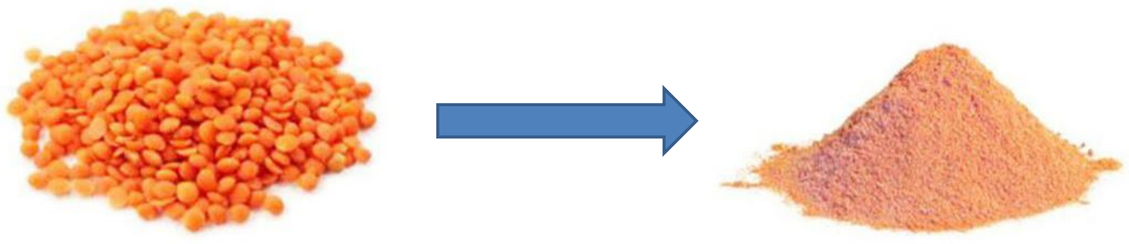
INTRODUCTION

Lentil has become a popular food among people suffering from the genetic dysfunction and cannot digest some cereal proteins (gluten intolerance) and among vegetarians. Lentil is rich in protein (38%) and low in fat.

MATERIALS AND METHODS

Organoleptic and physico-chemical indices of lentils flour

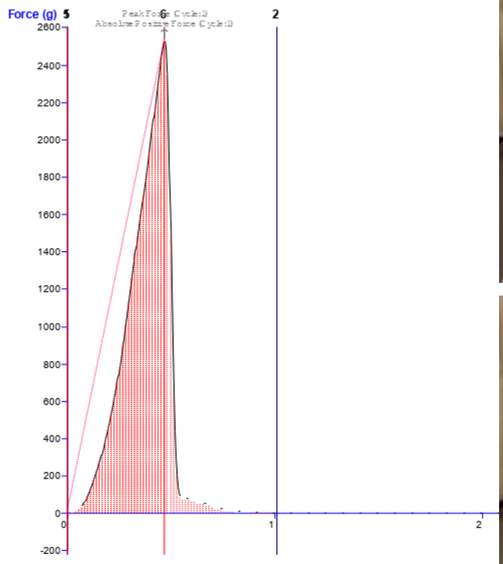
Quality indices	The characteristic and parameters of the flour
Colour	Cream-greenish, orange, yellow
Taste	Specific lentil, without bitterness or sour
Smell	Specific lentil, without unlike flavors
Mineral impurities	Chewing should not be griding
Humidity, %	14-16
The ash content related to DS, %, max	3,1

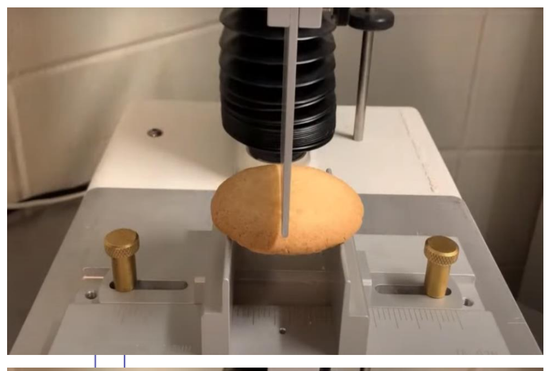


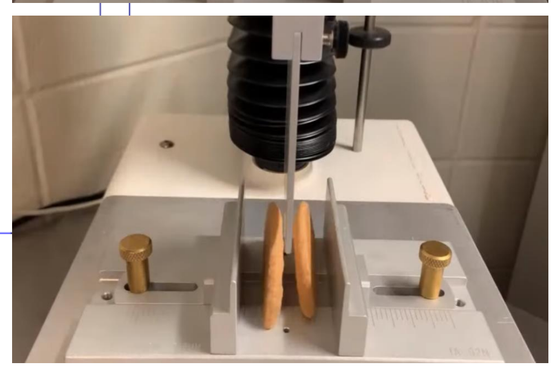
RESULTS AND DISCUSSION

Texture parameters of cookies

Dough samples	Hardness, g	Cohesiviness, %	Resilience, %	Gumminess, g	Chewiness, g
PM	1146.67	0.526	0.155	603.14	603.75
PFL 1	1301.88	0.518	0.149	674.37	675.04
PFL 5	1576.49	0.504	0.147	794.55	795.34
PFL 10	1863.90	0.473	0.137	881.62	883.38
PFL 15	1981.11	0.440	0.135	871.68	873.42

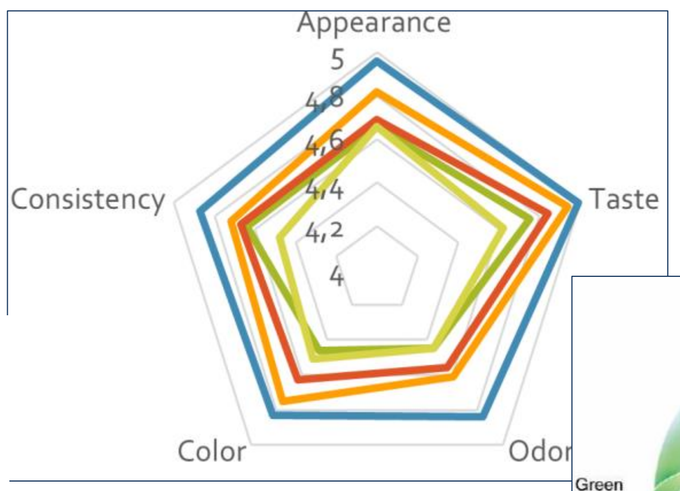


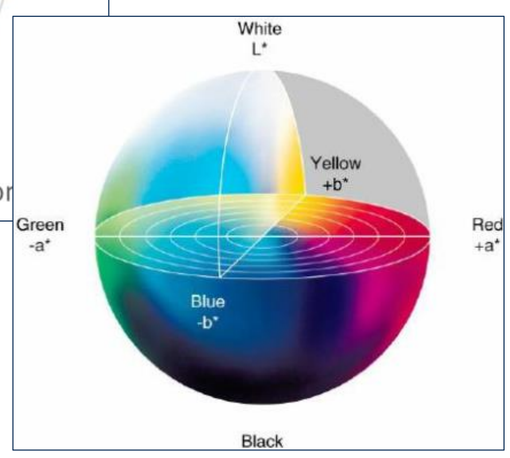




Physicochemical parameters of cookies

Indicator	PM	PFL 1	PFL 5	PFL 10	PFL 15
Moisture content, %	6,00	6,44	6,57	9,61	9,85
Alkalinity, grade	0,5	0,56	0,58	0,62	0,7
Swelling in water, %	127,5	125,0	118,0	117,5	115,0
Water activity, aw	0,120	0,275	0,310	0,420	0,508





CONCLUSIONS

The results are presented regarding the substitution of wheat flour with lentil flour in concentrations of 1, 5, 10 and 15%, in the cookies recipe. The cookies quality was analyzed during the storage period of 35 days, at a temperature of 20-22°C and a relative air humidity of 78%. There is an increase in swelling capacity of about 10%, a 14% decrease in cookie hardness, and a 1-4% decrease in product humidity, during the first 10 days,. In the third week of storage, the cookies hardness increases, and the swelling capacity decreases, due to the changes in gluten proteins.The analyzed quality indicators showed appreciable results for the sample with 10% lentil flour substitution.

Acknowledgements: The authors would like to thank the Moldova State project *20.80009.5107.09 Improvement of food quality and safety by biotechnology and food engineering*.

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Alternative sources for plant-based protein food products

Bulgaru Viorica, Popescu Liliana, Ghendov-Moşanu Aliona, Ilkay Şensoy, Mazur Mihai, Paiu Sergiu, Sturza Rodica

INTRODUCTION

Nowadays, food industry is interested in the use of nutritional compounds from plant sources in order to replace animal proteins. This concern comes in support of sustainable foods and biodiversity. *Sorghum Oryzoidum* (soryz), a hybrid of sorghum, could be considered one of such raw materials, based on its chemical composition and high productivity, despite the poor climatic conditions in Republic of Moldova.

MATERIALS AND METHODS

Materials
Sorghum Oryzoidum (sorzy) – grains obtaind at the Institute of genetics, physiology and plant protection from Moldova.
Methods
Protein content was analyzed using Kjeldahl method. Sequential extraction of protein fractions was performend by the method of Frances M. Dupont, et al., 2005.
Starch content was determinated by the method of Ming Li, et al., 2022.

RESULTS AND DISCUSSION

This is a vegetable raw material with a high starch content between 74-82% starch in which the amylopectin fraction prevails (Figure 1). Due to the higher amylopectin content, soryz starch is characterized by a high viscosity and a lower gelling tendency.

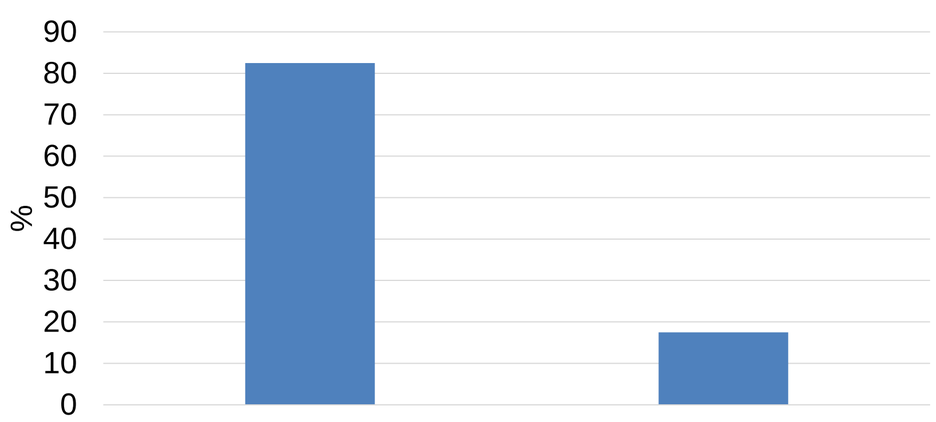

Figure 1. Sorghum Oryzoidum starch fractions

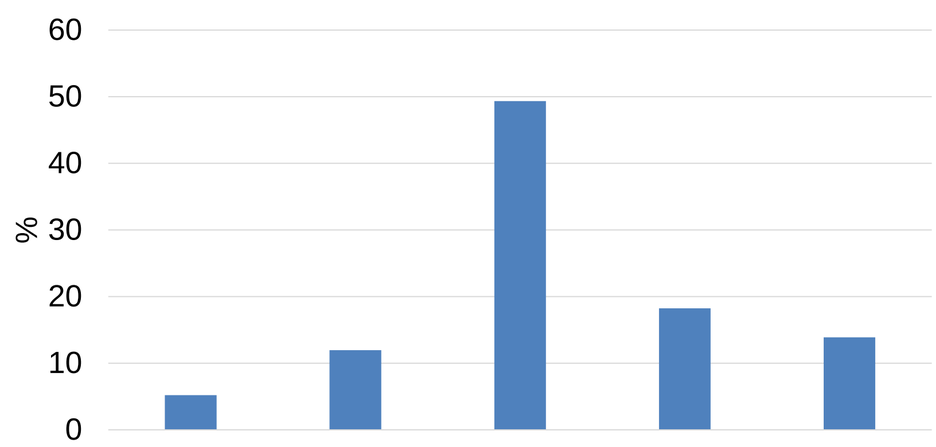

Figure 2. Sorghum Oryzoidum protein fractions

Proteins constitute the second important component of soryz grains. The value of the protein content, 13.07%, can vary depending on the changes that occur in the distribution of protein fractions and in the composition of amino acids. The distribution of protein fractions is showed in Figure 2. Glutamic acid is the major amino acid in the soryz proteins. It constitutes 34% of all amino acids, followed by the content of asparagine, alanine, leucine and arginine.

CONCLUSIONS Sorghum Oryzoidum (soriz) can be used in various composite food products, improving their nutritional and biological value.

Acknowledgements Bilateral project *23.80013.5107.3TR* Sustainable Nutrient-Rich New Generation Food Products Development: evaluating the relationship between ingredients, processing methods used, and techno- and bio-functional properties.

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Study on obtaining lactose-free ice cream

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The topic of functional ice cream requires further development. This review presents different perspectives on improving its formulation. Replacing common ingredients has been extensively studied. Plant-based milk alternatives are fluids that result from the breakdown (size reduction) of plant material (cereals, pseudo-cereals, oilseeds, nuts) extracted in water and further homogenisation of such fluids results in particle size distribution, which imitates cow's milk in appearance and consistency.

AM I LACTOSE INTOLERANT?

During digestion, the enzyme lactase breaks down lactose (the natural sugar found in milk) for energy. Each person produces a different level of lactase—people with lower levels may experience an upset stomach when they consume more lactose than their body can break down.

DIAGNOSIS ✚ Positive Hydrogen Breath Test
- Review your symptoms with a doctor
- Lactose intolerance may be a symptom of other conditions

Dairy foods have differing levels of lactose. Most people can experiment with dairy foods and find nutritious options that don't upset their stomachs.

• CHOOSE THE RIGHT PRODUCTS FOR YOU •

No Lactose ← → High Lactose

Lactose-Free Milk
Lactose: None
Milk with lactose broken down

Cheese
Lactose: None-Low
Hard cheeses have low or no lactose

Greek Yogurt
Lactose: Varies
Some varieties have less lactose than regular yogurt

Plain Yogurt
Lactose: Varies
Has live cultures that help your body break down lactose

Kefir
Lactose: Varies
Has live cultures that help your body break down lactose

Milk
Lactose: High
Try smaller portions to build up your tolerance

Although there is no stated definition and classification of these plant-based milk alternative in literature, a general type of plant-based/vegetable milk alternatives into five categories is attempted, which are as follows:

	Category				
	Cereal based	Legume based	Nut based	Seed based	Pseudo-cereal based
Types	Oat milk	Soy milk	Almond milk	Sesame milk	Quinoa milk
	Rice milk	Peanut milk	Coconut milk	Flax milk	Teff milk
	Corn milk	Lupin milk	Hazelnut milk	Hemp milk	Amaranth milk
	Spelt milk	Pea milk	Walnut milk	Sunflower milk	

CONCLUSIONS

Plant-based milk alternatives represents an enormous expansion prospective for health food market, and needs to be widely investigated through the development of advanced processing, technological interventions, fortification techniques, for developing a nutritionally complete beverage with high overall acceptability.

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AN OVERVIEW OF WINE WASTE VALORISATION IN THE REPUBLIC OF MOLDOVA

Ruseva Olga, Covaliov Eugenia, Deseatnicova Olga, Reşitca Vladislav, Suhodol Natalia

Key words: fertilizer, grape pomace, grape skin, polyphenols, sustainability

The Republic of Moldova is a country in which the main part of the economy related to agriculture, namely vinification. The land surface covered by vineyards is about 147,000 hectares, of which 102,500 hectares are used for commercial purposes. According to FAOSTAT, the Moldovan grape production in 2021 reached the value of 536829 tones. It is estimated that 75% of grape production is used in wine industry, thus generating 20-30% waste. The morphological parts of wine waste are used as sustainable products to obtain different compounds with biological active potential such as: enocolorants and polyphenols that exhibit antiradical activity from grape skin, polyunsaturated fatty acids from grape seeds, tartaric acids from grape mark and others.

Nowadays in Republic of Moldova, wide researches are done concerning the possibility of valorization of wine waste. On one hand, the majority part of the studies are based on the extraction of biologically active compounds in order to obtain sustainable food products and enhance the potential use of wastes. On the other hand, the wastewater from wine industry has been proven to be an energy source when applying anaerobic digestion. In the same context, wine waste is used in order to enrich soil fertility and consequently to increase the productivity of field crops.

Thus, products like ice-cream, marshmallow or bread have been used as food matrices in order to increase their functionality by incorporating grape skin extracts/powder in their formulations.

Fig.1. Grape skin powder

The content of polyphenols 2, 74 mg IN/ml extract; Antioxidant activity - 87.91%;

Fig.2. Ice-cream with addition of grape skin powder

Fig.3.Marshmallow with addition of grape skin powder

Fig.4 .Bread with addition of grape skin powder

CONCLUSIONS

It was found that adding grape skins powder to selected products significantly influences the color, increased polyphenol content and antioxidant activities.

Acknowledgements. The authors would like to thank the Moldova State project 20.80009.5107.09 Improvement of food quality and safety by biotechnology and food engineering.

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INTRACELLULAR SYNTHESIS OF SELENIUM NANOPARTICLES USING YEASTS AND PROSPECTS OF THEIR APPLICATION IN FOOD INDUSTRY

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INTRODUCTION

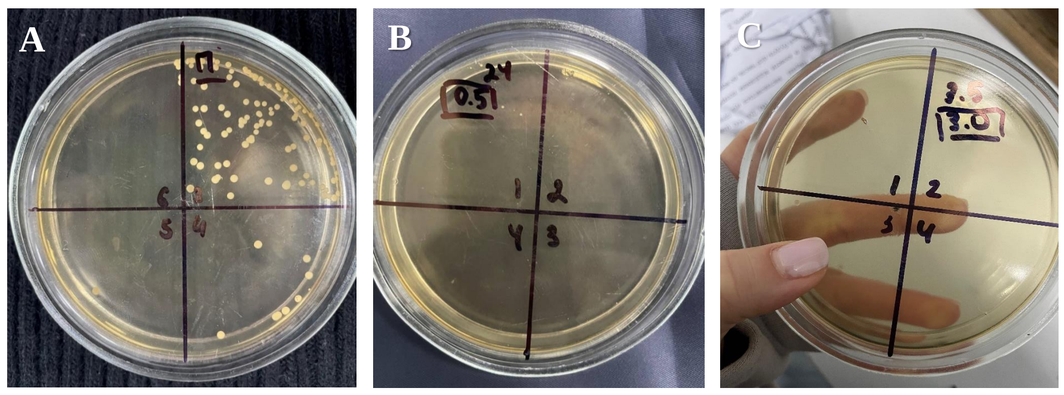
The deficit of selenium in human body leads to the decrease of synthesis of selenoproteins, the lack of which negatively affects the glutathione peroxidase activity, which results in increased risk of thyroid gland diseases, diabetes, obesity and reproductive dysfunction. Consuming food products enriched with bioavailable selenium in form of nanoparticles might be the solution to the problem.

MATERIALS AND METHODS

For the biosynthesis of selenium nanoparticles (SeNPs) we used *Saccharomyces cerevisiae* M437 cultivated on liquid Reader medium. Sodium selenite was added to culture liquid in 0.5-3 mM concentrations at the beginning of cultivation. Observations were carried out for 7 days.

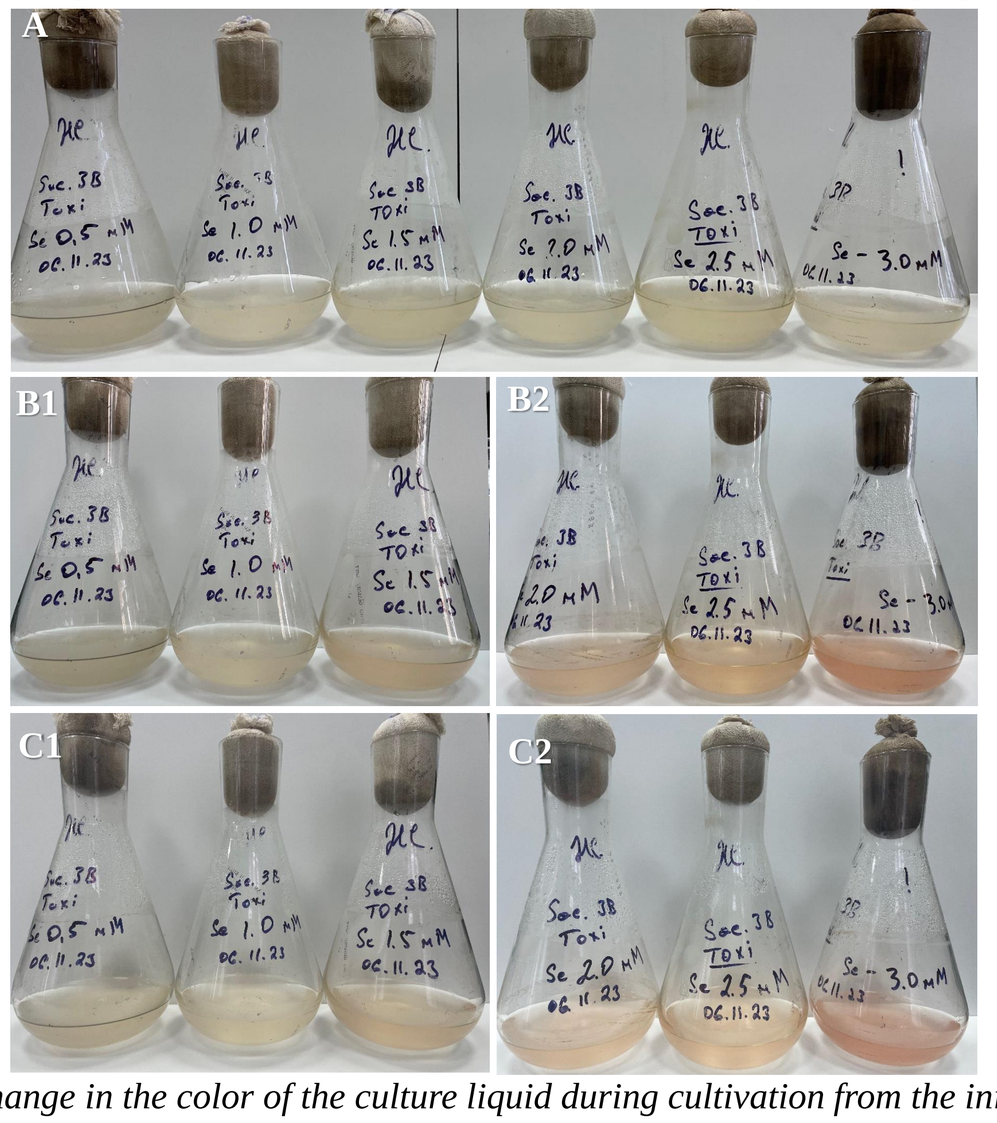
RESULTS AND DISCUSSION

As a result of incubation of yeast cells with the initial introduction of different concentrations of sodium selenite, it was established that all concentrations of selenite are toxic to yeast cells, only at the minimum studied concentration of 0.5 mM, insignificant cell growth was observed.



