University of Life Sciences "King Mihai I" from Timisoara

Faculty of Food Engineering

BOOK OF ABSTRACT

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The 8th Student Conference:
„Life Sciences – Food Processing"

Section: Conference cover following topics:

- ***Food Engineering***
- ***Food Control***
- ***Consumer and environmental protection***

2023

General Programme

14^{30} - 15^{00}	**Registration**
15^{00} – 15^{10}	**Opening of the Conference**
15^{10} – 15^{20}	Oral Communication OC_1
15^{20} – 15^{30}	Oral Communication OC_2
15^{30} – 17^{00}	**Posters**

Faculty of Food Engineering
University of Life Sciences "King Mihai I" from Timisoara

Programme

$14^{30} – 15^{00}$	**Registration**
$15^{00} – 15^{10}$	Opening of the Conference **Prof. dr. Adrian Riviş** *Dean of the Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara*
$15^{10} – 15^{20}$	Cocos-based pastry products **Roxanda Simescu, Mihaela Simescu, Andrei Dobîndă, Florina Băluţă, Gabriela Gherghinoiu, Corina Megyesi, Cristina Mitroi, Laura Rădulescu, Adrian Riviş, Daniela Stoin, Ariana Velciov, Despina Bordean, Nicoleta Hădărugă** *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania.*
$15^{20} – 15^{30}$	Lilac flowers-based jams: bioactive compounds, nutritional value and acceptability **Mihaela Simescu, Roxanda Simescu, Andrei Dobîndă, Florina Băluţă, Gabriela Gherghinoiu, Corina Megyesi, Cristina Mitroi, Adrian Riviş, Alexandru Rinovetz, Camelia Moldovan, Delia Dumbravă, Sofia Popescu, Ducu Ştef, Nicoleta Hădărugă** *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*
$15^{30} – 17^{00}$	**Posters**

Section: Food Engineering

P1 Innovative Advanced Technologies – 3D Printing of Food
Iasminca Birta, Lorena Cojocariu, Mihaela Simescu, Andrei Dobîndă, Florina Diana Filip, Roxanda Simescu, Cristina Mitroi, Camelia Moldovan, Despina Bordean, Laura Rădulescu, Gabriel Bujancă, Adrian Riviș, Daniela Stoin, Nicoleta Hădărugă
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P2 Development of innovative fresh juices from fruits and vegetables
Carmen Baranya, Ersilia Alexa, Ileana Cocan, Daniela Stoin, Monica Negrea
Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P3 Recovery of lemon fruit waste from the canning industry in the context of circular economy
Andreea Clipici, Călin Jianu, Ileana Cocan, Ersilia Alexa, Monica Negrea
Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P4 The importance of Hummus consumption
Andra – Mara Achim, Timeea – Maria Borcilă – Ciarnău, Radu – Iosif Avram, Georgeta – Sofia Popescu, Daniela Stoin, Antoanela Cozma, Corina – Iuliana Megyesi, Laura Rădulescu, Nicoleta – Gabriela Hădărugă, Ariana Velciov
Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P5 Honey as a functional food

Timeea-Maria Borcilă-Ciarnău, Mara Achim, Antoanela Cozma, Georgeta – Sofia Popescu, Daniela Stoin, Corina – Iuliana Megyesi, Laura Rădulescu, Adrian Riviș, Ariana Velciov - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P6 Quality characteristics and acceptability of low sugar content jelly with carrot and orange

Paula-Amalia Ivan, Călin Jianu, Ileana Cocan, Ersilia Alexa, Monica Negrea - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P7 Citrus sherbet - a tasty and nutritious sweet product

Patricia Mitar, Călin Jianu, Ileana Cocan, Ersilia Alexa, Monica Negrea

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P8 Studies on the production and characterization of a fermented alcoholic beverage from figs

Bianca Adriana Moldovan, Roxana Patricia Dehelean, Diana Moigradean, Camelia Moldovan, Florina Radu, Daniela Stoin, Delia Dumbrava, Adrian Rivis, Mariana-Atena Poiana

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P9 Obtaining and characterization of chocolate confectionery with added grape skin powder

Roxana Patricia Dehelean, Bianca Adriana Moldovan, Diana Moigradean, Nicoleta Hadaruga, Daniela Stoin, Florina Radu, Mirela Popa, Corina Misca, Despina Bordean, Mariana-Atena Poiana

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania.

P10 Determination of aflatoxins level in corn and wheat samples from Banat area, Romania intended for human consumption

Adina Potcovel, Sebastian Penea, Maria-Ionela Spafiu, Georgeta-Sofia Popescu, Mariana-Atena Poiană, Alexandru Rinovetz, Florina Radu

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania.

P11 Study on the production and characterisation of raw-dried salami from game meat

Marius Andronache, Loredana Tudor, Monica Negrea, Ersilia Alexa, Ileana Cocan

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P12 Valorisation of wild game meat for smoked and dried meat specialities

Andreea-Maria Angheluș, Monica Negrea, Ersilia Alexa, Bogdan Rădoi, Ileana Cocan

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P13 Strawberries and raspberries bioactive powder production

Alexandru Morariu, Liana Maria Alda, Laura Rădulescu, Delia Dumbravă, Camelia Moldovan, Mirela Popa, Diana Nicoleta Raba, Despina – Maria Bordean

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P14 Monitoring the technological process of obtaining pork sausages with hazelnuts and nuts, evaluation and comparison of quality indicators

Ioana Luciana Burcă, Dorina Ionela Curuți, Cristian Gottvald, Florin Alexandru Pârvu, Daniel Bogdan Platon, Mihaela Cazacu, Teodor Ioan Trașcă, Ducu Sandu Ștef, Gabriel Hegheduș – Mîndru, Bogdan Petru Rădoi, Ramona Cristina Hegheduș – Mîndru

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P15 Technical-economic study of the introduction in the food processing of a new jam recipe of citrus and banana sweet

Denisa Ema Iordache, Călin Jianu

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Section: Food Control

P16 Valorisation of lentils as a vegetable source of protein in chicken pâté technology

Delia Cuciuc, Oana Prasacu, Monica Negrea, Ersilia Alexa, Ileana Cocan

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P17 Obtaining dairy products through traditional processes and technologies, evaluation and comparison of quality indicators of "Telemea" cheeses

Dorina Ionela Curuți, Cristian Gottvald, Florin Alexandru Pârvu, Ioana Luciana Burcă, Alexandru Nicolae, Daniel Bogdan Platon, Milan Alexandru Ciușdic, Ducu Sandu Ștef, Teodor Ioan Trașcă, Gabriel Hegheduș – Mîndru, Ramona Cristina Hegheduș – Mîndru

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P18 Sensory assessment of the pork sausages with adaos of vegetable oils

Gabriel M., R. Boutiuc, D. Crăcea, A. Riviș, N. Hădărugă, D. Bordean, D. Dumbravă, C. Moldovan, M. Popa, C. Mișcă, M Cazacu., M.R. Hegheduș, L. Ştef, G. Bujancă, D. Ștef

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P19 Functionality. Concept

Teodora Iosivuț, M. Balaci, B. Vaipan, Mihaela-Gianina Fraiu, Oana-Alina Marcu, Corina-Dana Mișcă, Ariana Velviov, Corina Megyesi, P. B. Rădoi, Florina Radu, Delia-Gabriela Dumbravă, Nicoleta Hădărugă, A. Riviș, G. Hegheduș-Mîndru, T. I. Trașcă, A. Rinovetz - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P20 Acorn flour, an unconventional flour that improves the quality characteristics of gluten-free flour products

Ruth-Brighita Gal, Călin Jianu, Mariana-Atena Poiană, Ariana-Bianca Velciov, Adrian Riviș, Nicoleta Hădărugă, Diana Moigrădean, Daniela Stoin

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P21 Monitoring the technological process of obtaining raw-dried salami "Paprika", evaluation and comparison of quality indicators

Cristian Gottvald, Florin Alexandru Pârvu, Ioana Luciana Burcă, Dorina Ionela Curuți, Alexandru Nicolae, Daniel Bogdan Platon, Mihaela Cazacu, Ducu Sandu Ștef, Teodor Ioan Trașcă, Ramona Cristina Hegheduș – Mîndru, Gabriel Hegheduș – Mîndru

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P22 Presence of heavy metal in ground and instant coffee

Mihai Miloș, Nicoleta Hădărugă, Corina Dana Mișcă, Luminița Pîrvulescu, Mariana-Atena Poiană, Liana Maria Alda, Laura Rădulescu, Despina – Maria Bordean

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P23 Monitoring the technological process of obtaining "DRUMEȚULUI" bread, evaluation and comparison of quality indicators.