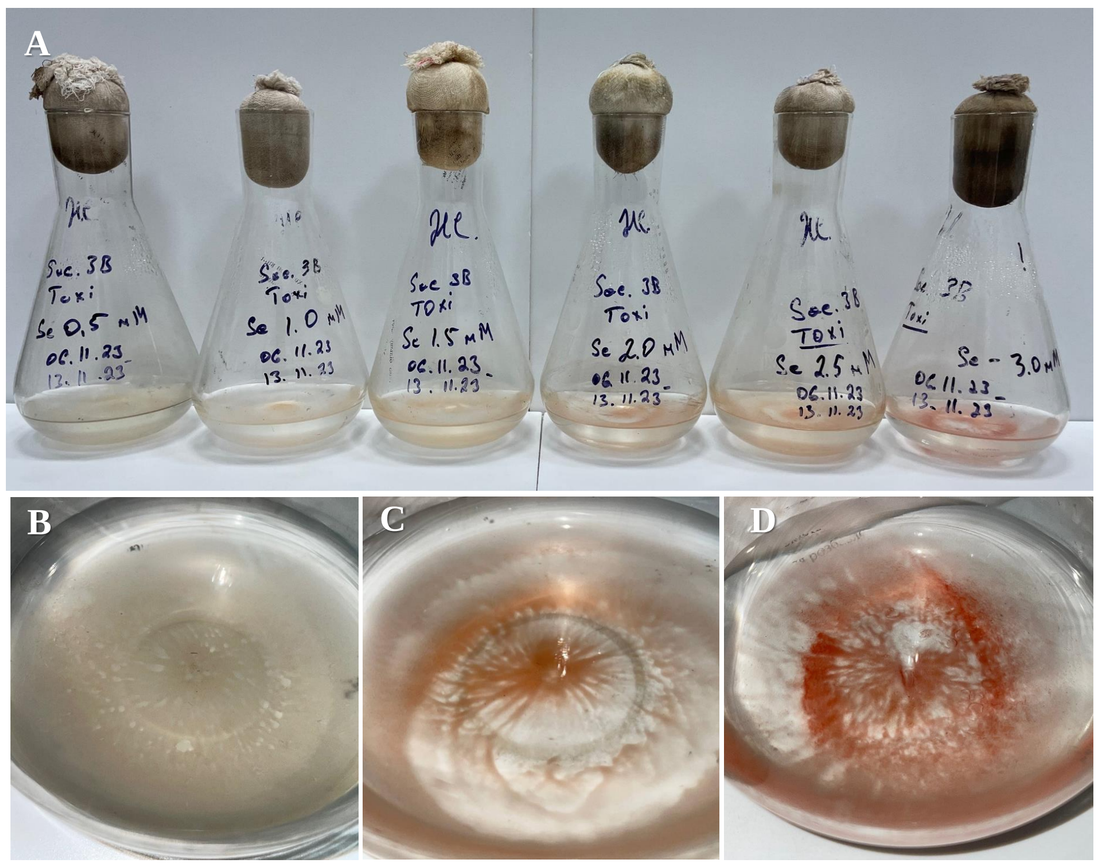
Viability of cells under the influence of sodium selenite: A – control (yeast cells without the introduction of selenite); B – yeast cells with an initial addition of 0.5 mM sodium selenite; C – yeast cells with an initial application of 3.0 mM sodium selenite

In the process of cultivation, the biotransformation of selenite into selenium nanoparticles was observed, as over time there was a noticeable change in the color of the solution from milky to orange/pink.



Change in the color of the culture liquid during cultivation from the initial application of different concentrations of sodium selenite: A – for 24 hours of cultivation (1 day); B1, B2 - for 96 hours of cultivation (4 days); C1, C2 - for 168 hours of cultivation (7 days).

During the observations, it was also established that the formed selenium nanoparticles were not released into the culture medium, but remained in the yeast cells, which was revealed as a result of the change in the color of the cells and the transparency of the culture medium after centrifugation



Sediment of yeast cells after overnight stay in the refrigerator: A – a general image of all studied samples; B – sediment of cells at the initial application of 0.5 mM sodium selenite; B – cell sediment at the initial application of 1.5 mM sodium selenite; D – cell sediment at the initial application of 3.0 mM sodium selenite

Sediment of yeast cells after centrifugation of the culture liquid, with the initial introduction of sodium selenite in the following concentrations, from left to right: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0 mM

CONCLUSIONS

In the future, yeasts containing selenium nanoparticles in bioavailable form can be used as food additive to recover selenium deficiency in human body and prevent diseases connected to selenium deficit in regions with low selenium content in food products.

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INFLUENCE OF DEMINERALIZED WHEY CONCENTRATES ON ICE CREAM SUGAR CONTENT

Galyna Polishchuk, Uliana Bandura, Oksana Bass, Artur Mykhalevych

INTRODUCTION

The production of low-calorie ice cream is increasing every year, which is one of the modern trends of changing consumer preferences in the direction of healthy eating. Sucrose in the composition of ice cream performs not only the role of a sweetener, but also is a source of solids, and ensures the proper formation of its structure and affects its quality indicators during storage. The use of liquid hydrolyzed whey concentrates in the composition of ice cream can help reduce the sugar content in it due to the increased degree of sweetness of monosaccharides.

MATERIALS AND METHODS

The degree of lactose hydrolysis was determined by iodometric and refractometric methods, the water activity in the mixtures was determined using the water activity analyzer, the rheological characteristics were determined using a rotary viscometer, the foam overrun and foam stability of the ice cream mixtures and the melting rate of ice cream were determined using modified methods, sensory indicators were determined using the descriptive-integral method.
The mass fraction of protein, dry matter, overrun, resistance to melting in ice cream were determined using well-known methods

RESULTS AND DISCUSSION

Based on the calculation of the degree of sweetness of whey concentrates, taking into account the mass fraction of total solids, the degree of lactose hydrolysis and the known values of the relative sweetness of sugar, lactose, glucose and galactose, a concentrate with a solids content 40% was chosen for use in the ice cream formulation.
According to the results of the study of the quality indicators of ice cream mixtures, it was found that the hydrolyzed concentrate of demineralized whey with a mass fraction of solids 40% could replace up to 42% of sugar in the composition of ice cream, while maintaining the degree of sweetness determined for this type of ice cream in the range from 0.8 to 0.9. According to the viscosity-speed characteristics, the mixture of low-fat ice cream with a concentrate of hydrolyzed demineralized whey is classified as a system with a pronounced coagulation structure with the detection of thixotropic properties.
Ice cream based on hydrolyzed whey concentrate contains 3.3% of whey proteins, which corresponds to the standard chemical composition of ice cream. The high content of lactose hydrolysis products in ice cream increases overrun, but reduces the resistance to melting of ice cream, which must be taken into account during the technological process and when choosing a consumer container.

CONCLUSIONS

The feasibility of using a hydrolyzed whey concentrate with a mass fraction of solids 40% as a sweetening and protein-containing ingredient in low-fat ice cream has been proven.

Acknowledgements
The work was carried out at the National University of Food Technologies (Kyiv, Ukraine) within the framework of the state RandD projects “Scientific substantiation and development of resource-efficient technologies for targeted food products as a food safety imperative” (state registration number: No. 0123U102060)

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THE VALORISATION OF *CANNABIS SATIVA* L. OIL CAKE BIOLOGICALLY ACTIVE COMPOUNDS

Cătălina Negoița, Tatiana Capcanari, Eugenia Covaliov

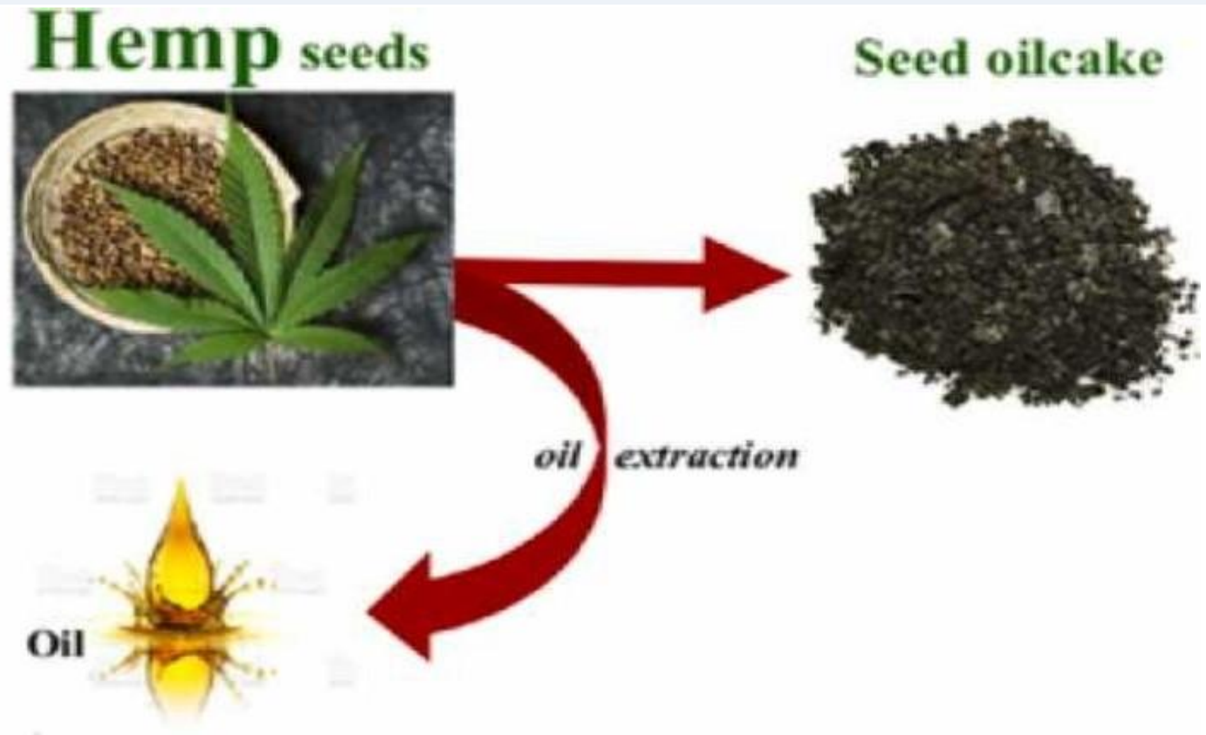
INTRODUCTION

The poor performance of hemp (Cannabis sativa L.) oil cake on certain functional qualities limits its utilization in the food industry

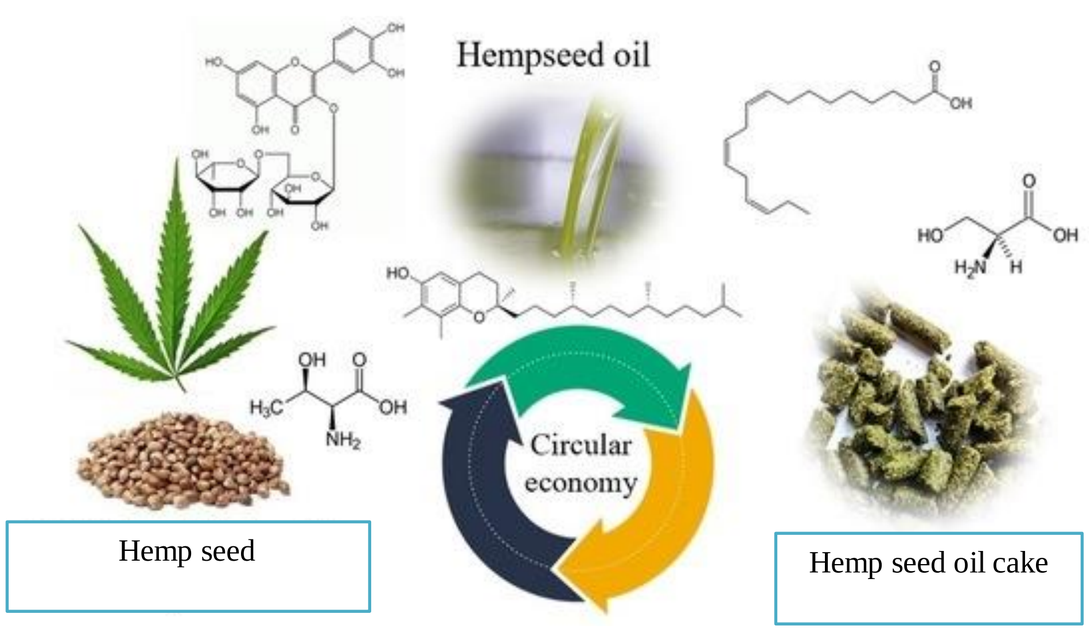
Food industry produces a significant amount of waste annually, thus creating premises for researches focused on reducing and effectively handling this problem, promoting the idea of zero waste. Oil cakes are produced during the oilseed extraction process. These leftovers are a source of health-promoting bioactive substances.

MATERIALS AND METHODS

CANNABIS SATIVA L. OIL CAKE

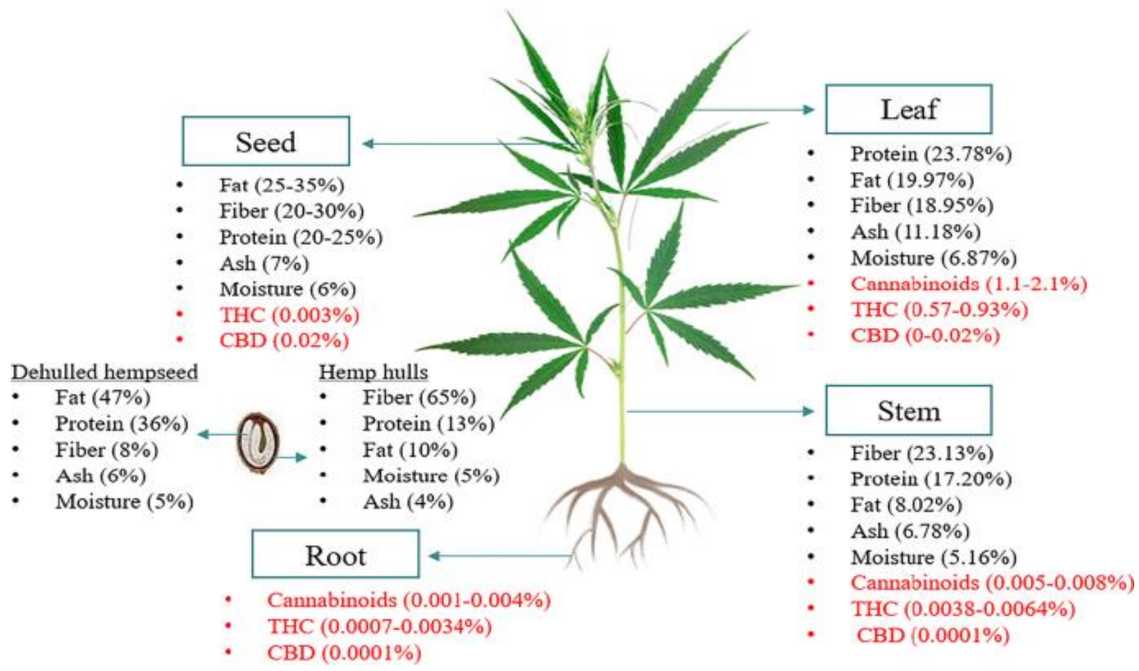


RESULTS AND DISCUSSION



Thus, the most recent processing techniques created to eliminate or reduce these limits were compared. All of the essential amino acids are present in hemp cake's proteins, with arginine (2.28...3.10% of whole seeds) and glutamic acid (3.74...4.58% of whole seeds) being the two most important amino acids. From a nutritional perspective, hemp seed protein is quickly absorbed and provides a decent profile of essential amino acids, comparable to casein.

Together with being high in nutrients, hemp seeds are also a good source of natural antioxidants and other bioactive substances such tocopherols, phenolic compounds, phytosterols, carotenoids, minerals and bioactive peptides.



CONCLUSIONS: The development of "functional foods" with positive effects on human health was the goal of this work, which aims to valorize agricultural waste sources, particularly hemp (Cannabis sativa L.) oil cake, by the extraction biologically active compounds that may be used to diversify food products.

Acknowledgements
The research was funded by State Project 20.80009.5107.10, nr. PS-62 “Personalized nutrition and intelligent technologies for my well-being”, running at Technical University of Moldova.

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SCIENTIFIC EXPLANATION OF THE RECIPE COMPOSITION OF MILK-VEGETABLE PASTAS

Oksana Kochubey-Lytvynenko, Tetiana Osmak, Artur Mykhalevych, Angelina Pivtoratska

INTRODUCTION

Recently, there has been an increased trend in the production and consumption of fermented milk products.
Sour milk pastes occupy an important place in the diet of all segments of the population, which is due to their high nutritional value, namely the content of easily digestible complete milk protein, vitamins, mineral elements and dietary properties.

MATERIALS AND METHODS

At the department of Milk and Dairy Products Technology of the National University of Food Technologies, recipes of new types of sour-milk milk-vegetable pastes have been developed.
The low-fat fermented milk cheese, obtained by a separate method, and low-fat yogurt were used as milk base, multifunctional vegetable raw materials (beetroot and prunes) were used as a filler, which perform a coloring function due to the presence of natural pigments, and a structuring function due to the presence of dietary fibers (fiber, pectin substances).

RESULTS AND DISCUSSION

At the first stage of the research, the recipe composition of dairy and vegetable raw materials was selected for use in the composition of sour-milk pastes. It is proposed to use beets and prunes as vegetable raw materials. According to its chemical composition, beet is one of the most useful vegetables, which includes vitamins B, P, PP, C, micro and macro elements (iron, copper, cobalt, potassium), folic and pantothenic acid. Prunes are the most popular dried fruit of all known.
Its value is determined by the presence in its composition of pectin substances, fiber, organic acids, vitamins B1, B2, PP, C, provitamin A, potassium, magnesium, sodium, phosphorus, iron. The multifunctional vegetable raw material in the composition of sour-milk pastes performs several functions: due to the presence of natural pigments in it - a coloring function, and due to dietary fibers (fiber, pectin substances) - a structuring function. As a milk base, it was proposed to use low-fat cottage cheese, and low-fat yogurt.
On the basis of the sensory evaluation of quality, a ratio of dairy and vegetable raw materials in the composition of sour-milk pastes was selected.
Also, the selection of structure stabilizers was carried out. Potato starch, modified potato starch LYCKEBY Volume C E1420, modified potato starch Microlys 52 E1442, modified potato starch CheesMaker BL 140 were used as structure stabilizers.
The complex interaction of pectin-containing plant raw materials and modified starches (LYCKEBY Volume C E1420 and Microlys 52 E1442) in the composition of sour-milk pastes allows obtaining a product with a delicate plastic consistency and prevent the separation of moisture during storage.

CONCLUSIONS

The developed new types of milk-vegetable pastes will allow expanding the range of sour-milk snacks and improve the nutrition structure of the country's population.

Acknowledgements
The work was carried out at the National University of Food Technologies (Kyiv, Ukraine) within the framework of the state RandD projects “Scientific substantiation and development of resource-efficient technologies for targeted food products as a food safety imperative” (state registration number: No. 0123U102060)

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Influence of water hardness on the process of fermentation by *Medusomyces gisevii* consortium

Olha Dulka, Vitalii Prybylskyi, Oleksii Fedosov, Serhii Prokopyshyn

INTRODUCTION

The basis for the production of kombucha is water. The technology of fermented drinks, as a rule, does not involve additional water treatment. However, the chemical composition of the source water has a significant impact on the technological process and indicators of the finished product.

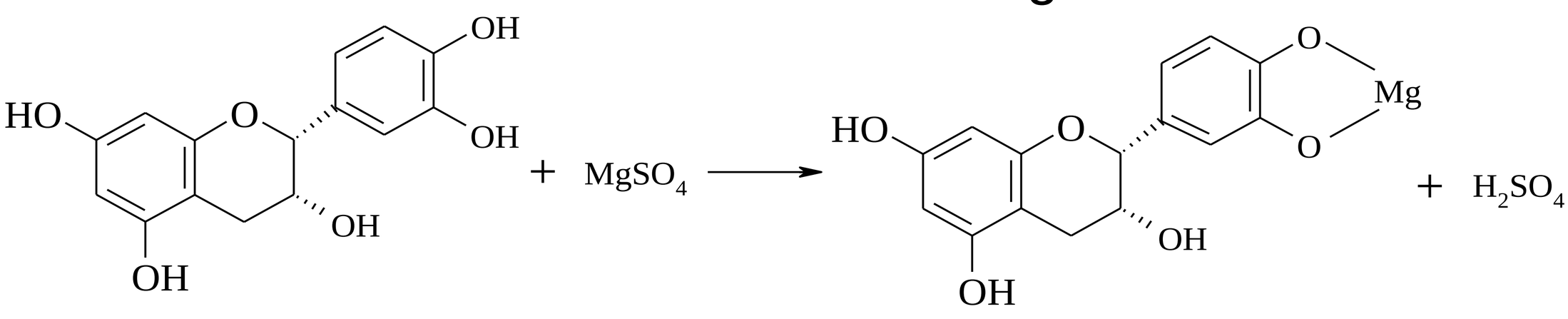
MATERIALS AND METHODS

The wort was prepared by adding sugar syrup and tea infusion to water to a dry matter concentration of 7.0...7.2%. The culture of *Medusomyces gisevii* in the amount of 3% was added to the finished wort. The duration of fermentation was 14 days. After fermentation, the fermented wort was cooled, and the culture of microorganisms was removed.