Ilie Răzvan Boboescu, Florin Alexandru Pârvu, Cristian Gottvald, Ioana Luciana Burcă, Dorina Ionela Curuți, Daniel Bogdan Platon, Milan Alexandru Ciușdic, Teodor Ioan Trașcă, Ramona Cristina Hegheduș – Mîndru, Bogdan Petru Rădoi, Gabriel Hegheduș – Mîndru

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P24 Processes and technologies used to obtain wide noodles with *Boletus Edulis*, evaluation of their quality indicators

Andreea Annemarie Kiss, Ioana Luciana Burcă, Dorina Ionela Curuți, Cristian Gottvald, Florin Alexandru Pârvu, Mihaela Cazacu, Ducu Sandu Ștef, Teodor Ioan Trașcă, Gabriel Hegheduș – Mîndru, Bogdan Petru Rădoi, Ramona Cristina Hegheduș – Mîndru

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P25 Thermopenetration. Concept

M. Balaci, Teodora Iosivuț, B. Vaipan, Mihaela-Gianina Fraiu, Oana-Alina Marcu, Corina-Dana Mișcă, Corina Megyesi, P. B. Rădoi, Florina Radu, Mirela-Viorica Popa, Delia-Gabriela Dumbravă, Nicoleta Hădărugă, A. Riviș, G. Hegheduș-Mîndru, T. I. Trașcă, A. Rinovetz

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P26 Teff flour and carob powder: an innovative combination to improve the quality characteristics of gluten-free flour products

Roxana-Codruța Rus, Călin Jianu, Mariana-Atena Poiană, Ariana-Bianca Velciov, Monica Negrea, Florina Radu, Diana Moigrădean, Daniela Stoin

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P27 Preparation and characterization of a lentil spread

Gabriela Raluca Albesc, Camelia Moldovan, Delia Gabriela Dumbravă, Ariana Bianca Velciov, Mărioara Drugă

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

Section: Consumer and environmental protection

P28 Tamarind flour and elderflowers powder: an innovative combination to improve the quality characteristics of gluten-free flour products

Iulia-Gabriela Mihai, Călin Jianu, Mariana-Atena Poiană, Ariana-Bianca Velciov, Ileana Cocan, Nicoleta Hădărugă, Florina Radu, Daniela Stoin

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P29 Mineral analysis of fresh meat products

Andrei Răzvan Potocean, Diana Moigradean, Liana Maria Alda, Aurica Breica Borozan, Laura Rădulescu, Sofia Popescu, Despina-Maria Bordean

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P30 Obtaining an innovative product using gooseberry fruits

Renata Sisa, Adrian Riviș, Ersilia Alexa, Liana Maria Alda, Laura Rădulescu, Diana Moigrădean, Despina - Maria Bordean

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P31 Obtaining and characterization of an acid dairy product with added fruit

Loredana Gabriela Tudor, Camelia Moldovan, Delia Gabriela Dumbravă, Ariana Bianca Velciov, Mărioara Drugă

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P32 Obtaining and characterizing a meat product with the addition of seeds

Yasmine Alexandra Goian, Camelia Moldovan, Delia Gabriela Dumbravă, Ariana Bianca Velciov, Mărioara Drugă - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P33 Obtaining and characterizing of some pâtés with the addition of tomatoes and basil

Ramona Daniela Pricop, Camelia Moldovan, Delia Gabriela Dumbravă, Ariana Bianca Velciov, Mărioara Drugă - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P34 Study regarding the production and characterisation of raw-dried salami with almonds

Diana-Andreea Oprițescu, Nicoleta Rădulescu, Monica Negrea, Ersilia Alexa, Ileana Cocan

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P35 Preparing and evaluation of new nutritious products from quail meat

Dorin Otiman, Dan D.Gîrjoabă, Nicoleta Gabriela Hădărugă, Ariana-Bianca Velciov, Corina Megyesi, Ducu Sandu Ștef, Adrian Riviș, Ioan David, Călin Jianu, Gabriel Bujancă

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P36 Production of biodegradable sodium caseinate film containing titanium oxide nanoparticles and grape seed essence and investigation of physicochemical properties

Teofil Nedelcu, Alexandru Rinovetz, Ariana Velciov, Corina Megyesi, Ducu Sandu Ștef, Adrian Riviș, Ioan David, Călin Jianu, Gabriel Bujancă - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P37 EU regulation on the use of antioxidants in meat preparation and in meat products

Dorin Otiman, Alexandru Borș, Bogdan Petricescu, Silvezter Tifan, Corina Megyesi, Ducu Sandu Ștef, Adrian Riviș, Ioan David, Călin Jianu, Gabriel Bujancă - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P38 Trade in selected raw materials of animal origin in the EU

Dan D.Gîrjoabă, Ariana Velciov, Alexandru Rinovetz , Corina Megyesi, Ducu Sandu Ștef, Adrian Riviș, Ioan David, Călin Jianu, Nicoleta Gabriela Hădărugă, Gabriel Bujancă - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P39 Use of bio-modified raw materials of plant and animal origin in technology of functional foods

Dorin Otiman, Adrian Riviș, Cristina Mitroi, Laura Rădulescu, Corina Megyesi, Ducu Sandu Ștef, Alexandru Rinovetz, Ioan David, Nicoleta Gabriela Hădărugă, Gabriel Bujancă - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P40 Valuation of goji berries as natural antioxidants in chicken pâté

Carmen-Florina Paroan, Ramona Râșniță, Monica Negrea, Ersilia Alexa, Ileana Cocan - *Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania*

P41 Monitoring the technological process of obtaining sausages from "Mangalița" meat, evaluation and comparison of quality indicators.

Florin Alexandru Pârvu, Cristian Gottvald, Ioana Luciana Burcă, Dorina Ionela Curuți, Daniel Bogdan Platon, Milan Alexandru Ciușdic, Mihaela Cazacu, Teodor Ioan Trașcă, Ramona Cristina Hegheduș – Mîndru, Bogdan Petru Rădoi, Gabriel Hegheduș – Mîndru

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P42 Processes and technologies used to obtain caraway sausages, evaluation of their quality indicators

Daniel Bogdan Platon, Cristian Gottvald, Ioana Luciana Burcă, Dorina Ionela Curuți, Alexandru Nicolae, Mihaela Cazacu, Teodor Ioan Trașcă, Ducu Sandu Ștef, Ramona Cristina Hegheduș – Mîndru, Bogdan Petru Rădoi, Gabriel Hegheduș – Mîndru

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P43 Obtaining and characterization of flavored walnut oil

Rebeca Estera Bulvanescu, Daniela-Florina Socaci, Razvan Rafan, Mariana-Atena Poiana, Daniela Stoin, Laura Radulescu, Diana Moigradean

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P44 Characterization of red wines from Buzias-Silagiu wineyard

Razvan Rafan, Daniela-Florina Socaci, Rebeca Estera Bulvanescu, Mariana-Atena Poiana, Liana-Maria Alda, Daniela Stoin, Diana Moigradean

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P45 Flavored sesame oil in the food industry and in human health

Daniela-Florina Socaci, Rebeca-Estera Bulvanescu, Razvan Rafan, Mariana-Atena Poiana, Liana-Maria Alda, Despina-Maria Bordean, Daniela Stoin, Diana Moigradean

Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Aradului Street no. 119, 300645 Timisoara, Romania

P46 Antioxidant, nutritional and sensory characteristics of some innovative elderberry-based jams

Mădălina Ceaușescu, Laurențiu Greu, Ducu-Sandu Ștef, Camelia Moldovan, Poiana Mariana-Atena, Diana-Nicoleta Raba, Viorica-Mirela Popa, Corina-Dana Misca, Delia-Gabriela Dumbrava

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P47 Assortments of white bread with added seeds, turmeric powder and sea buckthorn powder

Daniela Kocso, Sebastian Orbulescu, Nicoleta-Gabriela Hadaruga, Camelia Moldovan, Cristina Mitroi, Diana-Nicoleta Raba, Viorica-Mirela Popa, Corina-Dana Misca, Delia-Gabriela Dumbrava

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P48 A short study on the use of edible flowers in cakes

Andreea Kallos, Călin Cureleac, Ana-Maria Cretu, Florina Baluta, Gabriela Gherghinoiu, Ana Grecu, Cristina Mitroi, Delia Dumbravă, Corina Megyesi, Ariana Velciov, Adrian Riviș, Ducu Stef, Alexandru Rinovetz, Nicoleta Hădărugă

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P49 Nutritional and sensory properties of edible wild mushrooms

Alexandra Gridan, Iasminca Birta, Lorena Cojocariu, Mihaela Simescu, Andrei Dobîndă, Diana Filip, Roxanda Simescu, Corina Megyesi, Cristina Mitroi, Laura Rădulescu, Adrian Riviș, Daniela Stoin, Alexandru Rinovetz, Delia Dumbravă, Nicoleta Hădărugă

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P50 Nutritional value of chicken liver pate with the addition of mushrooms

D. Crăcea, R. Boutiuc, A. Riviș, N. Hădărugă, D. Bordean, D. Dumbravă, C. Moldovan, M. Popa, C Mișcă, M. Cazacu, G. Hegheduș-Mîndru, G. Bujancă, L. Ştef, D. Ştef

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P51 The nutritional and sensory evaluation of soymilk drink

Camelia Stoianovici[1], Mihaela-Maria Stanciugelu[2,3], Maria Spafiu[1], Andreea Ghițulescu[1], Ariana Velciov[1], Daniela Florentina Marcu[4], Sebastina Stoica[1], Florina Radu[1], Sofia Popescu[1]

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P52 The tomato fruit and Enhancing the health-promoting effects

Maria Ionela Spafiu[1], Camelia Elena Stoianovici[1], Andreea Ghițulescu[1], Mihaela Maria Stanciugelu[2,3], Sebastian Stoica[1], Elisabeth Spataro[4], Ariana Velciov[1], Florina Radu[1], Sofia Popescu[1]

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OC$_1$

Cocos-based pastry products

Roxanda Simescu, Mihaela Simescu, Andrei Dobîndă, Florina Băluţă, Gabriela Gherghinoiu, Cristina Mitroi, Laura Rădulescu, Adrian Riviş*, Daniela Stoin, Ariana Velciov, Despina Bordean, Nicoleta Hădărugă

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Coconuts are the fruits of the *Cocos nucifera* L., the fleshy part being widely used in food products in various forms ("coconut meat", "desiccated coconut", "coconut flour", "coconut milk" or "coconut water"). Depending on the coconut ingredient types, they are rich in carbohydrates (high content of dietary fibers), lipids (especially saturated fatty acid glycerides such as lauric acid contained glycerides), proteins (glutamic acid and arginine as the main amino acids), as well as vitamins and minerals (Fe, Mg, P and K). The most important vitamins belong to the complex B vitamins (niacin – vitamin B_3, or pantothenic acid - vitamin B_5). Phytohormones are other important compounds in coconuts. The aim of the study was the preparation of some assortments of cookies with low gluten content with the addition of coconut flakes. The nutritional quality and sensory profile of these products were compared for three types of coconut-based pastry products with "Spirulina" and white chocolate, "classical" chocolate and black chocolate.

Keywords: Cocos, pastry products, nutritional quality, sensory profile

OC$_2$

Lilac flowers-based jams: bioactive compounds, nutritional value and acceptability

Mihaela Simescu, Roxanda Simescu, Andrei Dobîndă, Florina Băluţă, Gabriela Gherghinoiu, Corina Megyesi, Cristina Mitroi, Adrian Riviş, Alexandru Rinovetz, Camelia Moldovan, Delia Dumbravă, Sofia Popescu, Ducu Ştef, Nicoleta Hădărugă*

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Lilac or common lilac (*Syringa vulgaris* L.) is used both as ornamental flowers and edible flower ingredients (flavoring material, sweets etc.). Lilac flowers are valuable and healthy food materials due to the presence of lutein as well as phenylpropanoids (e.g., syringin), iridoids, flavonoids (especially quercetin glycosides), triterpenes, lignans, essential oil components, and other minor compounds. They determined the use of the lilac flower infusion to treat cough, diarrhea, acute icteric hepatitis, vomiting, abdominal pain, or bronchitis. In this study the lilac flowers-based jams were prepared using lilac flowers, which were maintained in a sugar solution containing various other ingredients (lemon, blueberries etc.). The nutritional value based on the corresponding ingredients as well as the sensory profile of the lilac-based jams were evaluated by a sensory panel and compared with elderflower-based jams.

***Keywords**:* Lilac flowers, jams, bioactive compounds, nutritional value and acceptability

Posters

Section: Food Engineering

P1

Innovative Advanced Technologies – 3D Printing of Food

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3D printing and bioprinting have rapidly gained interest as a state-of-the-art experimental platform to conduct a wide variety of experiments from *in vitro* disease studies to large-scale food production. The goal of the study was the evaluation, design and quality of the "3D food printing foods" at research and manufacturing of innovative food products using this advanced technology. The 3D food manufacturing steps and especially "food grade" materials and equipment's components (syringes and print cartridges), as well as the corresponding software and hardware devices for the process control were surveyed and discussed for these "3D food printers".

***Keywords**:* 3D food printers, innovative, advanced, technologies

P2

Development of innovative fresh juices from fruits and vegetables

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Juices have become increasingly popular in recent years and now are considered a multi-million dollar industry. Carrots and apples are a common ingredient in many juices because they provide a flavor that pairs well with many other fruits and vegetables. Apple and carrot juice, tastes great, is a favourite with children and can provide, varied health benefits.

The main objective of the present research was to obtain, physicochemical, nutritional and sensory characterisation of two varieties of blended juices - *Apple, carrot and celery juice* and *Apple, carrot and red beetroot juice.*

In this research the technological process scheme was drawn up, the stages of the technological process were described and the recipes of two assortments of juices - *apple, carrots, celery, maple syrup* and *apple, carrots, red beet, maple syrup* - were established.

The results obtained from the physico-chemical analyses were presented, as well as the impact on consumers by reporting the results obtained from the sensory analysis using the 5-point hedonic scale. The average score for the Overall Acceptability criterion was 4.85 points for the beetroot juice sample, compared to an average score of 4.69 for the celery sample.

The acidity value is inversely proportional to the pH value, the lower the pH value the higher the acidity value. The juice studied with celery had an acidity of 0.212 g/L and the juice with red beet had an acidity of 0.146 g/L. The highest sugar level was found in the celery juice sample, which could be due to the red beet containing carbohydrates (7.13 g per 100 g), mainly in the form of sucrose (5.30 g per 100 g).

The vitamin C content recorded in the juice samples studied was 22.8 mg/100 ml in the celery samples and 28.6 mg/100 ml in the red beetroot juice samples, it being known that beetroot juice contains a high level of vitamin C (4.9%).

The juice samples studied in this research meet the quality requirements established by the legislation in force, have outstanding nutritional characteristics and obtained high scores from consumers who participated in the sensory evaluation, the impact being positive.

Keywords: juices, maple syrup, red beet, apple, carrots, celery, nutritive characteristics.

P3

Recovery of lemon fruit waste from the canning industry in the context of circular economy

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Citrus fruits are widely consumed worldwide in fresh state and juice and most often, the peel is discarded as waste, it contains a large variety of secondary components with substantial antioxidant activity compared to other parts of the fruit (Manthey and Grohmann, 2001).

One of the major issues facing the food industry around the world is how to make full use of the waste from juice processing. These wastes, such as citrus peels, make up 60% to 65% of the fruit. Citrus waste from juice processing is normally discarded and is a major environmental problem. Citrus waste contains many valuable compounds that can be extracted and used in different products. One of these compounds is pectin. Citrus peel has therefore become one of the most important sources of commercial pectin. Another way of exploiting citrus peel is to produce sugar-preserved products, namely jam.

The present study aims to recover lemon waste from the fruit canning industry and to obtain an assortment of jam from lemon peels and aims to develop a new jam recipe, develop the technological process, determine the physico-chemical properties, and the impact on consumers.

Following the sensory analysis of the products studied, the lemon peel jam samples scored 4.50 points on the Overall Acceptability criterion, more than the lime peel sample (4.42 points) falling between moderately pleasant (4) and extremely pleasant (5) on the 5-point hedonic score scale.

The water content of the jam samples ranged from 35.4% (lemon peel jam) to 34.8% (lime peel jam), which is within the limits set by the rules in force.

The vitamin C content of the jam samples studied ranged from 25.2 mg/100 g (lime peel jam) to 36.8 mg/100 g (lemon peel jam), values in line with literature studies, certifying that the products obtained have outstanding nutritional properties.

The studied jam samples have outstanding nutritional properties and by obtaining them the food industry could align itself with the current concept of the European Union policies of circular economy and promotion of the "zero waste" system.

***Keywords**:* lemon, lime, jam, vitamin C, circular economy.

P4

The importance of Hummus consumption

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Hummus, an appetizing paste originating from the Middle East, has attained global popularity owing to its distinctive flavor profile and perceived health benefits. These abstract endeavors to explicate the significance of hummus in human nutrition and diet, elucidating its nutritional attributes and potential impacts on health.

Comprising rudimentary ingredients such as chickpeas, olive oil, tahini (sesame paste), garlic, and lemon, hummus proffers a nutritionally dense composition, delivering proteins, fibers, healthy fats, and vitamins. The protein content in chickpeas complements essential amino acids, rendering it a commendable dietary option for vegetarians and vegans.

The multifaceted health benefits associated with regular hummus consumption encompass diverse facets. The inclusion of healthy fats from olive oil and tahini contributes to cardiovascular health, exhibiting favorable effects on cholesterol levels. The dietary fibers in chickpeas facilitate digestive health and weight management by imparting a satiating effect.

Moreover, hummus functions as a conduit for increased vegetable intake, commonly paired with raw vegetables such as carrots, peppers, or broccoli. This practice enhances the intake of essential nutrients and antioxidants, thereby fortifying the immune system.

Beyond nutritional considerations, hummus exerts a positive environmental impact, as chickpea cultivation necessitates less water compared to other protein crops. Opting for hummus can thus contribute to a reduction in ecological footprint and endorse a sustainable lifestyle.

In conclusion, hummus distinguishes itself not only through its palatable characteristics but also through its nutritional benefits and positive influence on health and the environment. Integrating this culinary delight into daily dietary practices represents an astute choice for those seeking to maintain nutritional equilibrium and advocate for a healthful and sustainable lifestyle.

Keywords: Hummus, healthy fats, vegetarian food, sustainable food

P5

Honey as a functional food

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This paper focuses on the study of the natural and versatile food - honey, analyzing its physicochemical characteristics, nutritional properties, and its benefits for public health and food safety. Honey has been appreciated and used since ancient times for its nutritional qualities, as well as its antioxidant and antimicrobial properties.

Within this work, aspects related to the chemical composition of honey are examined, including its proximate and minerals composition, along with its role in preventing and treating certain conditions. Additionally, honey production and processing technologies are discussed, highlighting the importance of adhering to standards and regulations regarding food safety.

Besides its nutritional benefits, honey is recognized for its antibacterial and antioxidant properties, contributing to public health protection by preventing diseases and boosting the immune system. Furthermore, the paper emphasizes the importance of proper handling of honey to avoid contamination and ensure food safety.

In conclusion, this study highlights the contribution of honey in promoting public health and the importance of implementing control measures and regulations to ensure the quality and safety of this valuable natural food.

Keywords: Honey, functional foods, proximate composition, food safety

P6

Quality characteristics and acceptability of low sugar content jelly with carrot and orange

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Jelly is a semi-solid dessert that is popular among people of all age groups because of its sweet taste and unique texture. Today, extracts or juices derived from natural products are incorporated into the jelly formula for various purposes, such as replacing synthetic colourings, increasing nutritional value and increasing bioactivity.

Jelly contains high amounts of sugar, and previous studies have attempted to reduce or replace sugar in jelly products using fruit powders, sugar substitutes and mixtures of gelling agents.

In the present study, two types of jelly were obtained from carrots and orange juice as raw materials and two types of sweeteners were used to impart a pleasant taste: crystal sugar and stevia. Following the analysis of the sensory characteristics, the average score for the *General Acceptability* criteria was 4.70 points for the sample with stevia and 4.60 points for the sample with sugar, falling between the moderately pleasant (4) and extremely pleasant (5) ranges on the 5-point hedonic score scale.

The carrot and orange jelly samples registered an ash content ranging from 1.19% to 1.28%, the results being similar to studies conducted by Abdelkebir R., et al., 2015, who obtained a mineral content in jellies ranging from 0.75 to 2.20%. The water content of the studied samples was 21.12% in the sample of jam with crystal sugar and 14.06%, in the sample of jelly with stevia, values that are within the limits set by the norms in force.

The vitamin C content of the studied jelly samples ranged from 7.14 mg/100 g (carrot jelly with sugar) to 8.25 mg/100 g (carrot jelly with stevia) and the soluble content ranged from 57.8% (carrot jelly with stevia) to 68.5% (carrot jelly with sugar).