RESULTS AND DISCUSSION

Based on the results of studies of the dynamics of wort fermentation, it was established that high water hardness negatively affects the fermentation process by *Medusomyces gisevii* culture and worsens the organoleptic qualities of the finished drink. It was established that the most intensive fermentation process occurred from the fourth to the eighth day, which canbe explained by the logarithmic phase of growth of yeast cells as a component of the *Medusomyces gisevii* consortium.

The effect of the general hardness of water on the content of polyphenolic substances in the tea solution is due to the formation of coordination bonds with calcium and magnesium salts:



CONCLUSIONS. There was defined the correlation between water indicators, wort fermentation dynamics and organoleptic evaluation of finished drinks.

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Rheological characteristics of beta-glucans obtained from wine lees of wines from local grapes varieties

Ana TROHINA, Aurica CHIRSANOVA, Alina BOIȘTEAN, Ana CHIORU

INTRODUCTION

The aim of the study was to characterize some rheological parameters of beta-glucan isolated by two methods from the wine lees obtained after the manufacture of three red wines: Rara Neagra, Feteasca Neagra and Craft wine.

MATERIALS AND METHODS

Yeast lees from wines:
- ❑ Rara Neagra
- ❑ Feteasca Neagra
- ❑ Craft wine

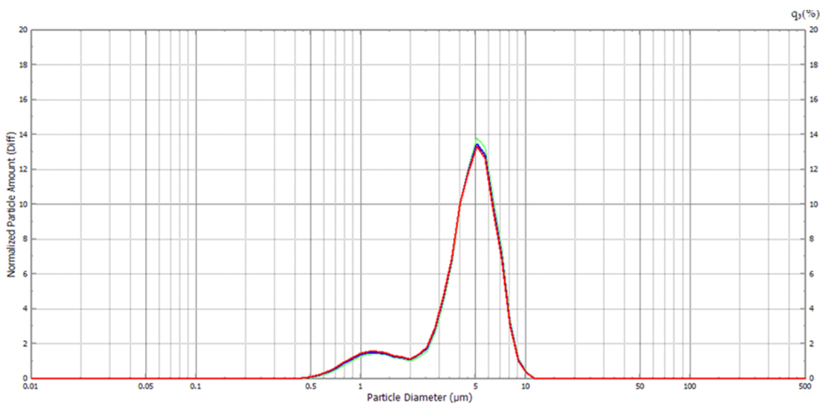
- ❑Sonication
- ❑Microscopy
- ❑Granulometry
- ❑Viscosity
- ❑Surface tension

RESULTS AND DISCUSSION

The results of the analysis of the viscosity of liquid phase of the suspensions obtained after centrifugation did not give impressive results, the viscosity of all analyzed suspensions ranged from 0.9044 (Craft wine) to 0.9108 (Rara Neagra) at 60 degrees and from 0.9072 (Craft wine) to 0.9318 (Rara Neagra) at 80 degrees, these indicators practically do not differ from the viscosity of water. The results of the analysis of the surface tension of the liquid phase of the suspensions obtained after centrifugation showed the difference between suspensions with the addition of beta-glucans obtained by the first and second methods. The surface tension of suspensions with the addition of beta-glucans isolated by the first method ranges from 70.14 (Feteasca Neagra) to 72.64 (Craft wine), while the results of the surface tension of suspensions with the addition of beta-glucans isolated by the second method range from 40.45 (Feteasca Neagra) to 54.33 (Craft wine).Beta-glucans isolated through the second method, after dissolution in distilled water and sonication, underwent a change in appearance and formed a gel-like consistency. A visual, microscopic, and granulometric analysis of all obtained emulsions was conducted, and their stability was assessed over a period of 2 weeks. The microscopic analysis provided the approximate diameter of the microparticles. Through granulometric analysis, more precise data were obtained, including the diameter of the microparticles present in the emulsions.

Beta-glucans isolated by the second method in distilled water

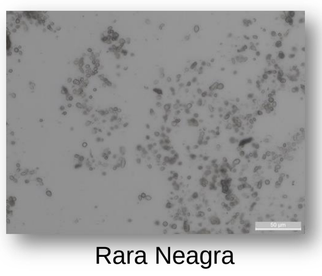
Beta-glucans isolated by the second method in distilled water after ultrasound treatment



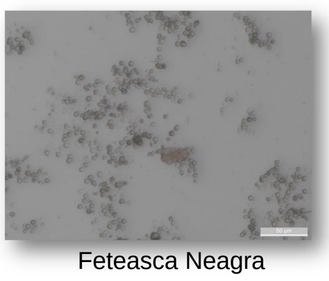
The graph depicts the granulometric stability of the suspension over a two-week period with the addition of beta-glucans extracted from the yeast sediment of Rara Neagra wine.

CONCLUSIONS

Beta-glucans are polysaccharides with significant biological activity. The obtained results have demonstrated the feasibility of extracting beta-glucans from the cell wall of yeast belonging to the *Saccharomyces cerevisiae* genus. In addition, they have assisted in determining their rheological characteristics and identified the second extraction method as more successful for further research.



Rara Neagra



Feteasca Neagra

Craft wine

Microscopy of suspensions with added beta-glucans: The average size of microparticles after sonication is 3-4 µm

Acknowledgements

The research was made possible by the project: «Valorisation de co-produits vinicoles mol-daves: identification et caractérisation d'agents multifonctionnels» supported by the Agency of the Francophone University (AUF) and the State Project 20.80009.5107.10, no. PS-62 "Personalized nutrition and smart technologies for my well-being" which was held in the Department of Food and Nutrition, Faculty of Food Technology of the Technical University of Moldova.

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Development and characterization of gluten-free pasta with pectin from sugar beet flakes

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INTRODUCTION

- In the last few decades, gluten-free pasta is consumed not only by the growing number of people diagnosed with celiac disease, but also by others who wish to exclude gluten-based products from their diet for health reasons.
- Common ingredients used for the preparation of gluten-free pasta are flour and/or starch from corn, rice, potato, pseudocereals, alongside the addition of proteins, gums, and emulsifiers that may partially act as gluten substitutes.
- This study is the first report on the use of pectin from sugar beet flakes in gluten-free pasta.

MATERIALS AND METHODS

- For gluten-free pasta preparation, three types of flour – rice flour, millet flour and quinoa flour, and different concentrations of pectin from sugar beet flakes (1, 2 and 3%) were used. Water at 25 °C was also added for optimal dough development.
- The samples were characterized by means of rheological and thermal analysis (by differential scanning calorimetry). Rheological properties of the dough were analyzed with a dynamic rheometer Thermo HAAKE model MARS 40 (Karlsruhe, Germany), and DSC analysis was made with a DSC 25 calorimeter (TA Instruments, Delaware, USA).

RESULTS AND DISCUSSION

- The gluten-free pasta dough prepared with rice flour and pectin from sugar beet flakes showed the highest G′ across all frequencies (figure 1), indicating a firm and elastic dough. The variation observed in the loss modulus (G″) data appears to be due to differing flour type and pectin concentration.
- All samples presented an endothermic peak between 90 and 106 °C, which indicated changes of the amylose component of flour.

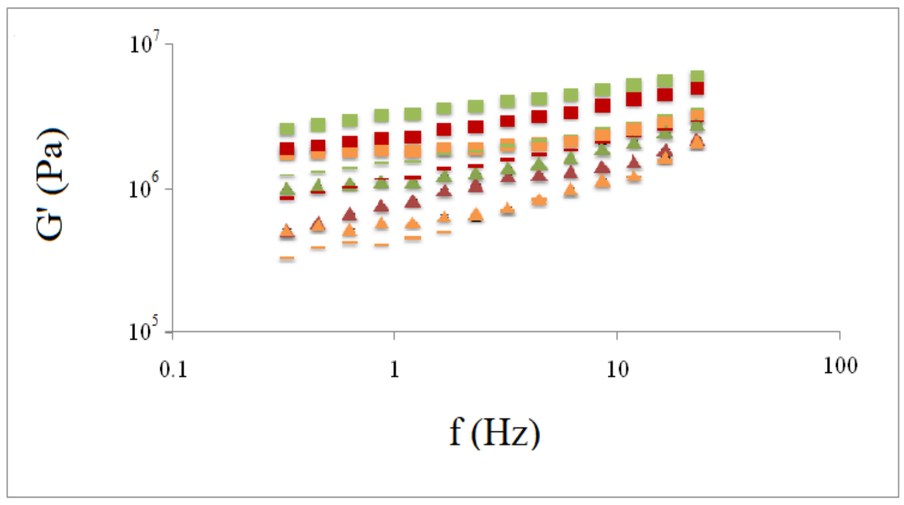

Figure 1 Elastic modulus (left) and loss modulus (right) for samples of gluten-free pasta dough with millet flour (△), quinoa flour (▪), rice flour (□) and pectin from sugar beet flakes (1% – orange, 2% – red, 3% – green)

CONCLUSIONS

- The progressive increase in the proportion of pectin from sugar beet flakes affects the rheological and thermal properties of gluten-free pasta.
- The differences observed between samples were remarkable and correlated with pectin proportion and type of gluten-free flour.

Acknowledgements

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-PD-2021-0290, within PNCDI III.

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Winery by-products as ingredients in extrudates

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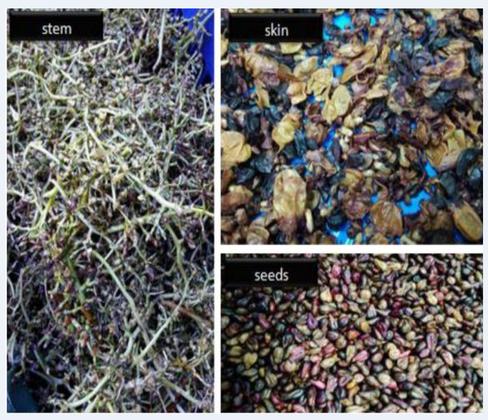
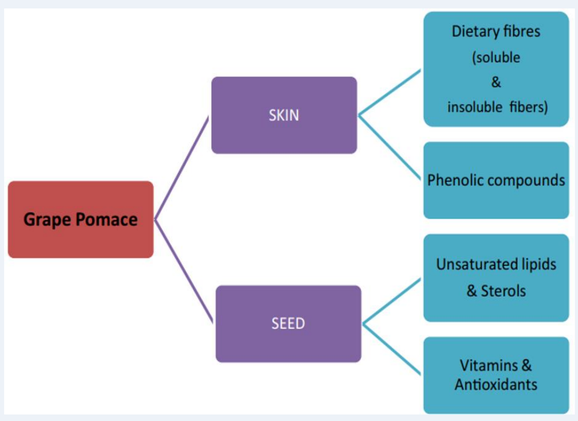
INTRODUCTION

This study presents a mini-review on the influence of winemaking by-products in extruded products studied by researchers. Grape pomace is the result of pressing whole grapes during must production. Grape pomace has a moisture content of about 70% and represents 11-15% of crushed grapes. According to evaluations, 1 kg of grape pomace is generated for every 6 L of wine. One ton of grape pomace consists of 425 kg of grape skin, 225 kg of grape seeds, 249 kg of stalks and other minor constituents (e.g. water). This consists of two main fractions known as seedless pomace (pulp, skin and stem) and the grape seed itself.

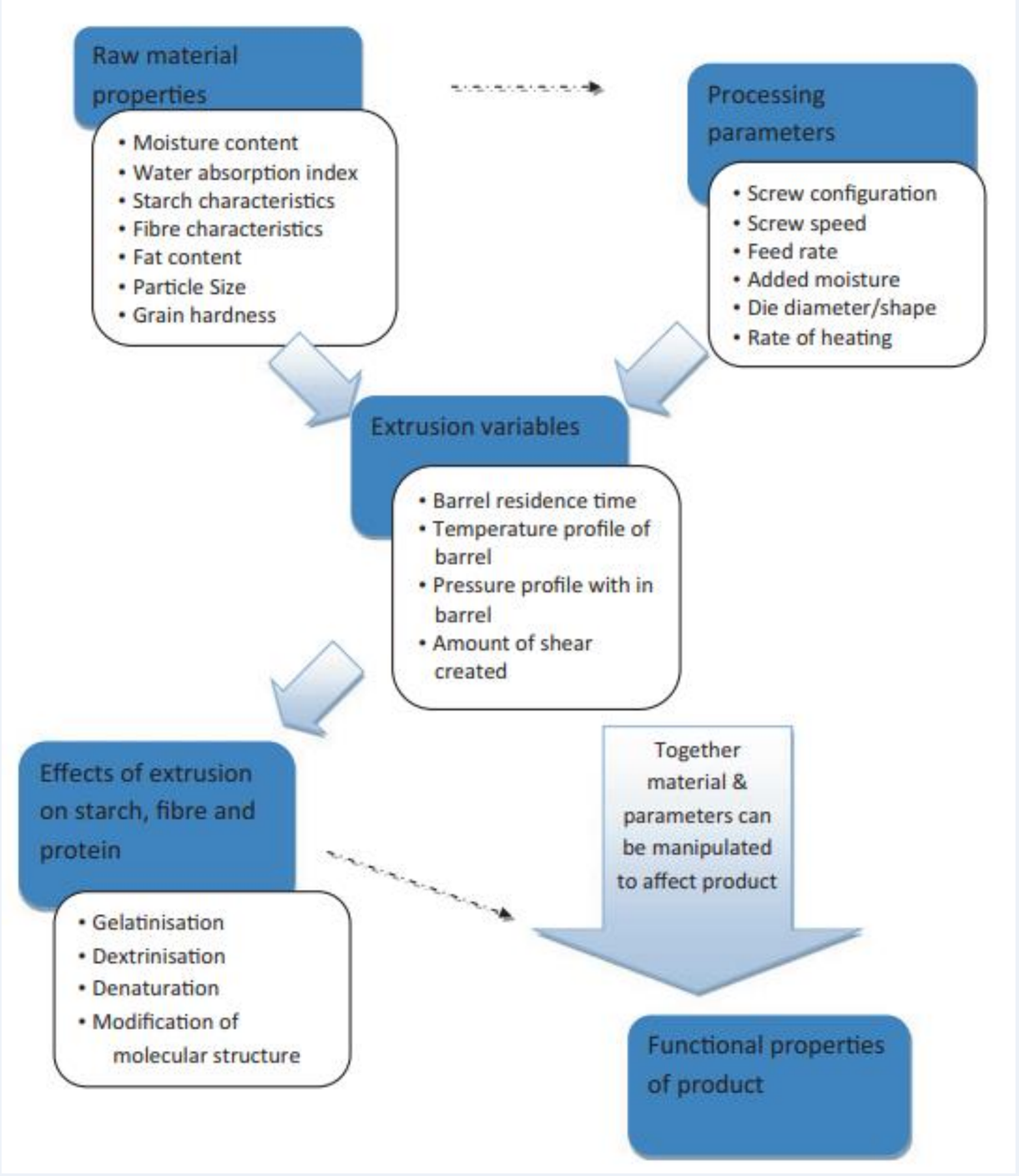




(Kalli et. al., 2018)

Phenolic compounds are widely distributed inside grapes and the distribution of soluble phenolic compounds is distinct: in seeds total soluble phenolic compounds correspond to 60–70%, followed by skin with 28–35% and pulp with 10%. Foods enriched with wine by-products are rich in polyphenols that exert prebiotic effects by stimulating the growth of beneficial and pathogenic inhibiting bacteria.

MATERIALS AND METHODS



(Brennan et al., 2013)

RESULTS AND DISCUSSION

Most extruded products are grain-based, for example ready-to-eat breakfast cereals, pasta and extruded snacks, and the main component of these products is starch. Extrusion increased the proportion of rapidly digestible starch and reduced the proportion of slowly digestible starch and resistant starch. The digestibility of starch in extruded products could be modified by mixing cereal-based with other ingredients such as vegetable by-products and dietary fiber. Grape pomace (GP) has great potential to serve as a source of dietary fiber and polyphenols to fortify extruded foods. Both polyphenol and dietary fiber content of the extrudate can increased with GP content, depending on the extrusion processing conditions.

CONCLUSIONS

The by-products of the wine industry (peel, stem, leaves and seeds) are characterized by a high content of phenolic compounds. Therefore, grape pomace could serve as an inexpensive source of dietary fiber and polyphenols in extruded products to compensate for increased starch digestibility and loss of total dietary fiber during extrusion cooking, thus improving the nutritional quality of the extruded products.

Acknowledgements

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P4-PCE-2021-0718, within PNCDI III.

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Influence of walnut oil adulteration with sunflower oil on color parameters

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INTRODUCTION

The nutritional quality of walnut oil has recently become a growing concern for consumers and health systems alike. Walnut oil consumption has been associated with a lower risk of cardiovascular disease, atherosclerosis and certain cancers, such as breast cancer. Food products found outside the acceptable colour range will be rejected by consumers. This is because colour is not only related to chemical or physical properties [1], but also to the consumer's perception of product quality.

MATERIALS AND METHODS

Materials

Walnut oils were obtained by cold pressing method, For walnut oil adulteration, were prepared walnut–sunflower oil binary mixtures at different concentrations (5%, 10%, 20%, 30%, 40%, 50%) with a total of 64 samples to analyse.

Methods

2.1 Color Measurement of oil samples

Colour determination was carried out using the CIEL*a*b* system (Konica-Minolta 200).

2.2 Statistical Analysis

The obtained results were statistically analyzed with the Software SPSS Statistics, $p < 0.05$.

RESULTS AND DISCUSSION

The brightness decreases with increasing percentage of sunflower oil (UFS) added. Walnut oil and sunflower oil tend towards colours in the yellow-red spectrum. The colour difference quantified by the ΔE* value shows that the samples have very small colour variations between the samples obtained. The white index increases with the increasing of the degree of adulteration from 5% to 50% and the decrease of the yellow index, which according to the literature makes the product edible The colour parameters of walnut oils show the following data: L* is between 20.39-21.12, a* is between -0.5 and -1.3, b* is between 4.33 and 5.66, C* is between 7.91-10.72 and h* is between 95.88 and 102.03. On addition of 5% -50% sunflower oil, in all authentic samples the brightness and chroma decrease proportionally. Instead the hue is increasing with the increase of the falsification fence.

CONCLUSIONS

In this study the 64 samples analysed demonstrated the importance of colour analysis in determining the adulteration of walnut oil. In this respect, it can be observed the increase of the white index with the increase of the degree of adulteration from 5% to 50% and the decrease of the yellow index, which according to the literature makes the product edible.

In our case, walnut oils with a percentage of 5-50 % added sunflower oil is not accepted because $\Delta E^* \leq 1.5$.

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Valorisation of carrot pomace as a source of dietary fiber in refined wheat flour pasta

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INTRODUCTION

Carrot processing by-products are known to be a source of beneficial compounds such as dietary fibers. Dietary fiber is the main focus are for human nutrition, and increased fiber intake is a dietary recommendation for reducing the risk of the number of chronic diseases.

The present study was aimed to assess the total dietary fiber content from carrot pomace from four carrot varieties cultivated in Romania, namely Baltimore, Niagara, Belgrado and Sirkana.

MATERIALS AND METHODS

Four varieties of carrots (Niagara, Belgrado, Sirkana and Baltimore) were purchased from a farmer in Bacau, Romania. The carrot pomace was obtained by extracting the carrot juice with a Bosch MES3500 (Philips Consumer Lifestyle B.V., Drachten, Holland) device. The drying treatment of carrot pomace was performed in a convector with hot air at a temperature of 60˚C for 24 h and a layer thickness of 0.5 cm. After drying, the resulting carrot pomace was kept in dark glass bottles until analysis. The amount of total dietary fiber was determined enzymatically, by using a Megazyme enzyme kit K-TDFR-200A 04/17 (Megazyme Ltd., County Wicklow, Ireland).

RESULTS AND DISCUSSION

The results (Figure 1) highlighted that the carrot pomace from the studied varieties presents high contents of total dietary fiber which varied between 20.09 and 33.34%, depending on carrot variety. The Belgrado variety has the highest total fiber content, while the Niagara variety has the lowest fiber content. The studied pomaces represents an important source of fibers, showing their potential for fiber enrichment of nutritionally poor products, such as pasta obtained from refined wheat flour. By partial replacing refined wheat flour with 3 to 12% carrot pomace, a rise in fiber content was obtained which will enhance the nutritional value of wheat pasta. The consumption of these fiber-enriched pasta may have many heath benefits such as prevention of constipation, control of blood sugar, heart disease prevention, and the inhibition of certain types of cancers.