Carrot and orange jelly with stevia samples had a higher content of polyphenolic compounds 58.6 mg GAE/100 g compared to carrot and orange jelly with crystal sugar (57.3 mgGAE/100 g) consistent with other studies.

The carrot and orange jelly samples studied meet the quality and safety requirements, have outstanding nutritional properties through the supply of bioactive compounds (vitamin C and polyphenols) and have a high degree of consumer acceptability.

***Keywords**:* jelly, carrot, orange, polyphenols, bioactive compounds

P7

Citrus sherbet - a tasty and nutritious sweet product

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Citrus fruits have seen a steady increase in commercial demand worldwide. In 2016, citrus production reached 124,246 thousand tonnes. Of these, the orange stands out, with a global production of 66,974 thousand tonnes/year. The orange is a highly nutritious food, a source of phytochemical compounds such as vitamin C, flavonoids and carotenoids, which also give it antioxidant properties. It is commonly consumed fresh and in juices, jams, herbal extracts and dietary supplements. This study aimed to develop a new sherbet recipe and using as raw material - orange and lemon juice, also developing the technological process, determining physicochemical properties, and impact on consumers. Following the results obtained water content of the citrus sherbet samples ranged from 18.36% (lemon sherbet) to 19.25% (orange sherbet), the results being in line with the results obtained by other authors, who quote a range of 16-28% water for products preserved with sugar.

The vitamin C content recorded in the sherbet samples studied ranged from 7.5 mg/100 g (orange sherbet) to 8.4 mg/100 g (lemon sherbet), and the level of polyphenols was higher in the lemon sherbet (172.79 mg GAE/100 g) compared to the orange sherbet samples (158.67 mgGAE/100 g). The impact of products obtained on consumers was determined using the 9-point hedonic scale. The average score for the Overall Acceptability criterion was 8.85 points for the orange sherbet sample and the average score for the lemon sherbet was 8.38 points, the taste being to the liking of the evaluators.

The orange and lemon sherbet samples meet the quality requirements set by the legislation in force, have outstanding nutritional characteristics and scored high marks from consumers who participated in the sensory evaluation, with a positive impact.

Keywords: sherbet, orange, lemon, polyphenols, vitamin C.

P8

Studies on the production and characterization of a fermented alcoholic beverage from figs

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The aim of this work was to present the technology of obtaining a fig cider assortment, as well as the characteristics obtained from its preliminary and physico-chemical analysis. The reason for the choice of the topic is the seasonal nature of figs, which is reflected in an imbalance between production and consumption of these fruits as such, in their fresh state, so that it is necessary to process the excess production. There is also growing consumer interest in this type of refreshing drink, which can be marketed as unpasteurised draft beer. As figs are highly perishable, they have a short shelf-life and are consumed fresh only in season and preserved by dehydration to extend shelf-life or used as jams and other sweet products. Cider or fruit wines are non-distilled alcoholic beverages, usually made from apples, pears, peaches, plums or apricots, bananas, elderberries, etc. and other fruits with a high sugar content. These fruits undergo a period of fermentation and ageing. Fruit cider-type fermented alcoholic beverages usually have an alcohol content of between 5 and 13%, but can reach higher alcoholic strengths, depending on the sugar content of the fruit raw material and the production recipe in which the sugar content is supplemented. The fig wine obtained has a high alcoholic strength, obtained by fermenting the figs and the added sugar according to the production recipe. This alcoholic strength gives it good physico-chemical and microbiological stability. On the basis of the residual sugar content, the product obtained is classified as a dry wine and is not subject to further refermentation. The high value of total dry extract denotes fullness and well-defined taste characteristics.

The sensory attributes assessed also reveal a pleasant golden-yellow colour, clarity and crystalline lustre and a harmonious taste with well-defined acidity, without strong astringency. The results obtained recommend exploiting the nutritional potential of figs to produce fermented alcoholic beverages that are balanced from a physico-chemical and sensory point of view.

Keywords: figs, fermented alcoholic beverage, sensory attributes, physico-chemical analysis

P9

Obtaining and characterization of chocolate confectionery with added grape skin powder

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The aim of this study was to present the technology of obtaining chocolate with added powder from grape skins recovered from the grape marc obtained as a by-product in winemaking. Also, assortments of chocolate obtained were investigated in order to evaluate organoleptic and physico-chemical characteristics. Grape pomace is the main by-product resulting from the grape vinification process, available in large quantities, rich in bioactive compounds, mainly from the polyphenol class, with multiple health benefits. Grape pomace consists of grape skins, seeds and bunch residues. The nature of the process and the conditions under which vinification takes place influence the composition of grape pomace. Conditioning of grape pomace by convective drying results in a reduction of total phenolic compounds, anthocyanins and total antioxidant capacity, but conditioned grape marc still retains a significant part of the bioactive properties of the fresh material. The results obtained when evaluating the antioxidant properties of red grape pomace powder, Burgund variety, show that the moderate temperature of 65°C at which it was conditioned is recommended in order to preserve a significant proportion of the content of bioactive compounds with antioxidant potential. The chocolate confectionery obtained by including in the manufacturing recipe grape skins recovered from dried grape marc, showed a high protein and fat content.

As grape pomace is a valuable source of dietary fiber and bioactive compounds, we believe that its use as a functional ingredient results in products with superior nutritional and antioxidant characteristics to the control sample. The addition of grape skins powder did not impair the sensory attributes of the chocolate confectionery obtained. The results recommend the use of grape skins powder as a functional food ingredient in the technological process of chocolate and other food products.

Keywords: red grape pomace, grape skins powder, phenolic content, antioxidant properties, chocolate confectionery

P10

Determination of aflatoxins level in corn and wheat samples from Banat area, Romania intended for human consumption

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Aflatoxins are a group of extremely toxic metabolites produced by some Aspergillus species namely *A. flavus*, *A. parasiticus* and the rare *A. nomius*, during the growth on foods and/or feeds [1]. Previous studies have demonstrated that cereals could be contaminated with various microorganisms including toxigenic moulds (especially Aspergillus spp.) which have aflatoxin producing potential [2]. From the variety of these natural toxins (over 20 related compounds regarding the chemical structure), four substances known as B1, B2, G1 and G2, where B-means blue and G- green fluorescence, and 1, 2 referring to the relative chromatographic mobility, are considered as significant feed and food contaminants [3, 4]. Many of the vegetable commodities such as (peanuts, cereals, druid fruits, nuts, cotton, etc) can be contaminated with aflatoxins even during the crop growth, and the degree of contamination can rise even during the harvest, drying and storage period. Also, the aflatoxins can contaminate the products during the storage even initially there was not any detectable trace of these natural toxins [5]. Therefore, cereals pose health problems because they are often added to foods with few processing operations. In the European Union (EU) an acceptable level of aflatoxins for wheat has been set at 2 μg Kg^{-1} for AFB1 and 4 μg Kg^{-1} for total aflatoxins (AF_T), respectively 5 μg Kg^{-1} and 10 μg Kg^{-1} for corn [6]. Romania, as a member of the EU, also has harmonized its aflatoxins limits accordingly to this directive. Due to their frequent occurrence and toxicity, it is essential for our country to dispose of a data base regarding the presence of these toxins in Romanian food and feed products. It must be noticed that there is only one published complex research study, done by the Pasteur Institute

from Bucharest, between October 2002-april 2004 regarding the aflatoxin level on the indigene cereals, feed and other vegetable foodstuffs.

Therefore**,** this study wants to further investigate the occurrence of the B1, B2, G1 and G2 concentrations to provide information on aflatoxins levels in cereal crops (wheat and corn), grown and consume in this region of our country.

The study follows the monitorisation of the aflatoxin B_1 (AFB1), B_2 (AFB2), G_1(AFG1), G_2(AFG2) levels in samples of cereals such as wheat and corn collected right after harvest as well as from different storages located around Timisoara, Ortisoara, Giarmata and Vinga, villages. A number of 120 corn respectively 90 wheat samples, was analysed by HPLC with flourescence detection and post-column derivatisation. The purification of the sample extracts was done by using immonoaffinity column clean- up. The presence of all four aflatoxins was observed in most of the samples. The content of total aflatoxins (AF_T) in wheat respectively corns samples varied between 1.27 and 4.89 μg Kg^{-1} in wheat and between 4.67and 8.98 μg Kg^{-1} in corn. Aflatoxin B_1 was the micotoxin found with the higher frequency (89.12%). The highest contamination level of AFB1 was found in two wheat samples (1.27 μg Kg^{-1}, respectiv 1.75 μg Kg^{-1}) located in Giarmata village. Regarding the corn samples, the highest aflatoxin B1 concentration was found in one sample (4.34 μg Kg^{-1}) taken from a private storage from Vinga village.

Keywords: aflatoxins; cereals; HPLC; Romania

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P11

Study on the production and characterisation of raw-dried salami from game meat

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Game meat has a number of benefits, such as low fat and high protein content, a rich source of vitamins and minerals, no antibiotics, hormones and enhancers. The superior qualities of venison make it not only a distinguished but also a very healthy ingredient.

In the present paper a salami made from game meat was obtained and characterised from an organoleptic and physico-chemical point of view, the results being compared with the maximum and minimum values regulated by Order No 210 of 30 August 2006 on the physico-chemical properties of meat products for the approval of the Rules on the marketing of meat products. The results obtained were compared with the physico-chemical characteristics of a salami obtained according to a similar recipe and technology but using domestic pork.

The physico-chemical analyses were carried out at the Interdisciplinary Research Platform of the "Regele Mihai I" University of Life Sciences in Timișoara.

The main physico-chemical characteristics monitored in the game meat salami sample were: moisture content (%), fat (%), sodium chloride (%), protein (%), ash (%), carbohydrate (%), nitrite (mg/100 g), energy value (kcal/100 g) and Kreiss reaction.