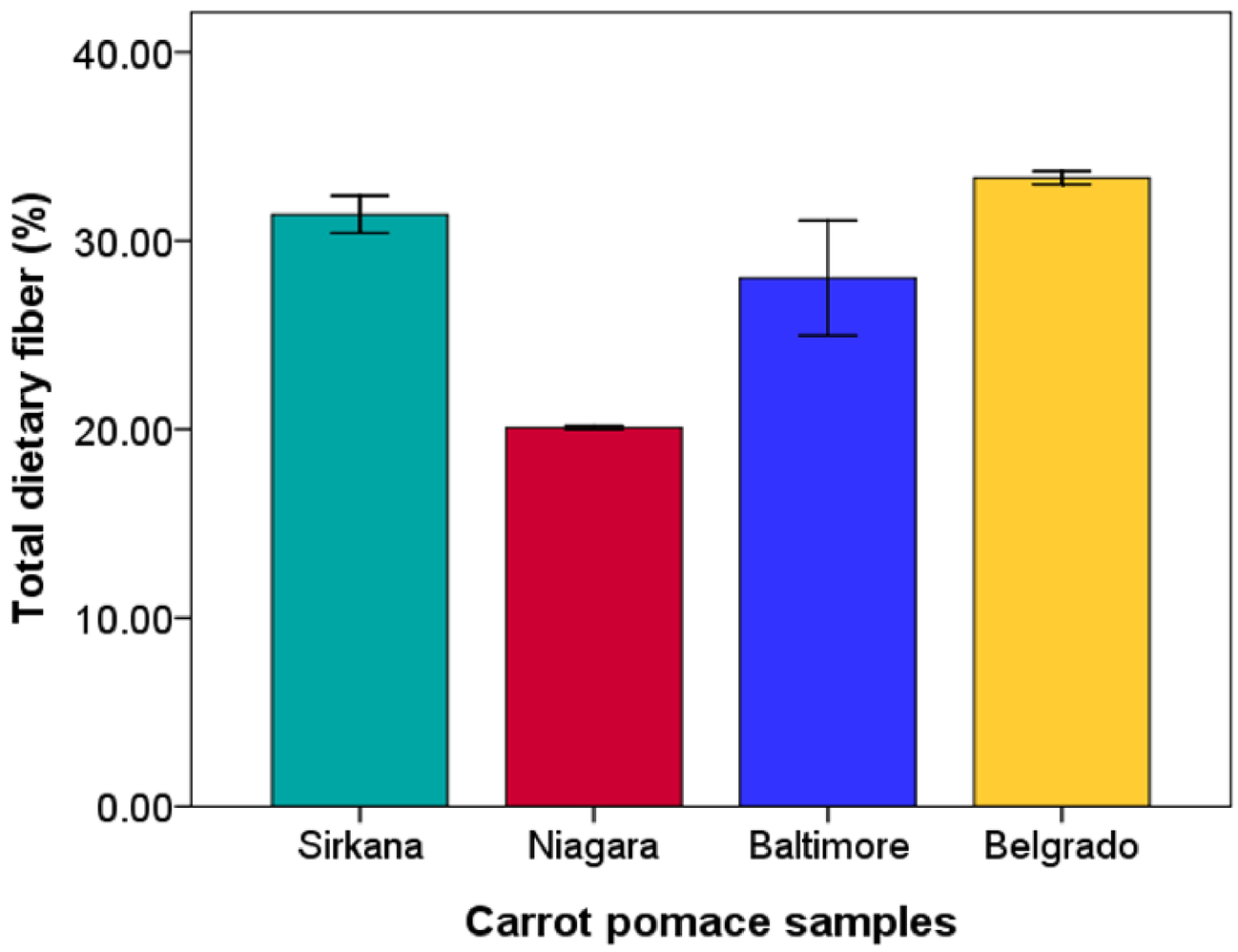

Figure 1. Variation of total dietary fiber content in carrot pomace depending on the carrot varieties

CONCLUSIONS

The content of total dietary fibers of carrot pomace powders investigated depended on the variety. The results obtained showed that carrot pomace is a rich source of fibers, which suggested its capacity to improve the nutritional value of food products into which it can be incorporated. Further research on the bioactive compounds quantification in carrot pomace would be necessary to better highlight the benefits of using it to create novel, value-added products.

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IDENTIFICATION OF MICROORGANISMS IN MODEL MEAT STUFFINGS USING MALDI TOF MS BIOTYPER

Karol Pietrzyk, Maciej Kluz, Bożena Waszkiewicz – Robak,Rafał Sochacki, Miroslava Kacaniova

INTRODUCTION

. Due to the continuous development of laboratories, newer and newer methods are needed for the detection and identification of micro-organisms, especially those that are not often isolated and identified as pathogenic. The MALDI-TOF mass spectrometry method is used in the identification of species that are routinely isolated, as well as for species that are not among the most common pathogenic species. The MALDI-TOF MS technique, using mass spectrometry, identifies microorganisms based on the analysis of a protein profile (a so-called molecular 'fingerprint') and its comparison with spectrophotometric reference standards from a database. The method is very fast, sensitive and reliable. The actual analysis of a previously isolated single colony of a micro-organism takes approximately 40 seconds.

MATERIALS AND METHODS

The research material consisted of minced pork meat (shoulder) purchased from a local shop. The microbiological analysis of the meat stuffing obtained was initially determined during culture on selection media under specific conditions. The following media were used for the culture of individual bacterial species: PCA, MRS, TSC, VRBL, Pseudomona s agar(Biomaxima, Lublin, Poland). The cultures were performed on the day of production and also systematically during the storage period. Bacterial colony isolates were identified using a MALDI TOF MS BIOTYPER mass spectrometer(Bruker Daltonik, Bremen, Germany). Meat samples tested on days 0,3,6,9,12 in a volume of 5g were placed in 45 ml of peptone water and homogenised in a BagMix for 15 minutes, followed by serial dilutions. For identification in the MALDI TOF MS Biotyper mass spectrometer, diluted samples were seeded on Mueller-Hinton Agar and incubated at 37 °C for 24 h. Pure colonies were transferred to Mueller-Hinton Agar medium and incubated again, after 24 h the bacterial biomass was harvested and placed in ependorfs with 300 µl of pure water and 900 µl of pure ethanol. After centrifugation, 10 µl of 70% formic acid and the same amount of acetonitrile were added to the biomass. The samples were centrifuged again, then 1 µl of each sample was applied to a metal plate and allowed to dry at room temperature, after drying 1 µl of matrix was applied, the plate thus prepared was placed in the MALDI TOF MS Biotyper analyser.

RESULTS AND DISCUSSION

H12 (+++) (A)	K	Kocuria salsicia	2.21	Kocuria salsicia	1.73
H10 (+) (B)	K 6	Pseudomonas taetrolens	1.97	Pseudomonas lundensis	1.90
A1 (+++) (C)	K 6	Pseudomonas fragi	2.21	Pseudomonas taetrolens	1.85
A10 (+++) (C)	K6	Serratia liquefaciens	2.11	Serratia liquefaciens	2.07
B7 (+++) (C)	K1	Pseudomonas fragi	2.10	Pseudomonas taetrolens	1.83
C7 (+) (C)	K1	Serratia liquefaciens	1.94	Serratia liquefaciens	1.88
D1 (+++) (A)	K1	Serratia liquefaciens	2.39	Serratia liquefaciens	2.35
E4 (+++) (C)	K1	Enterobacter cloacae	2.00	Enterobacter cloacae	1.90
G4 (+) (C)	K1	Acinetobacter lwoffii	1.82	Serratia liquefaciens	1.78
G5 (+++) (A)	K 0	Hafnia alvei	2.42	Hafnia alvei	2.40
H12 (+) (B)	K 3	Kocuria salsicia	1.70	Identyfikacja organizmu jest niemożliwa	1.66
A5 (+) (B)	K1	Serratia liquefaciens	1.82	Serratia liquefaciens	1.75
A7 (+) (B)	K 0	Pseudomonas lundensis	1.86	Pseudomonas taetrolens	1.85

B5 (+++) (A)	OT 1	Pseudomonas fragi	2.12	Pseudomonas taetrolens	1.98
C3 (+) (B)	OT 9	Pseudomonas fragi	1.95	Pseudomonas taetrolens	1.80
C6 (+) (B)	OT 1	Pseudomonas fragi	1.97	Pseudomonas taetrolens	1.92
C11 (+) (B)	OT 1	Pseudomonas fragi	1.99	Pseudomonas taetrolens	1.90
D1 (+++) (A)	OT 1	Serratia liquefaciens	2.20	Serratia liquefaciens	2.19
D9 (+++) (A)	OT 6	Serratia liquefaciens	2.11	Serratia liquefaciens	2.11
F2 (+) (B)	OT9	Pseudomonas lundensis	1.98	Pseudomonas taetrolens	1.96
B1 (+++) (B)	OT6	Pseudomonas fragi	2.12	Pseudomonas lundensis	2.01
B4 (+++) (A)	OT 1	Hafnia alvei	2.24	Hafnia alvei	2.23
B11 (+++) (A)	OT 6	Serratia liquefaciens	2.08	Serratia liquefaciens	2.07
C4 (+) (B)	OT 1	Pseudomonas fulva	1.94	Pseudomonas fulva	1.81
C4 (+) (B)	OT 1	Pseudomonas fulva	1.94	Pseudomonas fulva	1.81
F3 (+) (B)	OT 6	Kocuria salsicia	1.88	Identyfikacja organizmu jest niemożliwa	1.69
G2 (+++) (B)	OT 3	Pseudomonas fragi	2.14	Pseudomonas lundensis	2.02
G9 (+++) (C)	OT 6	Micrococcus luteus	2.25	Micrococcus luteus	2.18
H3 (+++) (C)	OT 6	Enterobacter cloacae	2.11	Enterobacter cloacae	2.01
H6 (+) (B)	OT 12	Kocuria salsicia	1.86	Kocuria salsicia	1.84

Testing using a MALDI TOF MS Biotyper mass spectrometer revealed the presence of a broad spectrum of bacteria in model pork meat stuffings stored for 12 days under refrigeration. Bacteria isolated from the samples were *Hafnia alvei, Kocuria salsicia, Micrococcus luteus, Enterobacter cloacae, Enterobacter hormaechei, Pseudomonas lundensis, Pseudomonas fragi, Pseudomonas fulva, Pseudomonas synxantha, Pseudomonas fluorescens, Serratia fonticola, Serratia liquefaciens, Serratia proteamaculans, Serratia grimesii, and Klebsiella oxytoca*.

A2 (+++) (A)	OO 3	Serratia liquefaciens	2.03	Serratia liquefaciens	2.02
A6 (+++) (B)	OO 12	Pseudomonas synxantha	2.13	Pseudomonas fluorescens	2.08
A7 (+++) (A)	OO 12	Serratia liquefaciens	2.36	Serratia liquefaciens	2.27
A10 (+++) (A)	OO 12	Serratia liquefaciens	2.22	Serratia liquefaciens	2.21
B1 (+++) (A)	OO 12	Hafnia alvei	2.42	Hafnia alvei	2.38
B3 (+++) (A)	OO 12	Hafnia alvei	2.43	Hafnia alvei	2.33
B9 (+++) (A)	OO 3	Serratia liquefaciens	2.39	Serratia liquefaciens	2.32
C7 (+++) (A)	OO 3	Serratia fonticola	2.13	Serratia fonticola	2.06
C8 (+++) (A)	OO 3	Serratia liquefaciens	2.23	Serratia liquefaciens	2.17
C9 (+++) (A)	OO 3	Serratia liquefaciens	2.04	Serratia liquefaciens	1.93
C10 (+++) (A)	OO 12	Pseudomonas fragi	2.08	Pseudomonas taetrolens	1.89
D2 (+++) (A)	OO 3	Serratia fonticola	2.09	Serratia fonticola	2.04
C1 (+++) (A)	OO 3	Serratia liquefaciens	2.31	Serratia liquefaciens	2.19
D3 (+++) (A)	OO 12	Hafnia alvei	2.39	Hafnia alvei	2.32
D7 (+) (B)	OO 6	Serratia liquefaciens	1.93	Serratia liquefaciens	1.92
D11 (+++) (A)	OO 9	Serratia liquefaciens	2.39	Serratia liquefaciens	2.32
E5 (+) (C)	OO 9	Pseudomonas fulva	1.91	Serratia liquefaciens	1.89
F12 (+++) (C)	OO 9	Enterobacter cloacae	2.22	Enterobacter hormaechei	2.17
H2 (+++) (A)	OO 9	Klebsiella oxytoca	2.06	Klebsiella oxytoca	1.93
A2 (+++) (A)	OO 9	Serratia liquefaciens	2.30	Serratia liquefaciens	2.22

A5 (+++) (A)	OR 3	Micrococcus luteus	2.23	Micrococcus luteus	2.15
B7 (+++) (A)	OR 9	Serratia liquefaciens	2.28	Serratia liquefaciens	2.23
B10 (+++) (A)	OR 9	Pseudomonas fragi	2.05	Pseudomonas lundensis	1.78
F5 (+) (C)	OR 9	Micrococcus luteus	1.95	Serratia liquefaciens	1.91
F9 (+++) (A)	OR 9	Hafnia alvei	2.47	Hafnia alvei	2.45
G1 (+++) (A)	OR 4	Serratia liquefaciens	2.11	Serratia liquefaciens	2.01
H2 (+++) (A)	OR 9	Pseudomonas fragi	2.07	Pseudomonas taetrolens	1.70
H6 (+++) (C)	OR 9	Hafnia alvei	2.50	Hafnia alvei	2.47
A9 (+++) (A)	OR 6	Pseudomonas fragi	2.13	Pseudomonas taetrolens	1.83
B2 (+++) (A)	OR 6	Serratia liquefaciens	2.03	Serratia liquefaciens	1.97
E8 (+++) (B)	OR 12	Pseudomonas synxantha	2.06	Pseudomonas fluorescens	2.06
E11 (+++) (A)	OR 12	Pseudomonas fragi	2.07	Pseudomonas taetrolens	1.94
G10 (+++) (B)	OR 12	Pseudomonas fragi	2.12	Pseudomonas lundensis	2.09
H1 (+++) (A)	OR 12	Pseudomonas taetrolens	2.01	Pseudomonas lundensis	1.99
H11 (+++) (A)	OR 3	Enterococcus faecalis	2.27	Enterococcus faecalis	2.23
A1 (+++) (A)	OR 6	Pseudomonas fragi	2.13	Pseudomonas taetrolens	1.89

D8 (+) (B)	OSZ 3	Pseudomonas fulva	1.91	Pseudomonas fulva	1.82
E1 (+++) (A)	OSZ 6	Pseudomonas libanensis	2.04	Pseudomonas synxantha	1.90
E3 (+) (B)	OSZ 6	Hafnia alvei	1.85	Hafnia alvei	1.71
G2 (+++) (A)	OSZ 3	Pseudomonas fragi	2.02	Pseudomonas taetrolens	1.70
B8 (+++) (C)	OSZ 1	Serratia grimesii	2.05	Serratia proteamaculans	2.01
C8 (+++) (C)	OSZ 1	Enterobacter cloacae	2.05	Enterobacter hormaechei	1.94
C12 (+++) (B)	OSZ 6	Pseudomonas fragi	2.19	Pseudomonas taetrolens	2.07
D8 (+) (B)	OSZ 6	Serratia liquefaciens	1.72	Serratia grimesii	1.71
E7 (+) (B)	OSZ 1	Serratia liquefaciens	1.90	Serratia liquefaciens	1.89
E12 (+) (C)	OSZ 3	Hafnia alvei	1.87	Serratia liquefaciens	1.82
F1 (+) (B)	OSZ 6	Serratia liquefaciens	1.88	Serratia liquefaciens	1.84
F9 (+) (B)	OSZ 3	Acinetobacter lwoffii	1.86	Acinetobacter lwoffii	1.86

CONCLUSIONS

Identification of bacteria using the MALDI TOF MS Biotyper method identified the presence of 15 bacterial species in the material studied, mainly of the genus *Pseudomonas*. These are widely distributed in nature. They occur naturally in soil, water, sewage and air and are involved in food spoilage processes.The second most abundant group were bacteria of the genus *Serratia*. The remaining bacteria belong mainly to the *Enterobacteriacea* family, which can occur in food as pathogens. The MALDI TOF MS Biotyper technique allows rapid identification of pathogenic microorganisms, which is important in identifying and preventing the spread of food contamination.

Acknowledgements

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INVESTIGATION OF THE PHYSICOCHEMICAL, TEXTURAL AND ANTIOXIDANT PROPERTIES OF CREAM CHEESE WITH ALGINATE-ENCAPSULATED PLANT EXTRACTS

Liliana Popescu, Maria-Loredana Soran, Ildiko Lung, Aliona Ghendov-Mosanu, Rodica Sturza

INTRODUCTION

Phenolic extracts from aromatic plants have attracted the attention of the scientific community regarding their safety as natural ingredients as well as their wide application in the food industry.
However, their use is still limited in food products because they can negatively affect the sensory and physicochemical characteristics of the products, they can interact with the components in food matrix. Moreover, the utility of bioactive compounds is, indispensably, related to their bioavailability.
Microencapsulation is considered an effective technology that ensures higher stability of bioactive compounds during the manufacture of cheeses.

MATERIALS

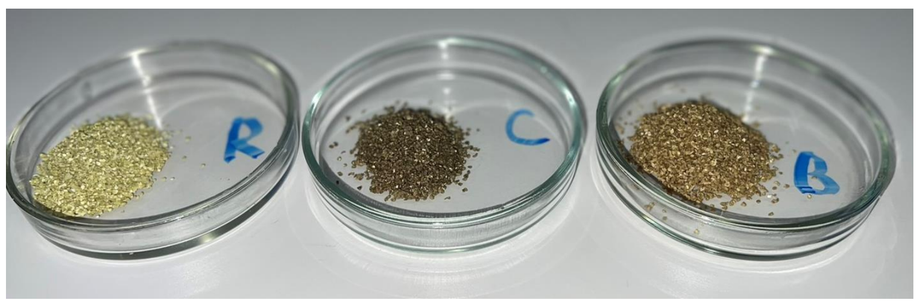
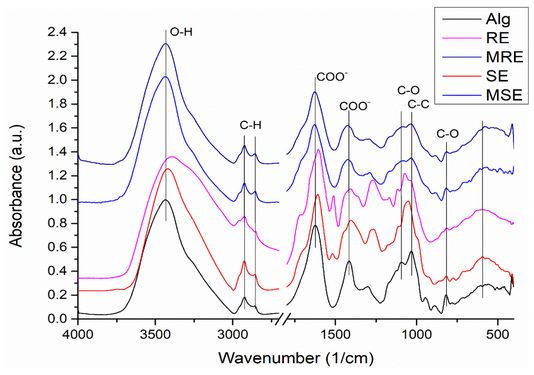


Figure 1. Alginate-encapsulated plant extracts used in the study

RESULTS AND DISCUSSION

Table 1. The content of total polyphenols and the antioxidant activity of plant extracts used for experiments

Indices	Quantity		
	Summer savory extract	Rosemary extract	Basil extract
Total Polyphenol Content (Folin–Ciocalteu), mg GAE/g DW	43.10±0.29	38.63±0.29	26.18±0.21
DPPH Antioxidant activity, mM TE /g DW	580.16±1.83	1216.46±2.42	644.75±21.37



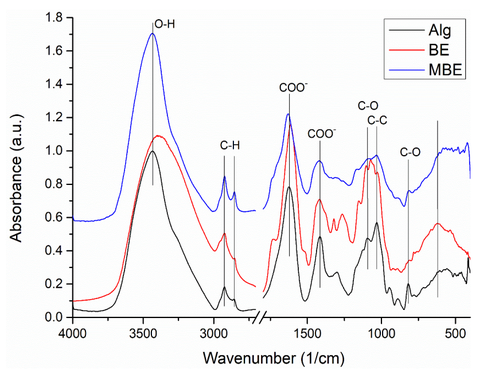


Figure 2. The FTIR spectra of sodium alginate (Alg), rosemary extract (RE), summer savory extract (SE), basil extract (BE) and microencapsulated rosemary extract (MRE), microencapsulated summer savory extract (MSE), microencapsulated basil extract (MBE), 4000-400 cm^{-1} spectral domain, 2700-1800 cm^{-1} splitted

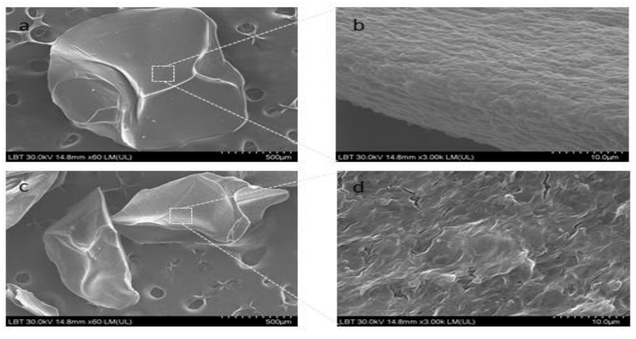


Figure 3. SEM micrographs of the microencapsulated plant extracts sample: a-b) MSE, c-d) MRE

Figure 4. Cream cheese fortified with microencapsulated basil extract

Table 6. Texture parameters evolution of cream cheese fortified with microencapsulated basil extract, during storage

Texture Parameters	Storage Time, day	Samples		
		CC	0.6%CCMBE	0.9%CCMBE
Hardness, g	1	1914.1±43.5 ^{b}	1913.5±28.6 ^{b}	1891.2±10.2 ^{b}
	7	2951.8±60.2 ^{e}	2476.1±25.4 ^{d}	2405.1±27.8 ^{c}
	14	4123.5±32.5 ^{h,i}	2637.3±32.5 ^{d}	2506.9±31.5 ^{d}
	21	4180.3±22 ^{i}	2962.4±31.6 ^{e}	2960.8±26.8 ^{e}
	28	2424.6±17.4 ^{c}	3280.9±18.8 ^{f}	3225.6±34.4 ^{f}
Cohesiveness, %	1	0.462±0.008 ^{h}	0.489±0.009 ^{i}	0.534±0.004 ^{j}
	7	0.214±0.005 ^{b,c}	0.315±0.007 ^{e}	0.390±0.004 ^{g}
	14	0.148±0.006 ^{a}	0.313±0.009 ^{e}	0.360±0.009 ^{f}
	21	0.199±0.007 ^{b}	0.245±0.006 ^{c}	0.282±0.006 ^{d}
	28	0.327±0.007 ^{e}	0.210±0.005 ^{b,c}	0.247±0.005 ^{c}
Adhesiveness, g·s	1	2252.0±26.7 ^{c,d}	2216.2±29.7 ^{c}	2134.5± 26.3 ^{c}
	7	3589.8±30.2 ^{h}	2914.6±32.3 ^{f}	2772.6± 34.7 ^{e}
	14	4833.9±5.2 ^{k}	3104.8±24.8 ^{f,g}	2821.7± 29.8 ^{e,f}
	21	4903.0±18.6 ^{k}	3606.3±27.5 ^{h}	3125.6±25.5 ^{f,g}
	28	1929.6±35.6 ^{b}	3916.5±31.7 ^{i}	3841.4± 31.3 ^{i}
Gumminess, %	1	884.3±6.7 ^{i}	897.8±9.7 ^{i}	935.7±10.9 ^{j}
	7	631.7±8.5 ^{a,b}	757.8±9.6 ^{e}	927.2± 9.6 ^{j}
	14	618.5±8.6 ^{a,b}	752.6±9.4 ^{e}	902.5±11.7 ^{i,j}
	21	611.9±9.2 ^{a}	725.8± 11.5 ^{d,e}	834.9±9.2 ^{g,h}
	28	792.8±10.1 ^{f}	717.1±10.1 ^{d}	819.3±10.3 ^{g}

CONCLUSIONS

- Microencapsulated plant extract was used to enriched cream cheese. In this study, the sensory, physicochemical and textural properties of cream cheese were evaluated during the storage period of 28 days at 4°C.
- It was determined that the addition of 0.6-0.9% microencapsulated rosemary extract in cream cheese inhibited the post-fermentation process, improved the degree of water retention and textural parameters of cream cheese, thus prolonging it's shelf life by 7 days compared to plain cream cheese.
- Microcapsules based on alginate ensured the stability of the bioactive compounds of the rosemary extract and led to the controlled release of the polyphenolic compounds from the cream cheese during the storage period.