The value recorded for game meat salami was 41.55%, compared to 43.04% for the control sample, both values being within the maximum permitted limit of 45%;

The value obtained for the protein content of the game meat salami studied was 24.13%, higher than the domestic pork meat control sample of only 19.59%, both above the minimum accepted value regulated by the legislation in force.

The fat content established by Order 210/2006 is a maximum of 50% for smoked and dried meat products, the sample examined recorded a fat content of 28.54% compared to the control sample of 31.91%. The NaCl content (%) in the examined sample was 2.83% and in the control sample 2.87%, the maximum limit of 6% set by Order 210/2006 on the admissibility conditions of smoked and dried meat products was not exceeded. The content of mineral substances in the salami sample from game meat was 2.53% and 1.73% for the control salami sample, with no legislated maximum limit. The carbohydrate content in the salami samples studied was 0.42% for the wild boar salami and 0.86% for the control salami sample, with no legislated maximum limit. The energy value calculated for the game meat salami sample studied was 355.06 Kcal/100g and for the control sample 368.99 Kcal/100g, with no limits set by Romanian legislation in this respect.

Keywords: game meat, physical - chemical composition, organoleptic analysis, sensorial analysis

P12

Valorisation of wild game meat for smoked and dried meat specialities

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Game meat is considered important in the diet and its share in consumption has increased in recent years. There is now a growing consumer interest in meat from animals raised as close to natural conditions as possible. One such demand is undoubtedly met by game meat, which is characterised by high nutritional value and specific sensory properties desired by consumers.

The main aim of the work was to obtain a sausage-type product from wild boar meat and to make a comparison with a similar sausage from domestic pork.

In order to highlight the nutritional benefits of wild boar meat, the two products were analysed from a sensory and physical-chemical point of view in the physical-chemical analysis laboratory of the Interdisciplinary Research Platform, U.S.V. "*Regele Mihai I*" in Timișoara.

From a sensory point of view, the appearance, consistency and taste were observed.

From a physico-chemical point of view, the following were monitored: water content, ash, protein, fat, NaCl and freshness.

The value recorded for the water content of wild boar sausages was 33.22% and for domestic pork sausages (control sample) was 33.04% (Figure 4.1), these values being within the maximum permitted limit of 35%.

The value obtained for the protein content of the wild boar sausages studied was 22.25% higher than the value recorded for the control sausage sample (20.15%), these values being above the minimum accepted value regulated by the legislation in force (16%).

The fat content in the sample examined was 36.22%, lower than the value recorded for the control pork sausage sample, i.e. 38.25%, these values being

within the maximum limit of 50% set by Order 210/2006 for smoked and dried meat products.

The NaCl content (%) in the wild boar sausage sample analysed was 2.75% and in the control sausage sample 2.87%, the maximum limit of 6% set by Order 210/2006 not being exceeded.

The mineral content in the game meat sausage sample was 2.88% and in the control sausage sample 1.77%, as there is no legislated maximum limit for this indicator.

The carbohydrate content of the wild boar sausage sample studied was 2.68% lower than the value recorded for the control sausage sample of 3.92%. The energy value calculated for the wild boar sausage sample studied was 425.70 kcal/100 g, lower than the energy value calculated for the domestic pork sausage sample 440.53 kcal/100 g, as there are no limits set by the Romanian legislation in this respect. However, the value obtained is comparable with the values reported by some researchers in the literature (386 kcal/100 g).

The Kreiss Reaction analysis for the sausage samples studied was negative. As a result of the sensory analysis carried out for the two sausage samples, the highest total and individual score for each characteristic was obtained for the wild boar sausage sample.

Keywords: game meat, physical - chemical composition, organoleptic analysis, sensorial analysis

P13

Strawberries and raspberries bioactive powder production

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Strawberries show a fiber content of 0.9-1.2%, while raspberries contain a higher amount of fiber, around 2.9-3.9%. The moisture content of raspberry and strawberry fruits are relatively similar, only the drying process is much longer for raspberry (73 minutes compared to 58 minutes, of strawberry drying time).

In order to carry out the study, raspberry and strawberry fruits were analyzed from the perspective of moisture content, mineral composition and total antioxidant capacity (TAC).

Raspberry and strawberry samples are characterized by high total antioxidant capacity (strawberry TAC = 64.9 µmol TE/g d.w; raspberry TAC = 82.7 µmol TE/g d.w) values compared to literature data. The mineral content of the raspberry fruits are higher compared to strawberries.

There is a positive correlation between the data of the mineral content of strawberries and raspberries, showing higher concentrations than those found in different databases, which confirms the superior quality of Romanian fruits.

A functional raspberry and strawberry products are characterized by: intense taste and aroma, high nutritional value and pleasant texture.

The process of obtaining bioactive raspberry powder can vary depending on your preferences and available equipment. The obtained powder is characterized by a high mineral content as well as a high total antioxidant capacity.

Keywords**:** functional food, food quality, total antioxidant capacity, minerals

P14

Monitoring the technological process of obtaining pork sausages with hazelnuts and nuts, evaluation and comparison of quality indicators

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The pork sausages with hazelnuts and nuts presented in the present paper were obtained based on the technology and block scheme of operations presented in the paper. Following physico-chemical analyzes as well as comparisons with data from the specialized literature, the following conclusions were drawn:

The analysis of the water content in the case of the sample of pork sausages with hazelnuts and nuts p.p. recorded a value of 51.73 g / 100g product, below the maximum limit imposed by the rules and legislation in force - 66 g / 100g product.

The analysis of the protein content in the case of the sample of pork sausages with hazelnuts and nuts p.p. recorded a value of 14.8 g / 100g product, above the minimum limit imposed by the rules and legislation in force - 10 g / 100g product.

The analysis of the fat content in the case of the sample of pork sausages with hazelnuts and nuts p.p. recorded a value of 27.16 g / 100g product, below the maximum limit imposed by the rules and legislation in force - 30 g / 100g product.

The analysis of sodium chloride content in the case of pork sausage sample with hazelnuts and nuts p.p. recorded a value of 2.37 g / 100g

product, below the maximum limit imposed by the rules and legislation in force - 3 g / 100g product.

The analysis of the total ash content in the case of the sample of pork sausages with hazelnuts and nuts p.p. recorded a value of 3.1 g / 100g product, slightly exceeding the maximum limit imposed by the rules and legislation in force - 3.1 g / 100g product.

The analysis of carbohydrate content in the sample of pork sausage with hazelnuts and nuts p.p. recorded a value of 3.21 g / 100g product, located in the range, (1.34 – 3.77 g / 100g product), recorded by other researchers in the field.

The energy value of the pork sausage sample with hazelnuts and nuts p.p. was 316.48 Kcal/100g product, respectively 1311.09 Kj/100g product, above the range (250.35 - 277.98 Kcal/100g product) respectively (1036.96 - 1150.04 Kj/100g product).

Keywords: pork sausages, hazelnuts and nuts, technological process, quality indicators

P15

Technical-economic study of the introduction in the food processing of a new jam recipe of citrus and banana sweet

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Through the proposed design/sizing theme, the paper aimed to involve the food technologist in food processing, design, and safety by EU Regulation no. 852/2004 requirements. We initiated our experiment with a classic fruit jam recipe; a new processing recipe was designed through repeated experimental tests that allowed the establishment of the main specific technological parameters (foreign bodies, edible parts, technological losses, processing yields, etc.). The experimental results were extrapolated and represented the input data of the evaluation: partial and global material balances alongside the main elements of economic calculation. The HACCP study identified two critical control points corresponding to the storage operations: cleaning of raw materials and pasteurization (heat treatment). For each critical control point identified, the critical limits, the corrective actions, the monitoring system, and the documentary part related to a critical control point (temperature monitoring sheet, non-conformity sheet, etc.) were established. The obtained experimental data justify in perspective the extension of concerns to other categories of agro-food products, especially with a seasonal character, with cultivation area sometimes restricted, with high perishability, or other representatives of the range of plant material carriers of less or no publicized and established dietary and/or sensory utilities.

Keywords: jam, food preservation, food safety, HACCP

Section: Food Control

P16

Valorisation of lentils as a vegetable source of protein in chicken pâté technology

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Proteins are the most important components of all living organisms, especially those with higher organisation. At the same time, they make up the most diverse class due to the unique sequence of amino acids in the primary structure of a polypeptide chain. Compared to animal proteins, plant proteins reduce blood lipid levels. Thus, the effect of added plant protein on reducing the concentration of low-density lipoproteins and total blood cholesterol is greater than that of protein extracts or isolates, but they are preferred because of the negative effects of isoflavones in whole soybeans on mammals.

Plant proteins are used to replace the functional and nutritional properties of skeletal muscle proteins in a variety of processed meat products. The most commonly used plant proteins in meat products are those derived from soybeans or wheat. However, there are a wide variety of other plant protein sources that are or may be used in the future, including peas, potatoes, corn, canola, rice and various other vegetable proteins and oilseed sources.

The research carried out in the diploma project entitled "Valorisation of lentils as a vegetable source of protein in chicken meat pâté production technology" consisted of making four types of pâté, one simple pâté exclusively from raw materials of animal origin and the other three in which meat was substituted with lentils in various proportions (10%; 20% and 30% respectively).

The products obtained were characterised from a physical-chemical point of view by determining moisture %, lipids %, NaCl %, proteins %, Kreiss reaction, calculation of carbohydrate content and energy value. The resulting values were compared with the values regulated by Order No 210 of 30 August 2006 on the physico-chemical properties of meat products for the approval of the Rules on the marketing of meat products. In addition to the physico-chemical evaluation, a sensory analysis was carried out to assess the impact of substituting animal raw materials with lentils.