Acknowledgements: The authors would like to thank the Project 20.80009.5107.09 ”Improvement of food quality and safety by biotechnology and food engineering”, conducted at Technical University of Moldova.

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Assessment of the fiber content of grape pomace-maize flour mixtures used to produce high-fiber snacks

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INTRODUCTION

Grape pomace is a valuable resource of bioactive compounds like antioxidant fibers that could enhance food nutritional profile.

The fiber content of maize-grape pomace mixtures was investigated to underline the possibility of using them in high-fiber snacks.

MATERIALS AND METHODS

Different grape pomace (whole and seedless pomace dehydrated in a convection oven or lyophilized) was added to maize flour in 10, 20, 30, and 40% doses.

The fiber content was determined by the enzymatic method, using a Megazyme kit.

RESULTS AND DISCUSSION

The results obtained (Figure 1) revealed that the enhancement of maize flour with grape pomace resulted in raised fiber content as the addition level was higher. The seedless grape pomace contains lowed dietary fibers compared to the whole grape pomace, thus the mixtures containing whole grape pomace were richer in fibers compared to the seedless-containing samples. The total dietary fiber content was different among the dehydration methods.

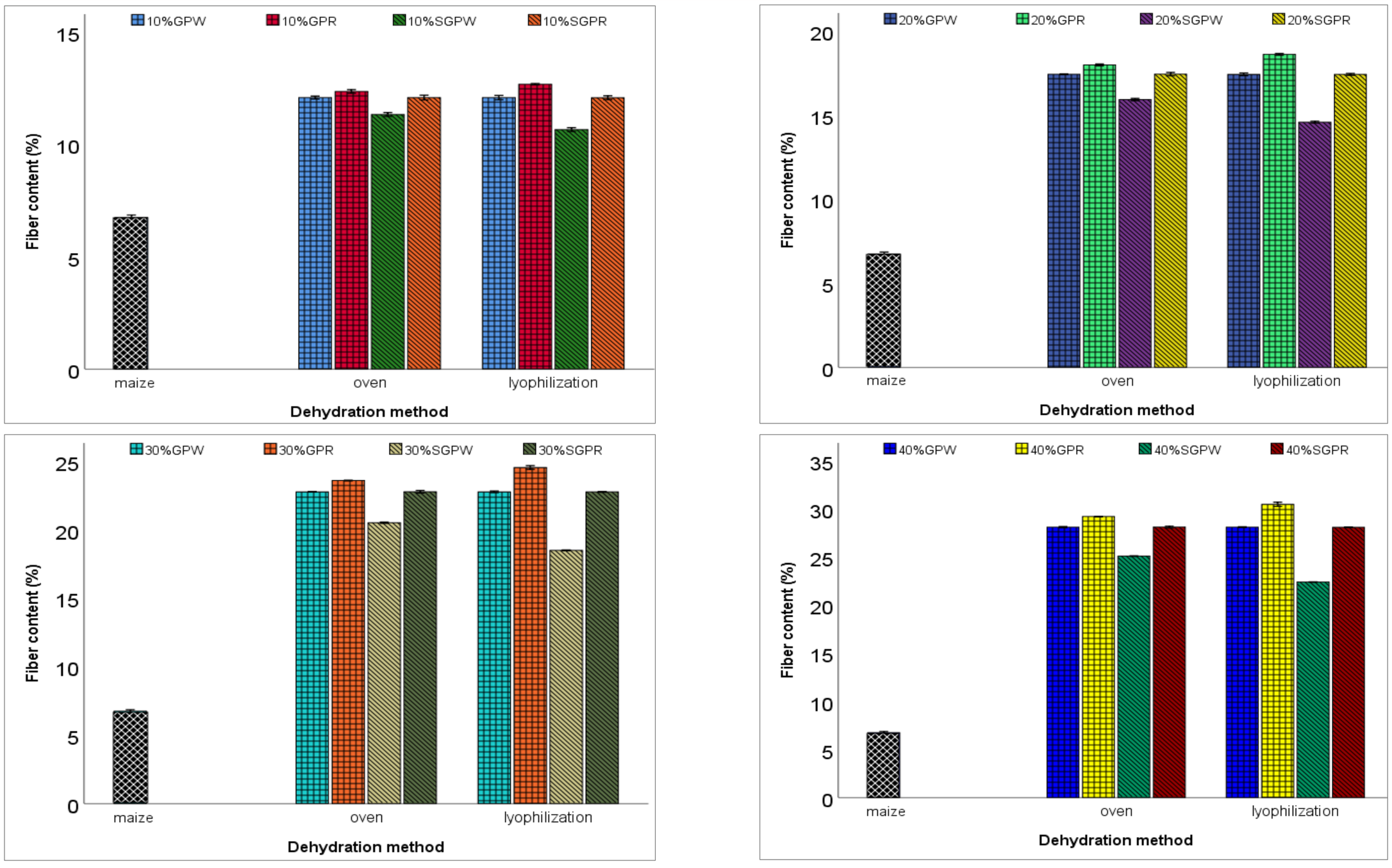

Figure 1. Fiber content of maize flour mixes with white (SGPW) and red (SGPR) seedless grape pomace and white (GPW) and red (GPR) whole grape pomace with different addition levels: a. 10%, b. 20%, c. 30%, d. 40%

CONCLUSIONS

This research could contribute to the selection of the grape pomace-maize mixture suitable to produce extruded snacks rich in fibers and at the same time with acceptable sensory characteristics.

Acknowledgement

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P4-PCE-2021-0718, within PNCDI III.

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EVALUATION OF THE BIOACTIVE COMPOUNDS AND THE ANTIOXIDANT CAPACITY OF GRAPE POMACE (BĂBEASCĂ NEAGRĂ VARIETY)

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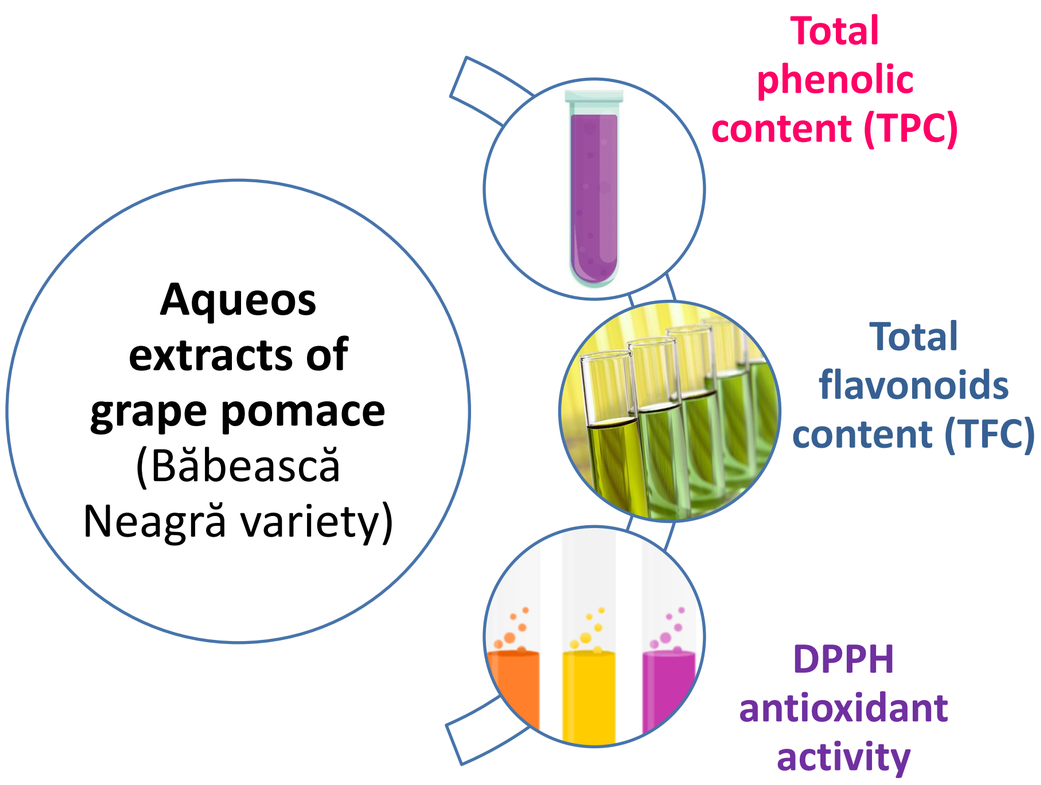
INTRODUCTION

Grape pomace is an agro-industrial residue that occurs all over the world and is primarily used as animal feed or fertilizer. Several studies have shown that grape pomace is a rich source of bioactive compounds such as *phenolic compounds*, *fatty acids*, *polysaccharides*, and others. During winemaking, only a small portion of the phytochemicals are transferred from the grapes to the wine, but a large amount remains in the pomace, a by-product consisting of pressed grape residue (**seeds**, **skins**, **stems**, etc.) remains.

MATERIALS AND METHODS



The aim of this study was to determine the content of bioactive compounds in terms of **TPC, TFC, and DPPH assay scavenging activity** of grape pomace (Băbească Neagră variety) with different granularities (<125 µm, ≥125 – <200 µm, and ≥200 – <300 µm).

RESULTS AND DISCUSSION

The total phenolic content (TPC), total flavonoids content (TFC), and DPPH antioxidant activity of grape pomace extracts with different granularities (<125 µm, ≥125 – <200 µm, and ≥200 – <300 µm) are presented in **Figure 1** and **Figure 2**. The highest values of TPC (146.52 mg GAE/g) and DPPH (67.1% inhibition) were obtained for grape pomace extract with granularity of <125 µm, while the highest value of TFC (21.4 mg QE/g) for grape pomace extract with granularity of ≥125 – <200 µm.

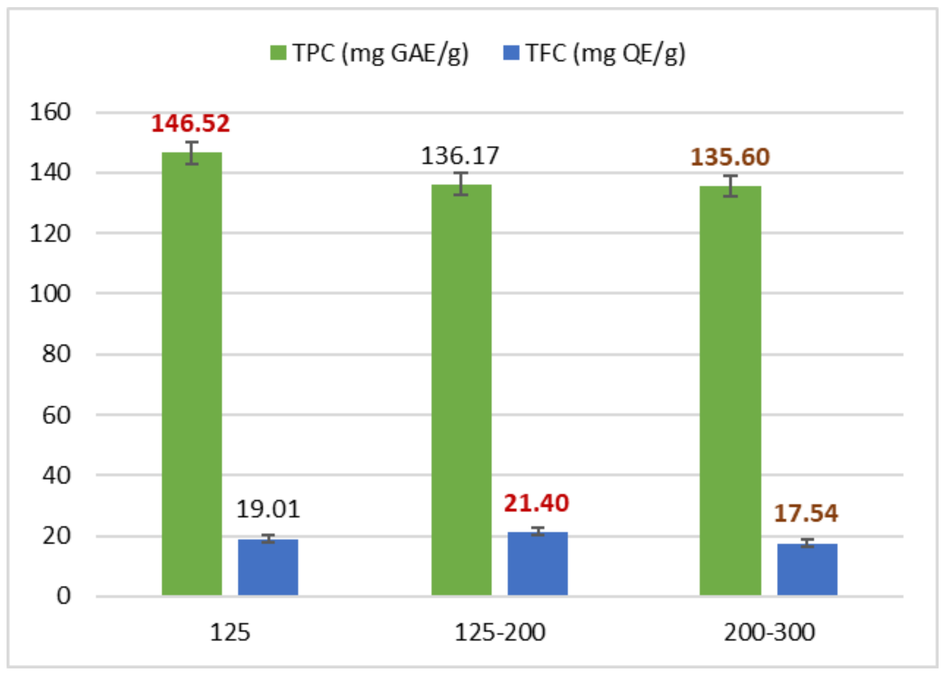


Fig. 1. TPC and **TFC** of grape pomace extracts with different granularities (<125 µm, ≥125 – <200 µm, and ≥200 – <300 µm)

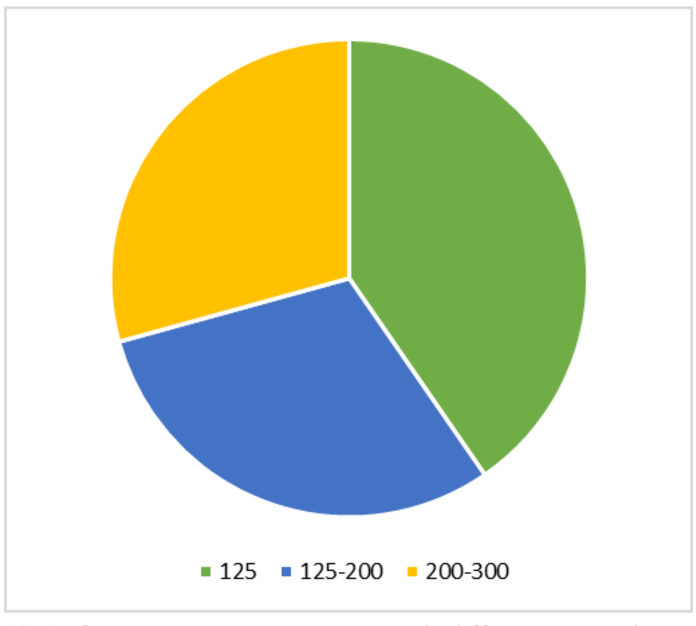


Fig. 2. DPPH of grape pomace extracts with different granularities (<125 µm, ≥125 – <200 µm, and ≥200 – <300 µm)

CONCLUSIONS: This work demonstrated that grape pomace from wine industry can be considered as a source for recovery of phenolic compounds as food ingredients and for human health. Moreover, Băbească Neagră pomace with <125 µm of granularity revealed high values of total phenolic compounds, total flavonoids and DPPH assay scavenging activity.

Acknowledgements: This work was funded by Ministry of Research, Innovation and Digitalization within Program 1 – Development of National Research and Development System, Subprogram 1.2 – Institutional Performance – RDI Excellence Funding Projects, under contract no. 10PFE/2021.

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ANTIOXIDANT ACTIVITY OF HOME-MADE ENERGY DRINKS BASED ON NATURAL INGREDIENTS

Rafał Sochacki, Maciej Kluz, Bożena Waszkiewicz – Robak, Marika Godzińska, Miroslava Kacaniova

INTRODUCTION

Drinks based on matcha and green tea are becoming more and more popular among consumers. Matcha has many positive properties, including:
-Great source of L-theanine to improve concentration,
-Filled with cancer fighting catechins,
-Natural detoxifier,
-Combats inflammation, oxidation and aging,
-60 Times more antioxidants than spinach.
It is also a fact that drinking green tea is associated with many benefits:
-High level od antioxidants,
-Metabolis booster,
-Energy levels enhancer,
-Improves mental function,
The aim of this work was to produce a home-made energy drinks based on green coffee or matcha extracts and to evaluate their antioxidant properties.

MATERIALS AND METHODS

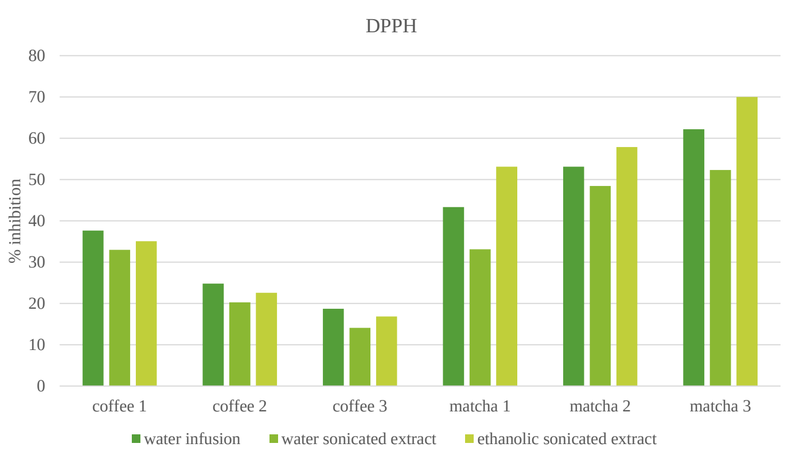
The research material contained **green coffee** (n=3) and **matcha tea** (n=3) obtained on the local market. For further analysis 2% w/v water infusions, as well as water and ethanolic extracts assisted by ultrasounds were subjected to analysis. Homemade energy drinks were prepared according to the recipes available on the internet. Following ingredients with the variable proportions were used:
✓selected green coffee or matcha infusion
✓honey (multifloral or rape)
✓taste ingredients: lemon or orange juice, mint leaves or spices (ginger, cinnamon, cardamom, turmeric).