Following the analysis, the water content values recorded for the pâté samples ranged from 57.12 - 61.12%, the maximum permitted water content in pâté being 74%, according to Order 210/2006. The protein content of the pâté samples studied ranged from 16.52 - 19.46%, which is above the minimum permitted value of 9% set by Order 210/2006 for pâté. Following extraction with the Soxhlett extractor, the values recorded for the samples analysed ranged from 15.11 - 23.24%, with the highest fat content recorded for the chicken pâté sample and the lowest value recorded for the pâté with 30% lentils. From the analysis of the experimental data it can be seen that the fat percentage decreases with the increase of the lentil content, this value being below the maximum allowed limit of 30%. The NaCl content (%) of the samples analysed was between 1.56-1.69%, the maximum limit of 2% established by Order 210/2006 on the conditions of acceptability of cooked meat products was not exceeded. From the analysis of the experimental data, it can be seen that the value range recorded for the pâté samples was between 0.65 - 0.99, the mineral content increasing with the increase in lentil content, with no maximum or minimum limit laid down by the legislation in force. The carbohydrate content of the pate samples studied was in the range 0.91 - 2.10%, the lowest value being recorded for chicken pate (0.91%) and the highest value for chicken pate with 30% lentil added (2.10%). The calculated energy value (Conf. EC Regulation 1169/2011) for the pate samples studied was in the range 222.23 - 278.88 Kcal/100 g and the reference consumption between 10.86-13.36%.

From the analysis of the obtained data it can be concluded that as the percentage of lentils in the product increases, there is a decrease in the energy value but also in the percentage expressing the reference consumption, as no limits were set by the Romanian legislation in this respect. Following the analysis of the Kreiss Reaction for the samples studied, it was negative. As a result of the sensory analysis carried out for the four pâté samples, the highest total and individual score for each characteristic was obtained for the pâté with 20% lentils. In conclusion from a sensory point of view lentils in moderate proportions improve the characteristics of the product in which they are added.

Keywords: dry-cured salami, almond, physical - chemical composition, organoleptic analysis, sensorial analysis

P17

Obtaining dairy products through traditional processes and technologies, evaluation and comparison of quality indicators of "Telemea" cheeses

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In this paper were studied several bibliographic data on raw materials, manufacturing methods and installations/machinery used in the technological process of cheese production.

Based on the technological process and the block scheme of operations presented in the work, cow cheese enriched with mint was obtained.

Also in this paper was carried out a physico-chemical evaluation of quality indicators: proteins, total ash, fats, moisture, sodium chloride, carbohydrates and energy value for cow cheese enriched with mint, comparison of the results obtained with the values prescribed in the legislation, norms in force as well as results obtained by other researchers in the field.

Comparisons of the results with legislation and rules in force led to the following conclusions:

- in the case of water content, the sample of cow's "Telemea" cheese with mint of own production recorded a value of 51.73 g/100g product, below the limit of maximum 55 g/100g product provided by the legislation and norms in the field;
- in the case of protein content, the sample of own-produced cow's "Telemea" cheese with mint recorded a value of 14,8 g/100g product, above the minimum limit of 14 g/100g product provided by the legislation and rules in the field;
- in the case of fat content, the sample of cow's "Telemea" cheese with mint of own production recorded a value of 27,16 g/100g product, above the

limit of values in the range (19,7 g/100g product - 23 g/100g product), recorded by other researchers in the field;

- in the case of sodium chloride content, the sample of cow's "Telemea" cheese with mint of own production recorded a value of 2,37 g/100g product, situated within the maximum limit of 4 g/100g product provided by the legislation and norms in the field;
- in the case of ash content, the sample of own-produced cow's "Telemea" cheese with mint recorded a value of 3,1 g/100g product, slightly below the limit of values in the range (3,25 g/100g product – 4,63 g/100g product), recorded by other researchers in the field;
- in the case of carbohydrate content, the self-produced cow's "Telemea" cheese sample with mint recorded a value of 3.21 g/100g product, well above the limit of values in the range (0.5 g/100g product – 0.77 g/100g product), recorded by other researchers in the field;
- The energy values for the 5 samples of cow's milk "Telemea" cheese followed the following hierarchical order: cow's "Telemea" cheese with mint p. p. > cheese "Telemea" de cow – sample 4 > cheese "Telemea" de cow – sample 1 > cheese "Telemea" de cow – sample 3 > cheese "Telemea" de cow – sample 2.

Keywords: milk, "Telemea" cheeses, technological process, quality indicators

P18

Sensory assessment of the pork sausages with adaos of vegetable oils

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Abstract. The purpose of this paper was to obtain 3 types of pork sausages in home conditions (one traditional, one with the addition of soybean oil and one with the addition of olive oil) and their sensory appreciation.

As consumers become more health conscious, demand for meat products low in saturated fat is steadily increasing (Marchetti et. all., 2014). The World Health Organization recommends reducing consumption of saturated and trans fatty acids and encourages people to switch to a diet higher in polyunsaturated fats (WHO, 2013).

Material and methods

One of the three variants of the pork sausages was made in the housework conditions, using the recipe shown in table 1.

Table 1. The recipe of homemade sausage

No	Ingredients	Quantity
1	Pork, [g]	3.000
2	Olive oil/soybean oil, [%] *	5
3	Paprika, [g]	57
4	Salt, [g]	47
5	Egg yolk, [g]	15
6	Pepper, [g]	14
7	Garlic, [g]	0.75
8	Caraway, [g]	0.45
* The percent was calculated for pork quantity		

The ingredients were purchased from the local supermarkets.

For sensory analysis, the method by comparison with unit score scales [8-STAS 12656-88] was used. According to this method, each characteristic is evaluated by comparing with scoring scales from 0...5 points, ascending depending on the degree of satisfaction, and obtaining the average score given by the group of tasters.

The sensory assessment of the samples was performed by 8 people, ordinary consumers, of different ages. Each evaluator gave ratings for appearance (color), smell, consistency and taste.

The individual assessments were centralized and processed; the obtained results were presented in Figure 1.

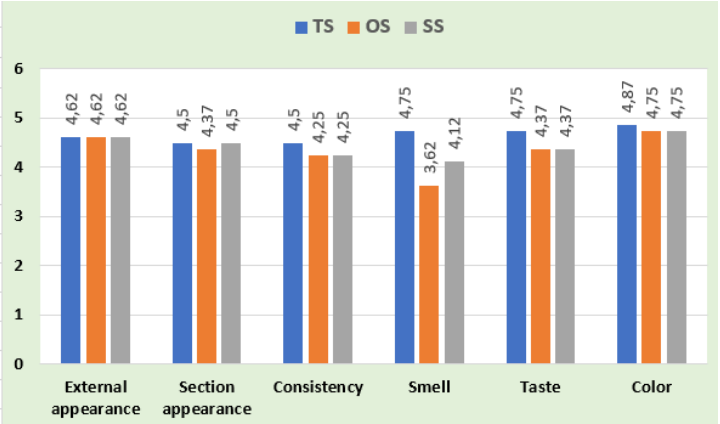

Figure 1. The results of sensorial assessment

It scored best for the next characteristics: smell, taste, color and consistency. The second place was occupied by "Sausages with soybean oil" with a total score of 35.5. It scored closely for all sensory characteristics, scoring slightly lower than "Traditional Homemade Sausages" for almost all sensory characteristics. In the exterior appearance and layout sections on the section were on par. The third place is occupied by "Sausages with Olive Oil", which obtained the lowest total score, namely 34.66, the average being 4.49, the second of the 3.

***Keywords*:** liver, health, fatty acids

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P19

Functionality. Concept

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Qualitative disturbances in the current diet profoundly affect the body's status, manifesting to varying degrees since intrauterine life. Scientific records describe various etiological agro-food mechanisms in nutritional pathology, but they are not exactly determined, and the results of the studies are insufficient. The nutritional problems that have arisen, in the new context of globalization, are partially explained by ***Barker*** *hypothesis*, the *phenotype-prosperity hypothesis*, which shows that "*the nutritional transition begins already in intrauterine life, as a response to inadequate maternal diet, with adaptive changes at the level of fetal organs*". The changes are irreversible, transposed to the adult individual through the disruption of physiological and metabolic processes, manifested both in malnutrition and when returning to a normal diet [1]. These problems have imposed the emergence of *medicinal foods*, with target functions, but which also satisfy the body's current nutritional needs. The development of products that provide health benefits is of relatively recent date, being the result of accepting the idea that nutrition has a determining role in the prophylaxis and therapy of certain aliments. Arguments underlying the rise of "*functional foods*" with "*health benefits*" and the development of a new market, with various opportunities for food processors [2]. The term "*functional food*" appeared for the first time in Nature magazine (1993), in an article entitled "*Japan Explores the Boundary between Food and Medicine*" [3]. In order to quantify *the risk-benefit* relationship of foods with defined, *functional* properties, the WHO and FAO organizations have developed some recommendations regarding obtaining this category of foods [4]: detection of food components that confer this characteristic; risk

assessment; the elaboration of rules and regulations; the development of educational and informational strategies. *A food can be considered as "**functional**", if it is demonstrated by arguments, the target beneficial character, beyond the nutritional effects and to present safety according to food risk assessment standards*. *The boundary* between *food* and *medicine* is rather precarious, and the exclusive tendency to use only *food-medicine* is dangerous. A *functional* food, beyond the basic nutritional function, can have a similar structure to conventional food, consumed as part of a regular diet, but with physiological benefits and/or reduces the risk of chronic diseases [5].

Keywords: Barker hypothesis, functional food.