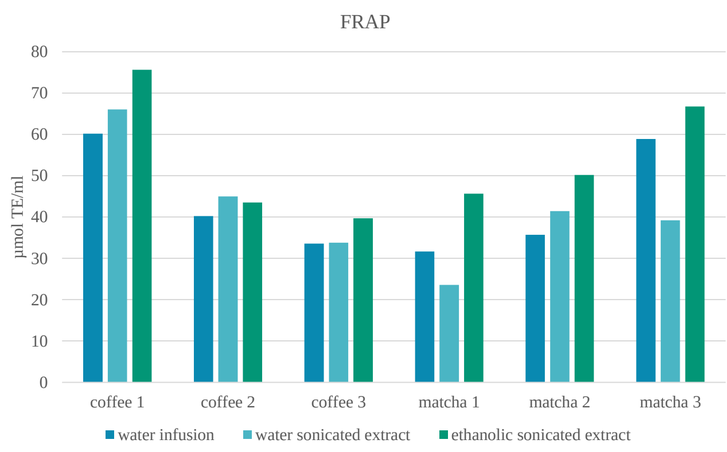
Methods:
- antioxidant activity (DPPH and FRAP tests)
- total phenolics content (TPC)
- caffeine, chlorogenic acid and Luteolin 7-Glukoside determined by thin layer chromatography (TLC)
- organoleptic assessment by 20 persons group using the 5-cm scale method

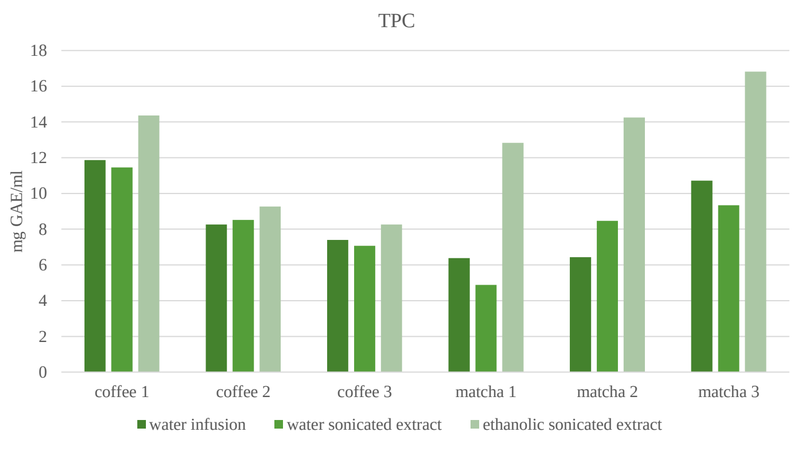
Symbol	Ingredients	
C1	47% of 2% (w/v) coffee extract, 47% water, 5% multifloral honey and 1 % of taste additive	ground ginger
C2		ground cinnamon
C3		ground cardamom
C4		lemon juice and mint leaves
C5		orange juice
C6		ground turmeric
M1	20 % (2% matcha ethanolic extract), 60% water, 10% rape honey,	10% lemon juice
M2	90 % (2% matcha water infusion), 10% rape honey,	
M3	20 % (2% matcha water infusion), 60% water, 10% rape honey,	10% lemon juice and mint leaves
M4	30 % (2% matcha water infusion), 70% water	

RESULTS AND DISCUSSION

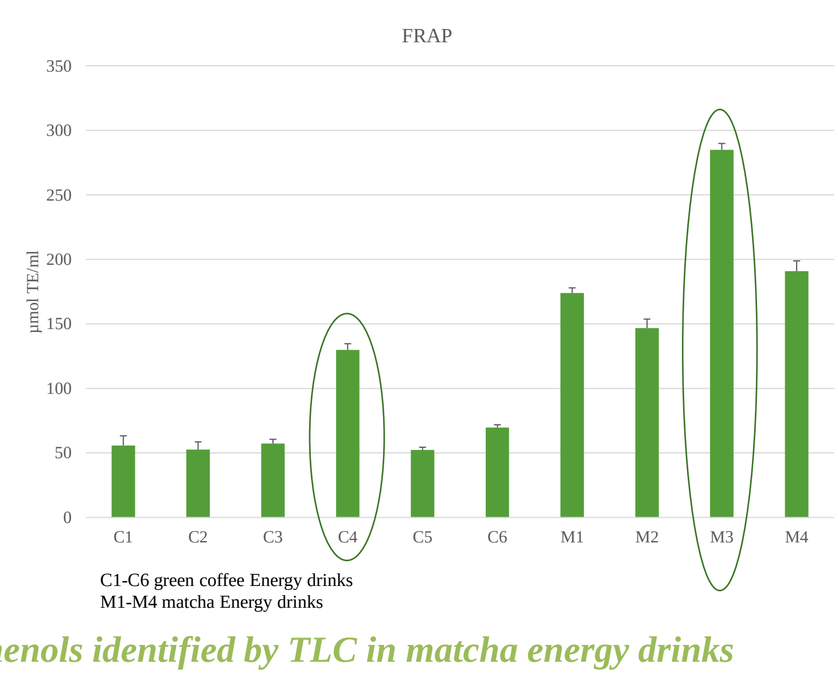
Antioxidant activity of green coffee and matcha extracts



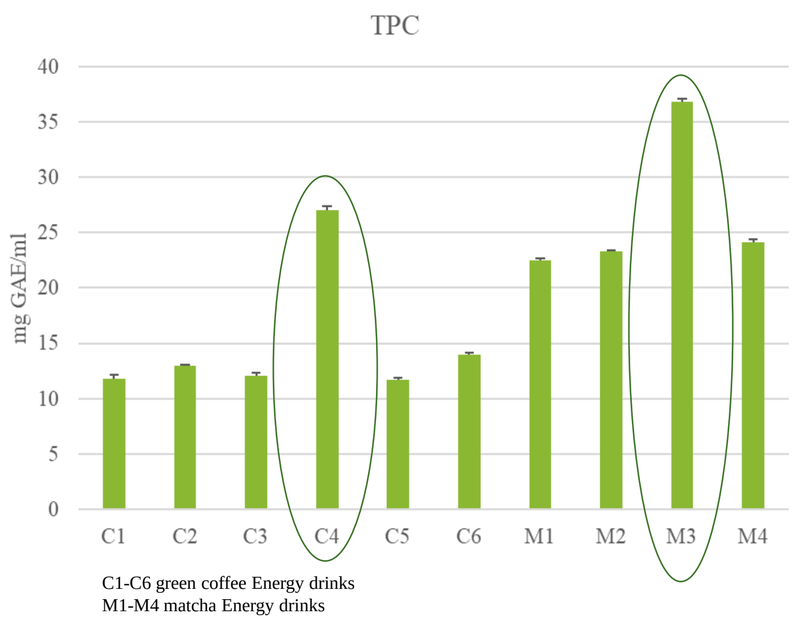




Antioxidant activity of green coffee and matcha energy drinks



C1-C6 green coffee Energy drinks
M1-M4 matcha Energy drinks



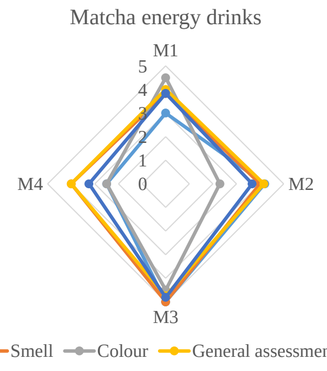
C1-C6 green coffee Energy drinks
M1-M4 matcha Energy drinks

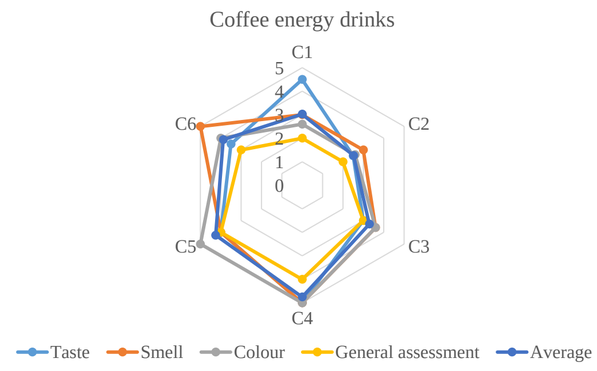
Literature data for commercial Energy drinks:
TPC (mg/ml) 0,3-1,9
FRAP (µmol/100ml) 0,18 – 21,73
Source: Witkowska i in., 2011

Polyphenols identified by TLC in matcha energy drinks

Sample/standard	Distance Y [mm]	Distance X [mm]	$R_f = \frac{x}{y}$	Identified compound
M1	147	54	0,37	Caffeine
M2	145	7 ; 61	0,05 0,42	Luteolin 7-Glukoside Caffeine
M3	145	6 ; 27 ; 62	0,04 0,19 0,43	Luteolin 7-Glukoside Chlorogenic acid Caffeine
M4	144	9 ; 28 ; 61	0,06 0,19 0,42	Luteolin 7-Glukoside Chlorogenic acid Caffeine
Caffeine	142	57	0,40	
Chlorogenic acid	143	6 ; 24	0,04; 0,16	
Luteolin	142	94	0,66	
Luteolin 7-Glucoside	142	7	0,05	

Organoleptic assessment





CONCLUSIONS

The antioxidant activity and the total content of polyphenols in the extracts of the tested green coffee and matcha samples differed between particular samples regardless of the applied extraction method. The results obtained for the antioxidant activity and phenolic compounds content tested for the home-made energy drinks were significantly higher as compared to the literature data obtained for popular, commercial energy drinks with the addition of synthetic substances. TLC analysis showed that caffeine was present in all energy drinks. In the organoleptic assessment, the best energy drinks turned out to be a drinks with the addition of lemon juice and mint. To sum up, it is possible to self-prepare energy drinks containing caffeine of natural origin based on matcha tea or green coffee water infusions while the addition of honey, herbs or fruit juices shapes their organoleptic qualities acceptable to consumers.

Acknowledgements

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Study regarding the effects of test conditions on the parameters of the Texture Profile Analysis

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INTRODUCTION

Texture Profile Analysis (TPA), a widely used method, represents a double compression test that quantifies various textural parameters in food, including *hardness*, *fracturability*, *springiness*, *cohesiveness*, *adhesiveness*, *chewiness*, and *gumminess*. Its significance in the food industry lies in its ability to provide essential information about product quality, assist in developing new products with specific textural characteristics, maintain the desired textural properties of existing products, and confer a competitive advantage to food companies through its application.

METHODS

Databases:
ScienceDirect, Google Scholar, Wiley, PubMed.

Key words:
Effects of test conditions, compression rate, and compression speed, on parameters of texture profile analysis

Analysis:
After reading the full text of the selected articles, the pieces of information were briefly synthesized.

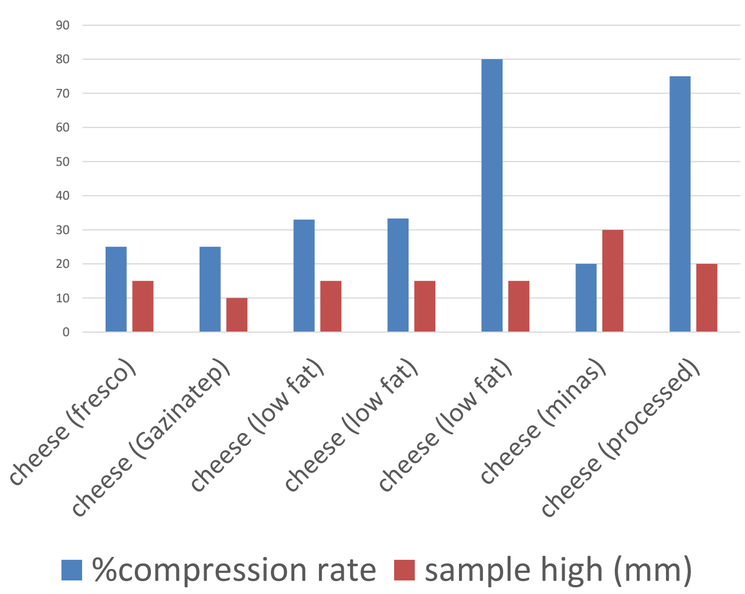

Fig. 1 The variations identified in the specialized literature concerning the compression rate and sample height in the assessment of cheese texture..

FINDINGS

Studies show that the effects of test conditions on the TPA parameters can vary from one product to another, depending on its *physical properties*, *chemical composition*, and *processing methods*. However, testing a product with different dimensions and geometries at different compression speeds or test rates also leads to different results, some of them as previously stated in **Table 1**.
While currently, TPA involves the measurement of texture using various sample sizes, certain studies have proposed the adoption of uniform sample sizes with cylindrical geometry. This suggestion aims to enhance the reproducibility and comparability of results across different studies..

Table 1. Effects of compression rate and compression speed on parameters of TPA

Test condition	Food product	TPA parameter	Effect on TPA parameter	Direction of influence	Magnitude of effect	Study reference
Compression rate	*Sausages*	*Hardness*	Increase	+	High	[Shin S.-A., Choi S.-W., 2020]
		Adhesiveness	Increase	+	Moderate	
		Springiness	Increase	+	Low	
		Cohesiveness	Increase	+	Moderate	
		Chewiness	Increase	+	High	
	Potato and apple tissues	*Hardness*	No significant change	0	-	[Alvarez M. A. et. al. 2002]
		Springiness	Increase	+	Moderate	
		Cohesiveness	Increase	+	High	
		Chewiness	Increase	+	High	
	Tofu	*Hardness*	Increase	+	High	[Kai R. et. al., 2019]
		Chewiness	Increase	+	High	
		Gumminess	Increase	+	High	
	Sausages	*Hardness*	Increase	+	High	[Shin S.-A., Choi S.-W., 2020]
		Adhesiveness	Increase	+	Moderate	
		Springiness	Increase	+	Low	
		Cohesiveness	Increase	+	Moderate	
		Chewiness	Increase	+	High	
Test speed	Frozen dough	*Hardness*	Variable effects	Variable	High	[Dou X. et. al., 2023]
		Springiness	Decrease	-	Moderate	
		Cohesiveness	Increase	+	High	
		Chewiness	Increase	+	High	
	Fish fillets	*Hardness*	Increase	+	High	[Bernado Y. A. et. al, 2021]
		Springiness	Increase	+	Moderate	
		Cohesiveness	Increase	+	High	

The effects of sample dimensions on Texture TPA parameters are multifaceted. Larger samples distribute applied force differently than smaller ones, as the force exerted during compression interacts with the entire volume, leading to variations in material response. The size and shape of the sample influence its deformation behavior under compression, with larger samples exhibiting distinct behaviors compared to smaller ones, impacting perceived texture attributes. Standardizing sample dimensions is crucial for ensuring reproducibility and comparability of TPA results across studies and laboratories. The impact of sample dimensions varies with material type, and different materials may respond differently to changes in size. The choice of sample dimensions should align with the study's specific objectives, tailoring them to simulate real-world consumer experiences when applicable.

CONCLUSIONS

This study has delved into the intricate relationship between test conditions and the parameters of Texture Profile Analysis (TPA). Through a comprehensive review of literature, it has been explored the diverse impacts of factors such as compression rate, , sample size, and geometry on key TPA parameters. The findings underscore the sensitivity of TPA outcomes to variations in test conditions, highlighting the need for standardization and meticulous control in experimental setups.

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The effect of Silver ions on the optical properties of colloidal solutions of Nanoparticles CdS

Olena Krupko

INTRODUCTION

The creation of core-shell heteronanostructures expands the possibilities of using semiconductor nanocrystals as new effective catalysts, as well as for the production of flat displays, diodes, and sensors. CdS NPs stabilized by L-cysteine are also widely used in analytical chemistry (in particular, as sensors of d-element cations – Zn^{2+}, Ag^{+}, Cu^{2+}, Co^{2+}, Ni^{2+}, Hg^{2+} and s-elements Ca^{2+}, Mg^{2+}), as photocatalysts as active elements of light-emitting diodes.

The alloying effect of ions of d-elements is revealed when introduced into the reaction mixture at different stages of synthesis and in different reaction media. In scientific works, it is shown that with a small content of impurity in the Ag/CdS/L-Cys structure, the PL intensity increases; exceeding a certain critical concentration of Argentum in the reaction mixture causes photoluminescence quenching. Another way to obtain double sulfides is to replace metal cations in a nanosized sulfide of another metal. The authors substantiate the possibility of such a synthesis by the values of the solubility product of the original sulfide and the one obtained by ion substitution.

MATERIALS AND METHODS

The synthesis of CdS/Me^{n+}(Ag^{+}) heterostructures was carried out according to two schemes:
-Ion exchange: CdS/L-Cys + xMe → $(Cd_{(1-x)}Me_xS)$/(L-Cys) + xCd^{2+}
-Co-deposition: $(xMe+yCd^{2+})$/L-Cys+$(x+y)S^{2-}$→$(CdS)_y(MeS)_x$/(L-Cys).
Synthesis according to both schemes was carried out using high-quality starting reagents, namely: 0.5 M solution of $CdCl_2 \cdot 2.5H_2O$ of the "high grade" grade, 0.05 M solution of "high grade" L-Cysteine; 0.5 M solution of $Na_2S \cdot 9H_2O$ (99% purity Aldrich), 0.1 M solution of NaOH, $1 \cdot 10^{-3}$ M solution of $AgNO_3$, $1 \cdot 10^{-3}$ M solution of $Cu(NO_3)_2$ $1 \cdot 10^{-3}$ M solution of $Mn(NO_3)_2$ "x.x.".
In the experiments, colloidal solutions of CdS/L-Cys NPs were used with a fixed ratio of all precursors, namely $[Cd^{2+}]$:[L-Cys]:$[S^{2-}]$= 1.1 : 2.2 : 1. After merging the initial solutions of $CdCl_2$ reagents and L-cysteine, the pH of the solution was adjusted to 7. The ratio between the content of Cd^{2+}/Men^{+} ions was 400:1, 80:1 and 40:1. The total volume of the studied systems was adjusted to 100 ml.
The optical properties of the solutions were studied at a temperature of 298±5 K using MDR-4 and USB-650 spectrophotometers (Ocean Optics). The optical density of the solutions was measured in the range of 0.01–2 with increasing wavelength in the range of 350–1000 nm.
Photoluminescence (PL) was measured on a Perkin-Elmer LS55 luminescence spectrometer. All investigated solutions were excited by light with a wavelength of λ = 360 nm. The quantum yield of photoluminescence was evaluated using a standard solution of anthracene as a luminescence standard (the quantum yield of which

RESULTS AND DISCUSSION

To study the influence of impurity ions of d-elements on the spectral characteristics of NPs, a solution of CdS/L-Cys NPs synthesized with a slightly higher concentration of Cadmium ions than S2- ions (25.6% Cd^{2+} : 23.2% S^{2-} or 1.1 : 1) and 51.2% L-Cys. This ratio was chosen due to the high quantum yield of the original solution (15%).

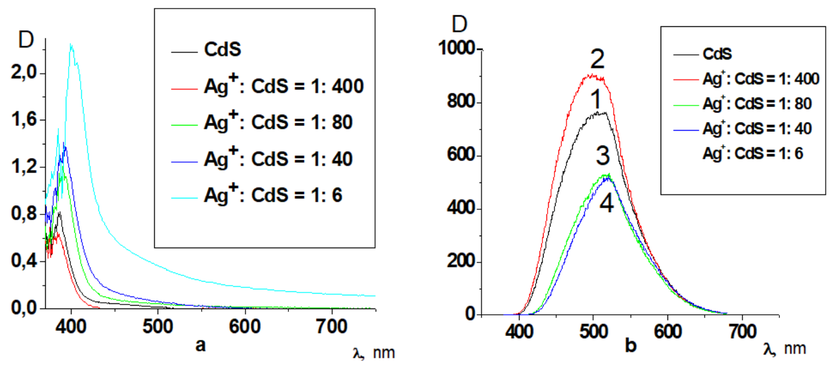

Fig. 1. Absorption (a) and luminescence (b) spectra for solutions obtained according to scheme 1 with different concentrations of Ag^{+} ions.

In fig. 1 shows the absorption (a) and luminescence (b) spectra of the initial solution of CdS NPs and a series of solutions with different concentrations of silver ions obtained according to scheme (1). The peak of the absorption spectrum of the original solution (375 nm) shifts to the long-wavelength region in proportion to the amount of the introduced impurity, while the spectral curve noticeably broadens. Since in the studied interval $[Ag^{+}]$, with an increase in the impurity content, there are no reflexes characteristic of Ag_2S NPs in the region of 520 nm, the broadening of the spectrum should be associated with the localization of Argentum on the surface of CdS/L-Cys NPs.
If the concentration of Ag^{+} ions ($1 \cdot 10^{-5}$ mol/l), which is minimal for the conducted studies, enhances photoluminescence, then its further increase leads to an increase in the Stokes shift and leads to PL quenching. This trend indicates an increase in the defectivity of nanocrystals.
Taking into account the values of the solubility products of Argentum sulfides (according to various sources $K_S Ag_2S$ = $8 \cdot 10^{-51} \div 1 \cdot 10^{-49}$) and Cadmium CdS ($K_S CdS = 1 \cdot 10^{-26} \div 1 \cdot 10^{-27}$), it can be expected that when adding CdS ions to NPs Argentum should undergo ionic substitution of cadmium with argentum with the formation of a more stable sulfide, since the solubility product of Ag_2S is much smaller than that of CdS. However, the appearance of both types of spectra (Fig. 1) does not change, new peaks do not appear, therefore the nucleus of the original particles does not change its composition.

The results of a series of experiments on the coprecipitation of both cations by sulfide ions are illustrated in fig. 2. From the spectra of optical absorption (Fig. 2, a.), it follows that the addition of Ag^{+} ions with a concentration of more than $1 \cdot 10^{-5}$ mol/l shifts the absorption edge to the long-wavelength region. Since the content of Cadmium ions is significantly higher compared to the content of Ag^{+}, both spectral curves reflect the formation of CdS/L-Cys NPs without evidence of Ag_2S formation.

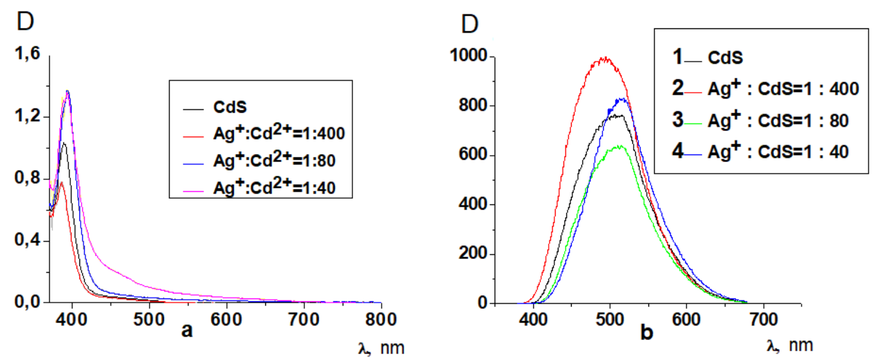

Fig. 2. Spectra of optical absorption (a) and luminescence (b) in the $(Ag^{+}+Cd^{2+})S^{2-}$–L-Cys system.

The increase in the concentration of the formed particles and their size is confirmed by TEM images of NPs from the studied systems (Fig. 3). To study the structure of CdS NPs by TEM, a drop of the analyzed solution was applied to a graphite substrate and dried under vacuum for 12 hours. Transmission electron microscopes CM-12, EM-420, Tecnai F30, manufactured by FEI, were used for electron microscopy. The resolution of the method reached 0.5 - 0.3 nm depending on the magnification. The image was recorded with a CCD camera.

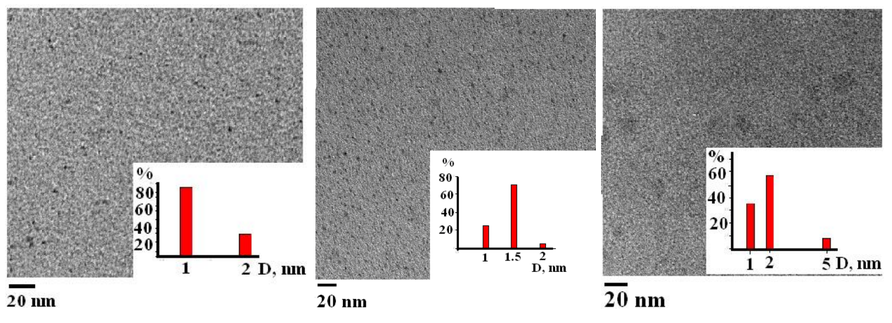

Fig. 3. TEM image of NPs from solutions obtained according to scheme 2: a) CdS, b) $[Cd^{2+}]/[Ag^{+}]$=80/1, c) $[Cd^{2+}]/[Ag^{+}]$=40/1; in the inset is a histogram of the distribution by size of NPs.

CONCLUSIONS

The effect of Ag^{+} ions on the optical properties of the CdS semiconductor was investigated. It was found that the introduction of Ag^{+} ions into a solution with nanosized CdS causes an increase in the luminescence quantum yield compared to the original solution of CdS NPs. The improvement of the luminescence output is caused by the fact that the introduction of impurity ions with a +1 charge contributes to the formation of hybrid structures that participate in energy conversion in the excited state of the system. Absorption spectra are characterized by a shift of the absorption edge to the long-wavelength region. The absorption edge is not clear, which corresponds to the defectiveness of the obtained systems. In all cases, the introduction of Ag+ impurities causes an increase in the number of formula units included in the composition of the agglomerate.
On the basis of optical studies of CdS/L-Cys/Me (Me=Ag+) systems, it is possible to draw a conclusion about the use of the obtained CdS/L-Cys colloidal solutions in analytical chemistry as sensors for Ag+ ions.

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Protein oleogels: production and effect on rheological and reofermentographic properties in bun dough

Sorina Ropciuc, Georgiana Gabriela Codina, Mircea Oroian, Ana Leahu, Ancuta Elena Prisacaru, Florina Dranca

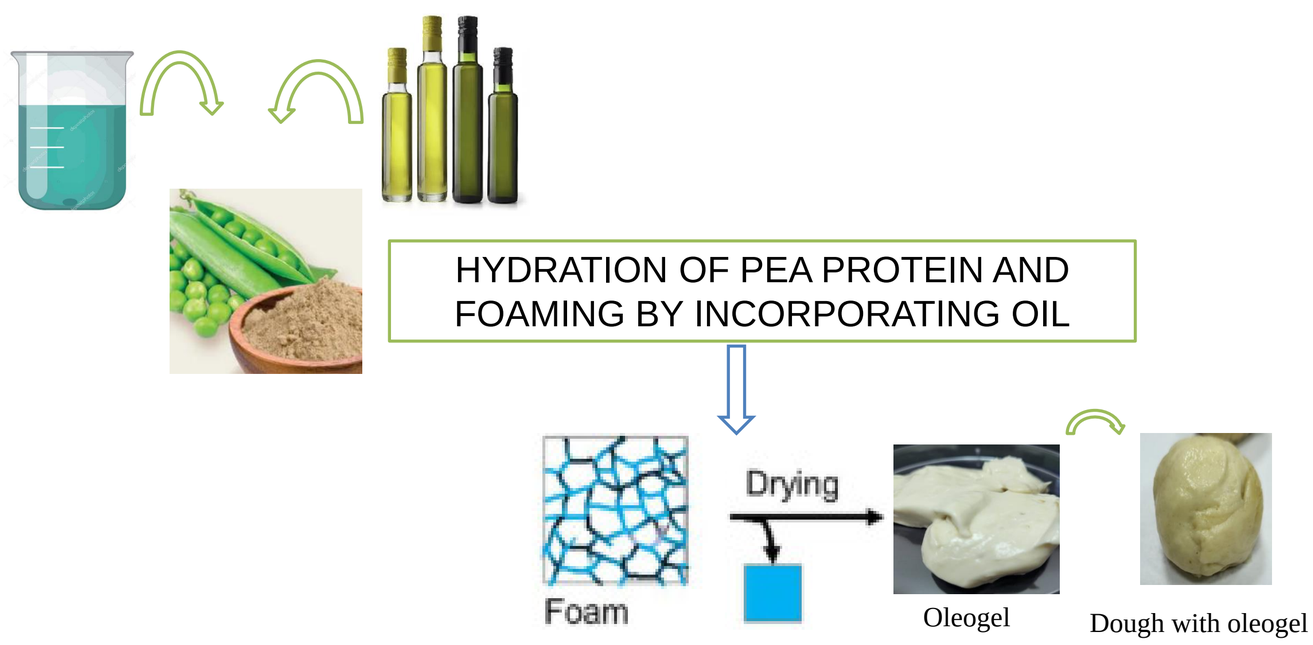
INTRODUCTION

In recent years, the search for alternative routes to structure oil has gained increasing interest. Structured oils are referred to as oleogels, in which the continuous lipid phase is an edible oil, and the structuring agent forms a three-dimensional network. Such oleogels are used as a substitute for solid fats, which contain high amounts of saturated and trans fatty acids. As the intake of trans fatty acids and often also saturated fatty acids has been associated with health-related concerns, the Food and Agriculture Organization (FAO) recommends to decrease the consumption of saturated fatty acids. Using locally grown and more diverse plant-based liquid oils, as for example sunflower oil, would provide a potential solution. Using oils is thus beneficial from a health point of view as well as a sustainability point of view.

The aim of this study was to obtain protein oleogels using pea powder. Protein oleogels were obtained in which grape seed oil, olive oil and sunflower oil were incorporated. The oleogels were introduced in a percentage of 3-5% in the fermented dough to obtain the buns. The rheological and reofermentometric properties of the obtained doughs were analyzed.

MATERIALS AND METHODS

OBTAINING PROTEIN OLEOGELS



DOUGH RHEOLOGICAL PROPERTIES WITH HAAKE MARS RHEOMETER

DOUGH RHEOLOGICAL PROPERTIES DURINFERMENTATION RHEOFERMENTOMETER

RESULTS AND DISCUSSION

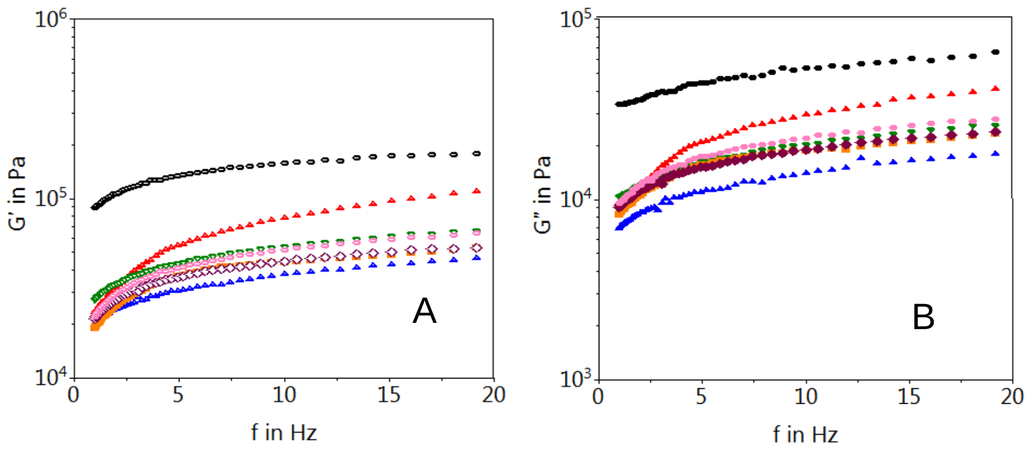


Figure 1. Graph A, B represents the viscoelastic modulus of the samples at the shear rate 0-20Hz.

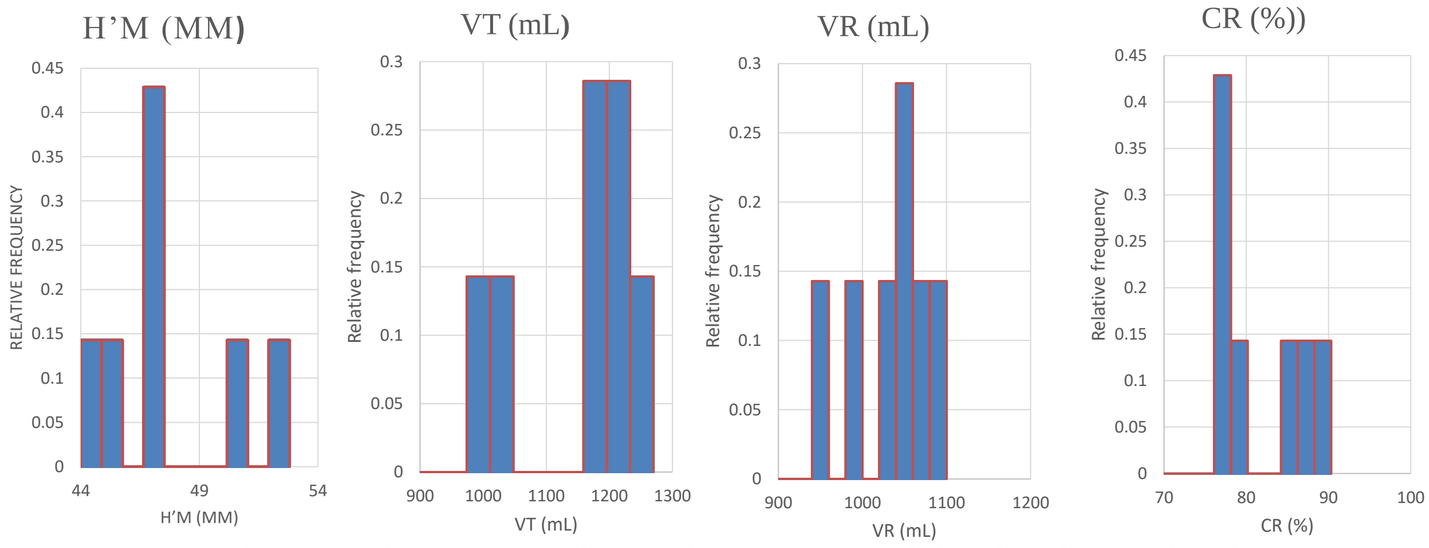


Figure 2. Rheological properties during fermentation of the dough samples from wheat flour with 3-5% oleogel addition of different types based on protein oleogels

CONCLUSIONS

The research carried out on protein oleogelation and the future applications of protein oleogels in food products seem to be a promising perspective. Protein oleogels have been successfully produced using different types of vegetable oils. This can be effective in reducing saturated fatty acids in foods and increasing unsaturated ones (especially essential ones) with more health benefits for human consumption. The use of protein oleogels in the dough recipe contributed to the improvement of the rheological properties of the dough during fermentation, which recommends their use in bread making. Our results provided the potential use of pea protein as a successful gelling agent for the preparation of oleogels and established a basis for the selection of a vegetable oil-based phase for the production of bun dough.

Acknowledgements

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Preventive measures for monitoring and water management in SUCEAVA municipality

Buculei Amelia, Albu Eufrozina, Leahu Ana, Ghinea Cristina

INTRODUCTION

Resource efficiency is an important aspect in the efforts to support and evolve economic development, while maintaining all natural systems unaffected. However, resource efficiency cannot guarantee the perpetual use of existing water resources. Water resource efficiency policy must be based on an awareness of the number of resources that can be used, but also the impact of activities on the environment and how it is affected. Options for water sources used for drinking water and irrigation will continue to evolve, with a growing dependence on groundwater and alternative sources, including wastewater. This study aims to monitor the quality of water distributed to consumers from Suceava county.

MATERIALS AND METHODS

The physico-chemical and microbiological analysis of the drinking water in the city was carried out in several strategic points, covering the entire distribution network. Samples were taken both from the catchment wells area and from the storage tanks for drinking water and were analyzed. Physico-chemical parameters (pH, turbidity, conductivity, oxidation, etc., free residual chlorine, nitrates, nitrites and ammonium, hardness, and in the case of the water station was also performed iron analysis) and microbiological (total number of aerobic mesophilic germs and number of coliform bacteria). The analysis points were chosen according to the way of distribution of water in the city, taking into account its route (7 different points).

RESULTS AND DISCUSSION

In figures 1-4 are presented the values obtained for the analyzed parameters: the pH value on the distribution network, the oxidability values, the free residual chlorine values in the pumping stations and the residual chlorine values on the distribution network. The results obtained for the microbiological analysis of the samples (the total number of aerobic mesophilic germs and the number of coliform bacteria) are between 10-13 cfu/ml for aerobic mesophilic germs and for coliform bacteria the samples were negative.

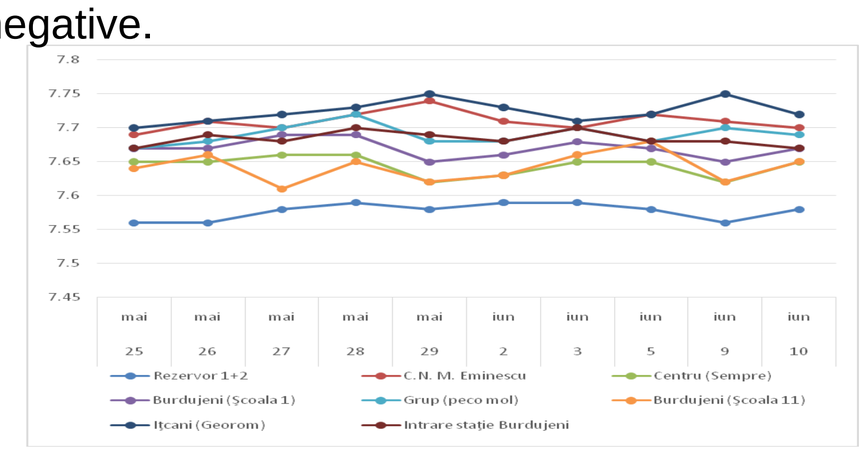

Figure 1. pH values on the city distribution network

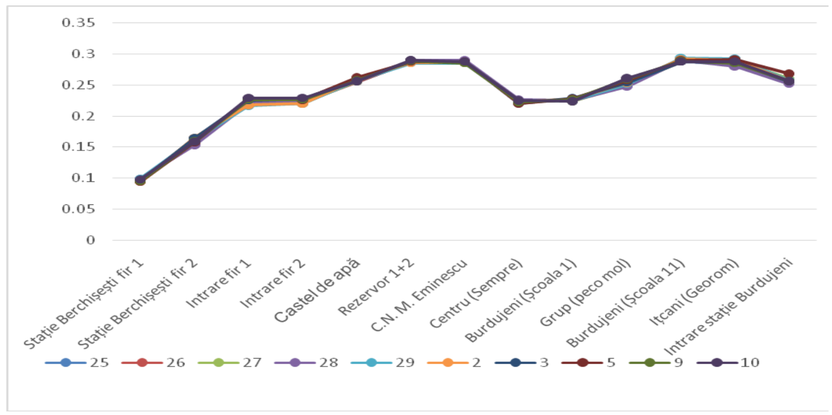

Figure 2. Oxidability values, mg O_2/l

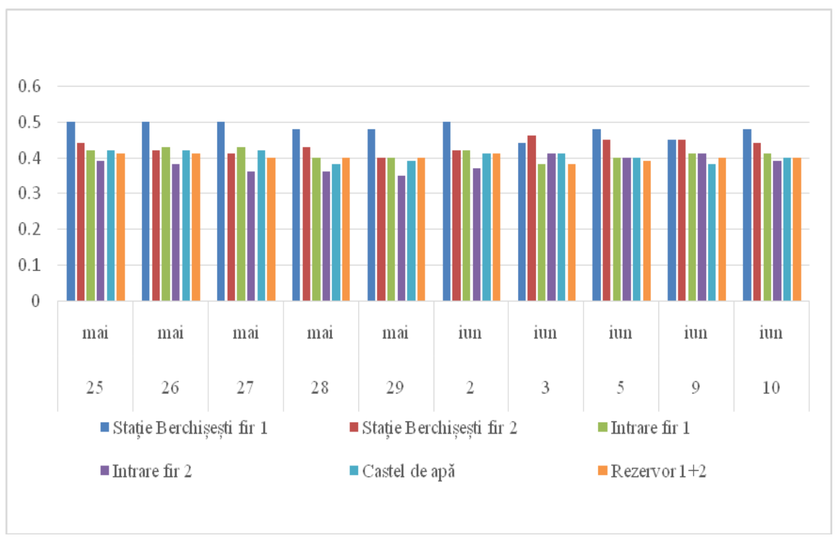

Figure 3. Free residual chlorine values, mg/l

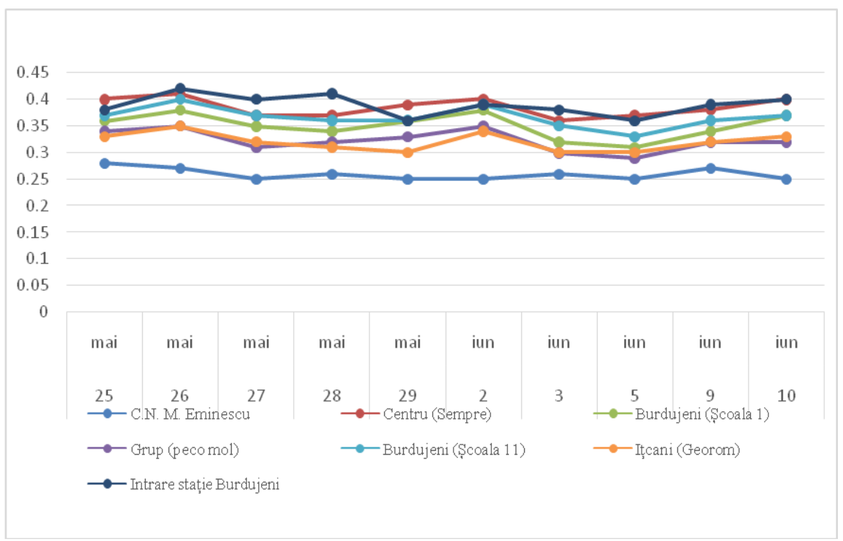

Figure 4. Residual chlorine values in the distribution network, mg/l

Table 1. Electrical conductivity values recorded between May 25 and June 10

Harvest point	Date of sample collection CMA 2500 µS/cm									
	25 mai	26 mai	27 mai	28 mai	29 mai	2 iun	3 iun	5 iun	9 iun	10 iun
Stație Berchișești fir 1	468	467	467	468	468	468	467	466	468	468
Stație Berchișești fir 2	465	464	465	466	466	464	465	465	466	464
Intrare fir 1	471	469	469	470	470	471	469	468	470	470
Intrare fir 2	466	466	467	467	466	466	466	467	467	465
Castel de apă	470	470	470	470	471	470	471	471	471	470
Rezervor 1+2	487	488	486	487	489	492	486	488	488	486
C.N. M. Eminescu	486	486	487	487	490	490	486	487	486	486
Centru (Sempre)	474	474	476	475	477	477	475	476	474	472
Burdujeni (Școala 1)	473	474	475	473	472	472	474	475	473	476
Grup (peco mol)	478	480	480	478	478	478	480	480	481	480
Burdujeni (Școala 11)	476	478	477	475	475	475	477	476	472	477
Iţcani (Georom)	476	477	477	476	474	475	477	472	470	475
Intrare stație Burdujeni	480	480	482	482	484	483	482	481	481	480

The values obtained for conductivity indicate an optimal level of mineral substances without exceeding the maximum allowed amount. The experimentally obtained values fall between the values of 465-495 mg/l.

The values established by law for the maximum permissible limits of the three parameters are: for nitrates, the CMA value is 50 mg/l, for nitrites the CMA value is 0.5 mg/l, and for ammonium the CMA value is 0.5 mg/l. The level of nitrates in drinking water determined at all 13 working points are representative of the entire distribution network. Although the concentration of nitrates may not vary seasonally, a larger number of samples will provide more accurate information about the quality of the water reaching the consumer. The analyzes carried out in the laboratory confirmed the total absence of the 3 analyzed parameters.

CONCLUSIONS

The day of the week, the time interval, the volume of water consumed, and the number of accidental damage occurred on the distribution network are the factors that influence the values of the analyzed parameters. During the study, there were no exceedances of the maximum concentration allowed by national legislation, for none of the analyzed parameters.

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THE PARTICULARITIES OF PALM OIL CONSUMPTION IN THE REPUBLIC OF MOLDOVA

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INTRODUCTION

Due to its high palmitic acid (44%) content (Table 1), palm oil represents important raw materials in the production of solid fats with low or absent trans isomers (margarine, spreads, shortenings). According to the FAO statistical data, the average global consumption of palm oil per capita in a year has increased 1.25 times in the last 10 years and averages 2,4 kg/capita/year. The main consumers of palm oil are African and Asian countries, while the Republic of Moldova is just discovering the world of palm oil (approx. 1 kg/capita/year), but this trend is growing.

Table 1. Fatty acid composition of palm oil [3]

Fatty Acid	Palm Oil
Caproic acid (6:0)	-
Caprylic acid (8:0)	-
Capric acid (10:0)	-
Lauric acid (12:0)	0.2
Myristic acid (14:0)	1.1
Palmitic acid (16:0)	44.0
Stearic acid (18:0)	4.5
Oleic acid (18:1)	39.2
Linoleic acid (18:2)	10.1
Linolenic acid (18:3)	0.4
Arachidic acid (20:0)	0.1
Total SFAs	49.9
Total MUFAs	39.2
Total PUFAs	10.5

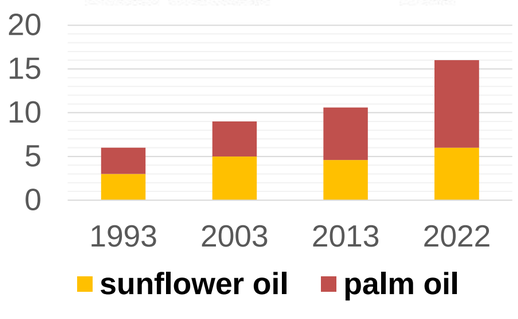

Fig.1. Worl oil production in thousands/tons [1]

MATERIALS AND METHODS

To establish local dietary habits regarding the consumption of foods high in saturated fatty acids, especially palm oil, a sociological survey was conducted in April-May 2023. Respondents were surveyed online using popular social media platforms. The questionnaire was developed on the Google Forms platform and included 16 questions divided into 3 categories (social demographic part, analysis of food habits, analysis of public awareness)

The survey results were analyzed statistically and reported in separate subsections, followed by the integrated results with overarching themes drawing on data from both qualitative and quantitative data.