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P20

Acorn flour, an unconventional flour that improves the quality characteristics of gluten-free flour products

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Over the past decade, the food industry has seen a surge in the production of healthy, nutrient-dense foods as consumers increasingly prioritize their health. These products serve as alternatives to traditional options, which often have lower nutritional value. Additionally, consumers have shown a growing interest in organic and functional foods due to their perceived health benefits. There is a clear link between the raw materials used and consumers' health. Therefore, emphasis has been placed on the quality and nutritional profile of these raw materials. Additionally, there is a growing demand for gluten-free food products due to an increasing number of consumers with celiac disease requiring them as part of their special diet. Obtaining bakery products that are gluten-free presents several technological challenges that can compromise their quality. This study aims to analyze an unconventional flour assortment as a potential replacement for traditional gluten-free flours to produce high-nutrition gluten-free bakery products. Apart from the commonly used gluten-free flours such as rice, oats, maize, millet, sorghum, flax and soya, there are also other non-traditional raw materials that can be used to produce a variety of gluten-free bakery and pastry products. An example of gluten-free flour is acorn flour, which is derived from the fruit of *Quercus sp.* To obtain acorn flour, the acorns are peeled, and the kernel content is dried and ground. Acorns have a high nutritional profile, with a high percentage of fiber (13-51%) and as moderate percentages of protein (4-7%), fats (1-3%), and ash (2-4%). In terms of vitamin and mineral content, acorns contain significant amounts of vitamins B, A, and E, as well as sodium, potassium, iron, manganese and phosphorus. Acorn flour has a high starch content, ranging from 71-74%, and is also rich in proteins (5-7%) and fats (7-9%). Additionally, it contains

significant amounts of fiber (10-12%) and micronutrients, including vitamins B2, B3, and B5, as well as potassium, calcium, magnesium, sulfur, iron, manganese and phosphorus. Because of their high starch content, acorn flour is considered a good alternative to cereal flour in many food industry applications. Acorn flour can be used in the manufacture of various bakery products, beverages, confectionery, pasta and biscuits, and as a coffee substitute. According to research, incorporating up to 15% acorn flour substantially enhances the nutritional qualities of bakery and pastry products without significantly affecting their sensory and quality properties. The literature data indicates that acorn flour substitution for bakery and pastry production depends on the product type and can vary from 10 to even 60%. Acorn flour has several benefits for the human body due to its superior nutritional profile. It can improve digestion, regulate cholesterol levels, and prevent obesity, atherosclerosis, and cancer. Additionally, it has a tonic and regenerative effect on the body. The introduction of new goods made from acorn flour would significantly increase the variety of innovative food products available on the constantly evolving market.

Keywords: gluten-free products, acorn flour, unconventional flours, innovative foods

P21

Monitoring the technological process of obtaining raw-dried salami "Paprika", evaluation and comparison of quality indicators

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In this paper were studied several bibliographic data on raw materials, manufacturing methods and equipment/machinery used in meat processing. Based on the data resulting from the technological process of obtaining raw dried salami "PAPRIKA" and with the help of Microsoft Office Excel, a mathematical model was developed to evaluate losses, specific consumption and manufacturing yield.

The specific consumption recorded was 1,146 kg of raw and auxiliary materials to obtain 1Kg of dry raw salami "PAPRIKA". The manufacturing yield recorded was 87.22%.

Also within this work was carried out a physico-chemical evaluation of quality indicators: protein substances, total ash, fatty substances, moisture, sodium chloride, carbohydrates and energy value for dry raw salami "PAPRIKA" and comparison of the results obtained with the values prescribed in the legislation, norms in force as well as the results obtained by other researchers in the field of meat products.

Comparisons of the results with legislation and rules in force led to the following conclusions:

- the content of protein substances, salami "PAPRIKA" – p.p. registered the lowest value - 19.63 g / 100g product, below the limit provided by the legislation in force, minimum - 20 g / 100g product;

- total ash content, also in the case of salami "PAPRIKA" – p.p. was recorded the lowest value – 2.912 g / 100g product, located within the limit provided by the legislation in force, maximum - 4 g / 100g product;
- and in the case of fat content "PAPRIKA" salami – p.p. recorded the lowest value – 30.93 g / 100g product, situated within the limit provided by the legislation in force, maximum – 46 g / 100g product;
- water content, dry raw brass sample 5 recorded the highest value – 29.51 g / 100g product, located very close to the limit provided by the legislation in force, maximum – 30 g / 100g product;
- the content of sodium chloride, dried raw brass sample 4 recorded the highest value – 5,26 g / 100g product, below the limit provided by the legislation in force, maximum – 6 g / 100g product;
- the highest carbohydrate content was recorded in the sample salami "PAPRIKA" – p.p. – 18,868 g / 100g product, the other samples showed a much lower carbohydrate content, located in the range of 2,489 g / 100g product – 5,830 g / 100g;
- The energy value for the 6 samples of dried raw salami followed the following order: dry raw salami sample 1 < dry raw salami sample 3 < dry raw salami sample 4 < dry raw salami sample 2 < dry raw salami sample 5 < salami "PAPRIKA" – p.p.

Keywords: pork sausages, paprika, technological process, quality indicators

P22

Presence of heavy metal in ground and instant coffee

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Heavy metals are considered toxic elements because they have the ability to accumulate and transfer along the food chain. The maximum levels, at which they are present, become a quality standard, worldwide. The aim of the study was to investigate the level of heavy metals in coffee beans and instant coffee. The presence of heavy metals in coffee can induce adverse health effects such as severe decrease in liver functions, mutagenesis and carcinogenesis. All analysis were performed in triplicate using XRF Hitachi Met8000 Analyzer at the Interdisciplinary Research Platform belonging to the University of Life Sciences "King Michael I" from Timisoara.

The use of mathematical models allows the identification of the quantitative proportions of coffee, depending on the nutritional characteristics sought. Principal component analysis highlights the characteristics of the coffee assortments, grouping them into instant coffee and ground coffee samples, based on the mineral composition of the analyzed samples. Ness coffee samples are notable for their high content of mercury, while ground coffee is characterized by their high content of cadmium and molybdenum. The highest potassium and calcium content is found in instant coffee samples. Finally, we can say different varieties of coffee contain chemical elements that can affect a person's health, but consumed in small quantities, these harmful effects are insignificant.

The acquisition of XRF Hitachi Met8000 analyzer was financed by Interreg–IPA Cross–border Cooperation Romania-Serbia Programme, through the project “Modern technologies for monitoring land covered with waste in order to restore their initial use”, 2019-2021, code e-MS: RORS 365.

Keywords: contamination level, hazard, mathematical models

P23

Monitoring the technological process of obtaining "DRUMEȚULUI" bread, evaluation and comparison of quality indicators.

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In this paper were studied several specialized bibliographic data on bakery products, raw materials, technological methods and equipment used in obtaining bread.

Based on the data recorded in the pastry laboratory, respectively from the technological flow of obtaining bread "DRUMEȚULUI" p.p. and with the help of Microsoft Office Excel, a mathematical model was developed for assessing losses, calculating specific consumption and manufacturing efficiency.

The specific consumption recorded was 1.22 Kg of raw and auxiliary materials to obtain 1Kg of "DRUMEȚULUI" bread. Manufacturing efficiency recorded in the technological process of obtaining bread "DRUMEȚULUI" p.p. being 81.78%.

The second stage of the chapter of own contributions was the physico-chemical evaluation of the quality indicators: humidity, proteins, fats, fiber, carbohydrates, energy value for bread "DRUMEȚULUI" p.p. and comparison of the obtained results with the values prescribed in the legislation, norms in force as well as the results taken from the specialized literature for other bread samples.

When comparing the results obtained for "DRUMEȚULUI" bread p.p. with the legislation, norms in force and values taken from the specialized literature, the following conclusions emerged:

- in the case of moisture content, a value of 45.8 g / 100g product was recorded, being below the maximum limit provided by legislation - 47 g / 100g product, but much higher than the values taken from the specialized literature where the highest value recorded was 37.78 g / 100g product;
- in the case of protein content, a value of 13 g/100g product was recorded, being in the range of values taken from the specialized literature, where the lowest value was 9.22 g/100g product and the highest value was 37.78 g/100g product;
- in the case of fat content, a value of 5,4 g/100g product was recorded, being situated in the range of values taken from the specialized literature, where the lowest value was 1,19 g/100g product and the highest was 6,16 g/100g product;
- in the case of fibre content, a value of 6.8 g/100g product was recorded, being well above the values taken from the literature, where the highest value recorded was 2.1 g/100g product;
- in the case of carbohydrate content, a value of 29 g/100g product was recorded, being well below the range of values taken from the specialized literature, where the lowest value was 41.04 g/100g product and the highest was 63.42 g/100g product;
- The energy value of the evaluated products follows the following hierarchical order: bread of "DRUMEȚULUI" p.p. < multigrain rye bread < multigrain bread 2 < multigrain bread 1 < bread with barley < bread with oats.

Keywords: bread, technological process, quality indicators

P24

Processes and technologies used to obtain wide noodles with *Boletus Edulis*, evaluation of their quality indicators

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Based on our own technology and the block scheme of operations presented in the paper, noodles with *Boletus Edulis* – own production – were obtained and evaluated physico-chemically.

Following physico-chemical analyses as well as comparisons with results obtained by other researchers in the literature, product standards and FAO recommendations regarding quality indicators (moisture content, protein content, fat content, total ash content, carbohydrate content and energy value) of Their noodle samples were drawn the following conclusions:

- In the case of water content, the noodle sample with *Boletus Edulis* – own production registered a value of 12.9%, situated within the limit provided by the legislation in force – 12.9%. The amount of water obtained for *Boletus Edulis* noodles – own production falls within the range obtained by other researchers in the field (6.57% - 13.34%);
- In the case of protein content, the noodle sample with *Boletus Edulis* – own production registered a value of 11.31%, which is very close to the value recommended by FAO – 11%. The value for the amount of protein obtained in the case of noodles with *Boletus Edulis* – own production is very close to the values obtained by other researchers in the field (10.99% - 13.05%);
- In the case of fat content, the noodle sample with *Boletus Edulis* – own production registered a value of 1.7%, which is very close to the value recommended by FAO – 1.7%. The value for the amount of fat obtained

in the case of noodles with buckwheat – own production falls within the range obtained by other researchers in the field (1.39% - 10.82%);

- In the case of total ash content, the sample of noodles with *Boletus Edulis* – own production registered a value of 4.41%, situated in the range obtained by other researchers in the field (0.877% - 4.69%);
- In the case of carbohydrate content, the noodle sample with *Boletus Edulis* – own production registered a value of 72.16%, situated in the range obtained by other researchers in the field (65.80% - 72.84%);
- The energy value for the noodle sample with *Boletus Edulis* – own production was 349.18 Kcal/100g, respectively 1481.89 Kj/100g, close to the value recommended by FAO – 367 Kcal/100g. The energy value obtained in the case of noodles with *Boletus Edulis* – own production is very close to the values obtained by other researchers in the field (342.39 Kcal/100g - 364.96 Kcal/100g) respectively (1453.42 Kj/100g - 1547.36 Kj/100g).
- Following our own manufacturing technology, physico-chemical analyzes as well as comparisons made with data obtained by other researchers in the field, the product noodles with *Boletus Edulis* – own production falls within the legal norms and limits regarding pasta.