RESULTS AND DISCUSSION

Due to palm oil's availability, stability, and relative safety, it is now widely used in the production of bakery, confectionery, dairy and sausage products, etc. The wide range of these goods on the local market has contributed in recent years to an increase in the total number of calories in citizens' diets, mainly from fats (up to 105 g/capita/day, Fig.2).

Moldovan population was found to snack 2-3 times a day using a variety of ready-to-cook foods, 45% of which potentially contained palm oil (Fig.3). Moreover, the survey participants themselves often find it difficult to say which products may contain palm oil, they are mainly interested in the taste and total calorie content. At the same time, the attitude towards palm oil itself is quite negative, 40% of respondents claim that the corresponding product is harmful and should not be consumed (Fig.4).

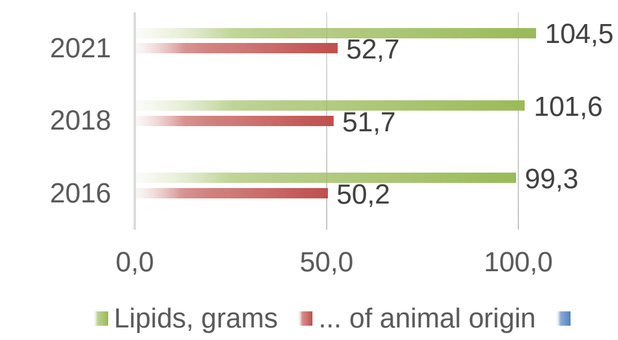

Fig.2. Fat consumption in RM, g/capita/day [2]

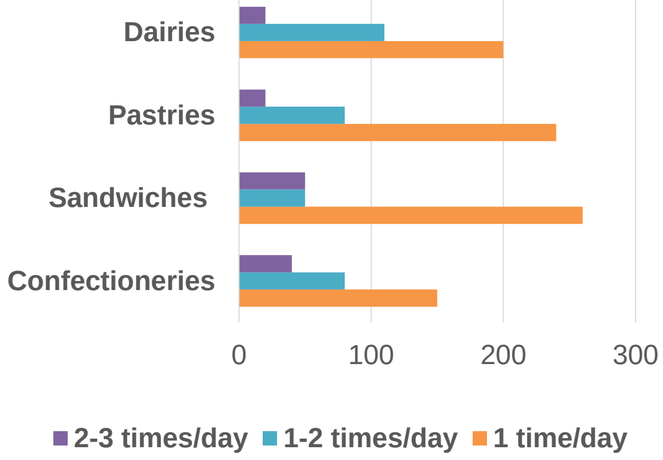

Fig.3. Types of food consumed at a snack

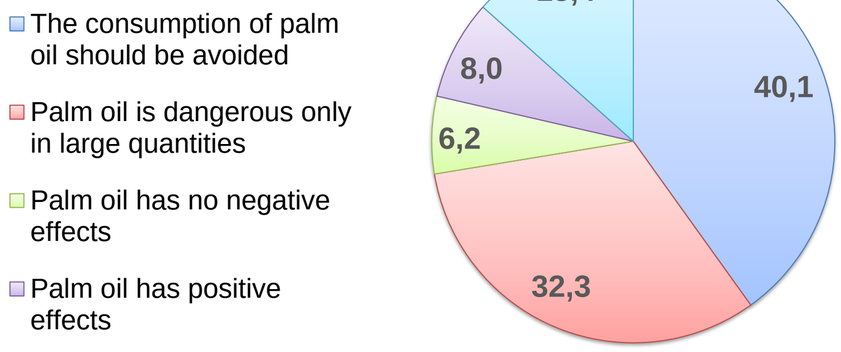

Fig.4. Respondents' opinion about the influence of palm oil on human health

CONCLUSIONS

Palm oil can indeed be pernicious to health, but only if consumed in large quantities due to its high content of saturated fatty acids, or if the manufacturer uses its hydrogenated form with trans isomers. According to the Government Decree No. 279/2017, such information must be presented on the product label and comply with the manufacturer's internal technological instructions. However, due to the negativity of society towards palm oil, manufacturers often camouflage this product with terms such as 'vegetable fat', 'mixtures of vegetable fats', and 'special-purpose oils' (Fig.5). Raising awareness about products' characteristics and palm oil's properties can enhance the quality of life for local citizens

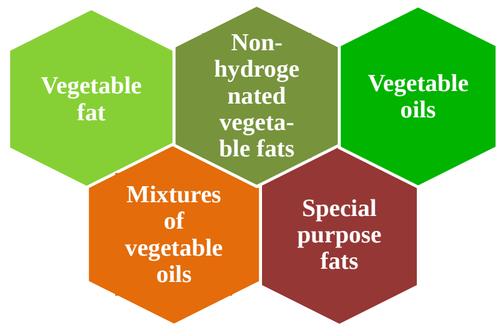

Fig.5. Ways to camouflage palm oil on a product label

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ACKNOWLEDGEMENTS

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Mechanical cell disruption of microorganisms

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National University of Food Technologies, Kuiv, Ukraine

Disrupted microorganisms:
- Micellar fungi
- Microalgae
- Yeast
- Bacteria

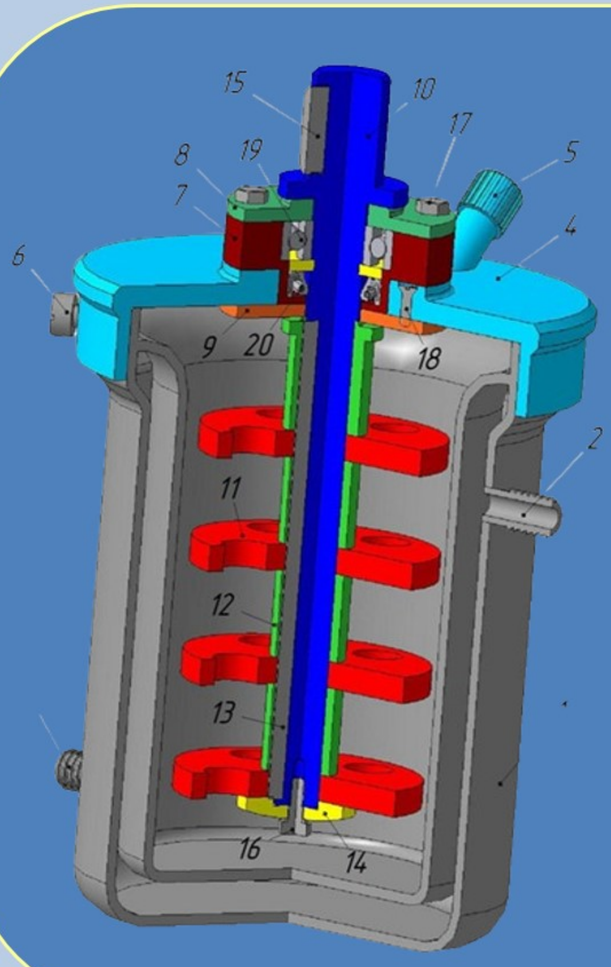
Disruption use samples

- Extraction of beta-glucan from brewing yeast shells;
- Production of biofuel from microalgae;
- Production of insulin from Escherichia coli bacterial cultures

Mechanical methods of cell disruption

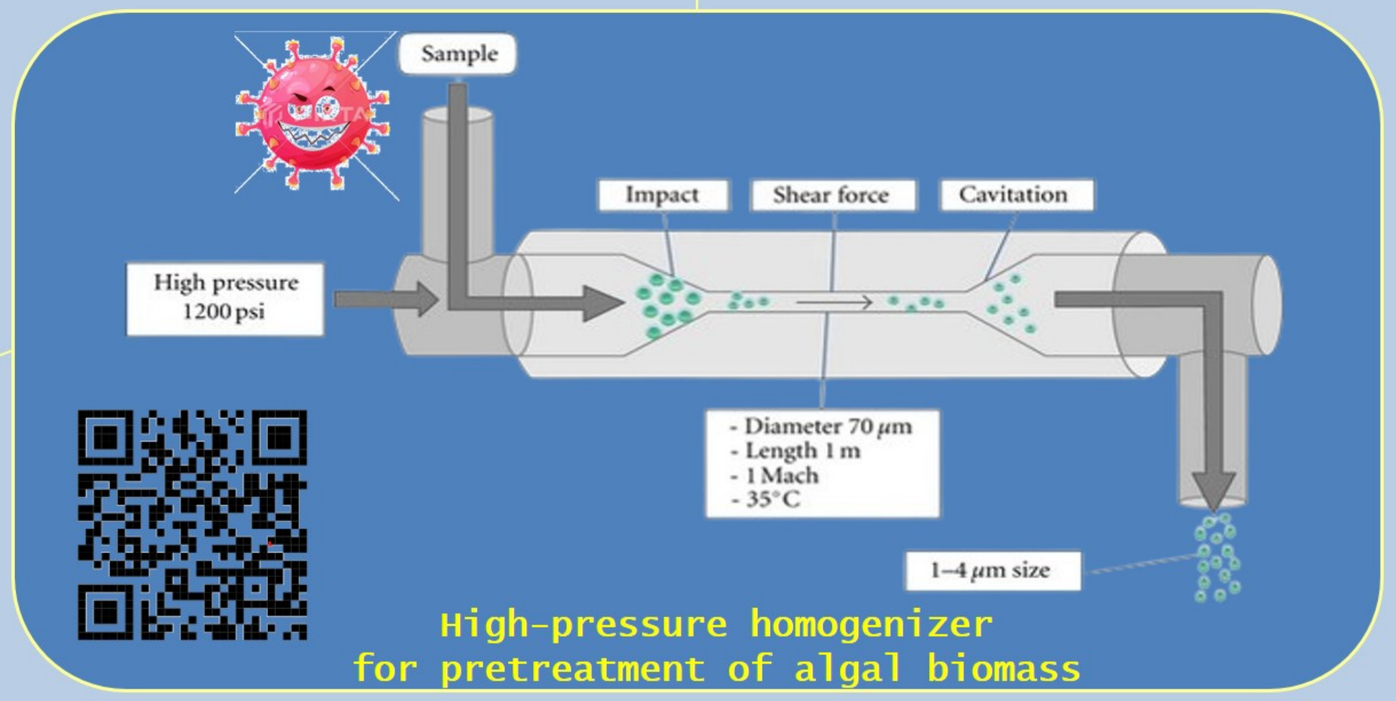
- Solid shear
  - Bead meal
  - Press
- Liquid shear
  - Hight-pressure homogenization
  - Ultrasonication
- Others
  - Autoclave
  - Lyophilization
  - Microwave

Using equipment



Vertical bead mill

1 - housing;
2 - cover;
3 - flange;
4 - through cover;
5 - shaft;
6 - disc;
7 - thrust bushing;
8 - intermediate bushing;
9 - clamping washer;
10 - stop ring;
11 - rubber seal;
12 - washer;
14 - bolt;
15 - concealed bolt;
16 - seal;
17 - bearing;
18, 19 - key



High-pressure homogenizer for pretreatment of algal biomass

Ultrasonic Cell Disruptor (only for laboratory low productivity using)

Mechanical cell disruption methods on industrial scale

Cell disruption method	Advantages	Disadvantages
Ultrasonic method	High cell disruption efficiency. Capability for gentle cell disruption.	Requires special equipment. High power consumption.
High-pressure homogenizers	High pressure for effective disruption. Capability to process large volumes of material. Capability for disruption in various modes.	High energy consumption. Capability for the disruption of biomolecules. Requires voluminous equipment.
Bead mill	Ability to achieve uniform grinding. Capability to adjust particle sizes. Relatively simple maintenance.	Particle size limitations. Potential contamination from mill material. Requires a relatively long processing time.

Conclusions

- The process of compromising the integrity of the cell is correctly referred to as "Disruption." Terms such as "Grinding" and "Disintegration," are not rational: goal is not to break the cell into pieces but to disrupt the integrity of its wall.
- The question of "What constitutes a disrupted cell" remains a subject of discussion, including the criteria for identifying a disrupted cell as an indicator during research
- On an industrial scale, mechanical methods of cell disruption are employed, such as bead mills and pressure treatment in long slits. Other methods, including chemical ones, may complement to intensify the process.
- **Yeast cell disruption is often performed using bead mills. Disruption of algae and bacterial cells is carried out in narrow slits under pressure**.
- The ultrasonic method is only used in laboratory conditions at the "test tube" level. Industrial scale are not found due to significant energy consumption, high energy intensity, and rapid wear of technological equipment components.
- The conditions and modes of grinding are insufficiently described; this issue requires detailed study.

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GUMMY CANDIES AS AN ALTERNATIVE METHOD FOR DELIVERING ACTIVE PHARMACEUTICAL INGREDIENTS

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National University of Food Technologies, Ukraine
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The policy of the largest pharmaceutical giants involves the gradual abandonment of pills

Advantages of Using Jelly Candies for Pharmaceutical Ingredients Delivery

Improved Taste and Palatability

Jelly candies provide a pleasant and enjoyable taste, making them an ideal choice for delivering pharmaceutical ingredients to individuals with taste and texture preferences.

Easy Administration

With their soft and chewable nature, jelly candies offer a user-friendly method of consuming pharmaceutical ingredients, especially for those who have difficulty swallowing pills or capsules.

Enhanced Drug Absorption

The gelatinous texture of jelly candies promotes faster breakdown and absorption of the active ingredients, ensuring quicker onset of action compared to traditional delivery methods.

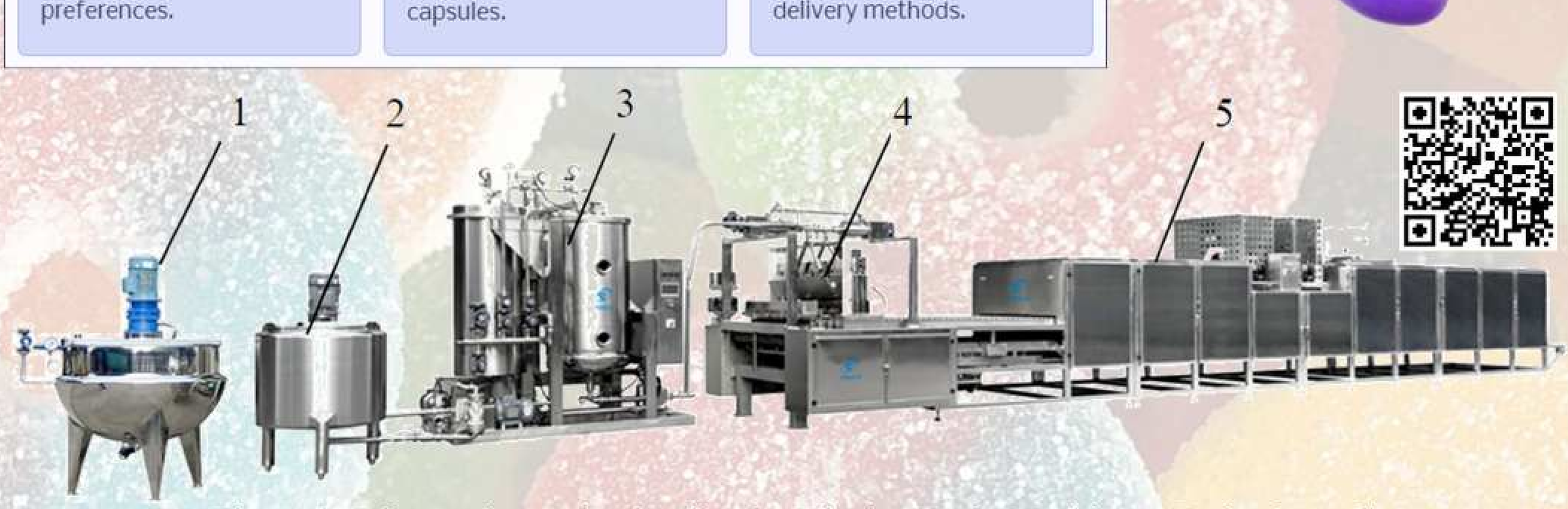

Figure 1. Jelly candy production line by Ningbo Youlu Machinery Technology Co:
1-system of automatic weighing and dissolution of components; 2-a storage capacity; 3-a vacuum cooking boiler; 4-a depositing machine; 5-a cooling tunnel.

The use of jelly candies as alternative delivery systems for pharmaceutical ingredients is gaining popularity due to their appealing taste, ease of administration, and enhanced drug absorption. Exciting future developments and applications in this field are on the horizon.

But there are some problems, for example: how to ensure cleanliness and aseptic production; how to make jellies at low temperatures so as not to damage APIs.

EXPLORING THE POTENTIAL OF CANOLA PROTEIN IN THE FOOD INDUSTRY: MARKET TRENDS, NUTRITIONAL BENEFITS, AND TECHNOLOGICAL ADVANCEMENTS

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Introduction

Rapeseed protein, also known as Canola protein, scientifically derived from rapeseed plant *Brassica napus*, stands as a highly promising plant-based protein source worldwide, albeit currently unavailable in the Romanian market.

Nowadays, canola protein is primarily directed towards the animal feed market where it stands as a competitive animal feed source due to its high protein value, mass market production and cheap cost of manufacturing. However, beyond its role in animal nutrition, there exists a huge functional potential for canola protein, positioning it as a valuable source of high-quality food use protein, as well as an alternative source of a plant based protein that can be successfully added to the human diet. An economic and sustainable source of protein with high bioavailability and digestibility is essential to human health and well-being.

The increasing global population, environmental considerations, and several key food trends currently dominating the global food market strongly emphasize the importance of using and developing highly bioavailable plant proteins, such as canola protein.

Market trends

The canola protein market is witnessing significant growth due to the rising demand for plant based protein sources. As more consumers adopt vegetarian and vegan diets and prioritize health and sustainability, the demand for canola protein is expected to escalate. Manufacturers are focusing on developing innovative food products are expanding their production capacities to meet the growing market demand. Essential drivers for the substantial growth of the canola protein market include the escalating demand for supplementary products, especially among the younger and middle-aged population, a surge in lactose intolerance and gluten sensitivity, a rise in the adoption of vegan or vegetarian diets, and an increasing demand for sustainable and environmentally friendly protein sources.

Nutritional benefits

As one of the lesser known oilseed proteins, canola protein can actual rule the market and the newest food trends due to the functional benefits it may provide to the human health.

1. Balanced amino acid profile

Comparing to soy or hemp protein, canola protein contains higher levels of **methionine, lysine and arginine**, plus it is rich in vitamins and essential minerals. However, glutamine is the most abundant amino acid in the rapeseed protein as well as casein. Depending on the extraction method, different species of canola seed may contain 17.27% to 23.21% of glutamine, histidine content varying from 3.14% to 3.175% and casein, exceeding the requirement by FAO/WHO/UNU (1985) for all groups including infants. Overall, the quality of proteins from the *Brassica genus* is better than other plant proteins such as pea and wheat protein also being reported to have a higher protein efficiency ratio.

2. Malleable protein functionality

Canola protein can be obtained from a few different processes that generate end products consisting of varying levels of the constituent seed proteins. The major storage proteins in Brassica napus (canola) seed are cruciferin and napin, which comprise 85%–90% of the total proteins. Also present in small amounts are structural proteins and metabolic proteins. Since cruciferin and napin differ in many ways including amino acid composition, molecular structure, size and physico-chemical properties, the functional properties they exhibit under given conditions are different. Therefore the properties and functionalities of canola protein products may differ depending on the levels of cruciferin and napin in the product.

3. New Product Development Opportunities

Recognized for its sustainability, economic feasibility, high bioavailability, and digestibility, canola protein has found applications across various sectors. Its versatile applications include enhancing bakery products, acting as an emulsifier and binder in meat products, and serving as a substitute for traditional protein sources in vegetarian and meat analogues. Additionally, animal feeds benefit from its high protein content and balanced amino acid profile. Moreover, as a co ingredient canola protein already claimed to improve the vegan and vegetarian products. First and foremost, it delivers a clean taste with good texture and a smooth mouthfeel. Furthermore, canola protein is, gluten-free, non-dairy, and it is mostly produced via a unique, solvent-free extraction process, preserving the nutritional and functional benefits of the protein. All of which makes it ideal for manufacturers looking to stand out on the shelves with new, functional products.

Technological advancements

Peptide mixtures and hydrolysates derived from canola protein have been reported to possess a range of biological activities that could have beneficial health effects in humans. Another advancement represent the potential to use genomics and breeding techniques to improve canola meal for protein extraction and to increase its bioavailability. Although various techniques of canola protein extraction exists, the biggest factor determining the success of canola protein as a food ingredient is being able to bring a product to market at a competitive price.

Conclusion

In conclusion, the untapped potential of canola protein in the Romanian market presents a compelling opportunity for the local food manufacturers and researchers. With its status as a complete and sustainable plant-based protein source, canola protein is well-positioned to meet the growing demands of consumers seeking supplementary, eco-friendly, and nutritionally balanced food products. As the market continues to evolve with innovative product developments and heightened consumer awareness, the canola protein market is poised for robust growth, offering a promising avenue for industry stakeholders and food innovators alike