Keywords: noodles, *Boletus Edulis*, technological process, quality indicators

P25

Thermopenetration. Concept

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The primary, survival needs of the individual have not evolved significantly historically (food, clothing, property). The satisfaction of these needs is determined by the transformation/consumption of available natural resources. In this context, *transmission of heat*, a natural phenomenon, conditioned by laws transposed by physical-mathematical relations determined between the characteristic quantities of thermal transfer (flow/flow), is the expression of sensitive and latent forms of internal energy. The study of heat transfer is important by offering predictive information, for understanding the operation of unitary "***actions***", the transformations induced by food materials in the manufacturing chain. In this sense it is important to know the operating principles of heat transfer and how it conditions/constrains the design and operation of food processing equipment. *Heating/cooling* of food products is necessary to prevent the onset of enzymatic and microbial degradation reactions. Additionally, *targeted* sensory properties are initiated and defined: color, aroma, texture. *The study of heat transfer* provides predictive information for understanding the various unit "***actions***", the transformations induced by food materials in the manufacturing chain. Explanation of heat transfer *phenomena* is based on mathematical equations that allow ***prediction*** of heat transfer in solid foods. Absence of product movement and low thermal diffusivity, energy absorption is very low, causing non-uniform temperature distribution during *heating/cooling*, constrained by *temperature gradient* between the "*package wall*" and the *geometric center* of the product. The process that defines the speed of heat migration in the geometric center of the product is called ***thermopenetration***. The migration *time–temperature profile*

is dependent on the product's physical/thermal properties, size, shape and operating conditions. So, the prediction of the *thermal flow* contributes to: the formulation of the food components, the filling mass, the choice of the packaging material, the volume of the packaging. Reaching the critical, process temperature in the geometric center of the product, equivalent to the temperature of the heat agent in contact with the packaging surface, is constrained by the physical laws of heat transfer. Special attention must be paid to the sequence of superposition modes of heat transfer (*conductive/convective*), influenced by the flow regime (*Reynolds (Re*)), which intervenes in the evolution of the phenomenon. Understanding the mechanisms of heat transport is necessary to recognize the limitations of heating/cooling environments, which can lead to the adoption/adaptation of practices that avoid these limitations.

Keywords: heat transfer, unit „*actions*", thermopenetration, geometric center.

Acknowledgements: The authors are indebted to the University of Life Sciences "*King Mihai I*" From Timisoara, Research Institute for Biosecurity and Bioengineering, Faculty of Food Engineering, Timișoara, for financial and technical support.

P26

Teff flour and carob powder: an innovative combination to improve the quality characteristics of gluten-free flour products

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In recent years, there was been a growing interest in health and nutrition. This shift in attitude can be attributed to several factors. One of them is the increasing awareness of the impact that diet has on health. People have started to understand that a healthy diet can reduce the risk of chronic diseases such as heart disease, diabetes, obesity and celiac disease. Additionally, scientific research in the field of nutrition has shed light on new information and perspectives on food. These scientific findings have helped people better understand the benefits and risks of certain foods and diets. This study analyses an innovative combination of raw materials as a potential replacement for traditional gluten-free flours to produce gluten-free flour products with a higher nutritional profile. The proposed innovative combination consists of teff flour and carob powder. Today, the demand for gluten-free food is growing due to the increasing number of people with celiac disease who need a special diet. Obtaining gluten-free products is a challenge for scientists to get products that are suitable in terms of quality. Teff flour can be successfully used as a raw material in various food recipes. It offers multiple health benefits due to its rich nutrient content. It is an excellent source of fiber (8-10%), protein (10-13%), fat (2-3%) and minerals such as calcium (15-20%), iron (25-30%), phosphorus (10-15%) and zinc (15-20%). Teff flour contains certain vitamins such as vitamin C (88 mg), niacin (2.5 mg), riboflavin (0.2 mg) and thiamin (0.30 mg), all per 100 grams product. Teff flour is also valuable due to the phenolic compounds with antioxidant activity (ferulic acid, vanillic acid, coumaric acid and cinnamon acid). Thanks to its distinctive nutty flavor and fine texture, teff flour can add flavor and variety to culinary preparations. It can be used in various recipes such as bread, biscuits, cakes, and pancakes.

Furthermore, the water absorption properties of teff flour allow soft and fluffy textures in baked goods. According to studies on the use of teff flour, the incorporation of up to 30% substantially improves the nutritional qualities of bakery and pastry products without significantly affecting their sensory and quality characteristics. Moreover, due to its high fiber content and low glycemic index, teff flour can help maintain stable blood sugar levels, control type 2 diabetes, to maintaining a healthy digestive system and immune system. Carob powder contained high levels of carbohydrates (45%), appreciable amounts of protein (4%), fiber (7%), ash (3%) and low levels of fat (0.7%). Carob powder can be used in the manufacture of various bakery products, bread, pasta, cakes, biscuits, snacks and yogurt. The proportion of carob powder that can be added depends on the type of product and can vary from 10 to even 15%. Carob powder has astringent properties and is rich in soluble fiber, which helps regulate intestinal transit, prevent constipation, bloating and other digestive problems. In conclusion, innovative combination consists of teff flour and carob powder can be an excellent choice as a raw material in various food recipes, bringing health benefits and adding aroma and flavor to culinary preparations.

Keywords: gluten-free products, raw materials, teff flour, carob powder

P27

Preparation and characterization of a lentil spread

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Lentils are a legume rich in minerals such as iron, zinc, calcium, potassium, phosphorus and magnesium, but also a valuable source of vitamins, especially of B group. Lentils have low calorie content and provide a feeling of long-term satiety, by maintaining a low blood sugar level.

The aim of this work was to obtain and characterize, from a sensorial and physico-chemical point of view, a red lentil spread. The sensory analysis followed the consistency, smell, taste, color and appearance, compared to a similar commercial cream. From a physico-chemical point of view, dry matter, moisture, starch content, acidity and salt content were analyzed.

Conclusions:

1. Spreadable lentil creams with added vegetables are light spreads with a pleasant taste, which can be consumed by people of any age.
2. The innovative character of these spreads lies in the addition of vegetables, such as peppers or carrots, which give them extra taste, color and consistency.
3. Following the comparative sensory analysis of the two types of lentil pasta and the way of appreciation of each taster, the home-made cream was much more appreciated by the evaluators for all the evaluated characteristics, the best appreciated being the smell, the taste and consistency. 4. From a physico-chemical point of view, the evaluated characteristics of the two types of lentil spreadable creams showed close values, slightly more consistent differences being found in acidity and the presence of starch, in the case of commercial lentil paste.

Keywords: spreadable pasta, red lentils.

Section: Consumer and environmental protection

P28

Tamarind flour and elderflowers powder: an innovative combination to improve the quality characteristics of gluten-free flour products

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Nowadays, challenges regarding in food products are focused on the growth the health benefits. The food industry, in response to current consumer demand for natural and functional foods, is constantly evolving and reformulating traditional products formulations using multiple unconventional raw materials. In addition, the use of unconventional raw materials can also increase the nutritional quality of the food. The raw materials obtained from unconventional resources are used in the manufacturing recipes of some bakery and pastry products, alongside the traditional raw materials, but also in the manufacture of substitutes for certain deficient products. Therefore, in recent decades, the food industry has tried to find new and sustainable natural sources, such as plant powders, unconventional flours as alternatives to synthetic products. The aim of this study is to analyze an innovative combination of raw materials as a potential substitute for traditional gluten-free flours to be used to obtain gluten-free flour products with a superior nutritional profile. The proposed combination consists of tamarind flour and elderflowers powder.

The reason why this combination of unconventional raw materials was proposed is determined by the growing demand for gluten-free products from people with celiac disease who need a special diet. Celiac disease is an immune-mediated enteropathy triggered by the ingestion of gluten in genetically susceptible individuals. Tamarind flour contains protein (15.0-19.5 %), crude fibre (2.1-2.4%), fat (3.9-5.7 %), ash (2.4-2.7 %), carbohydrate

(60.1-62.2 %), K (852.63 mg/100g), Ca (581.74 mg/100g), P (161.54 mg/100g) Mg (136.31 mg/100g), Na (27.56 mg/100g), Fe (7.94 mg/100g), Zn (2.94 mg/100g) and Cu (1.45 mg/100g). Tamarind flour it can be used for preparing bakery products, confectionery, pasta and biscuits. Studies have shown that incorporating up to 20% tamarind flour and 5% elderflower powder can enhance the nutritional qualities of bakery and pastry products. The chemical composition of elderflowers powder is rich and depends on different factors, such as cultivar, location, ripening stage and climatic conditions. Elderflowers powder is rich in basic nutrients, such as carbohydrates (~18%), fiber (~7%), proteins (~3%), and lipids (0.35%). In lipids, they present an exceptional composition, with very high polyunsaturated fatty acids amounts (~80%), low amounts of saturated fatty acids (<10%). The vitamins present are B2-65 mg/100g, B7-17 mg/100g, B9-1.8 mg/100g, vitamin C and A are found in smaller amounts. As a general conclusion, the incorporation of tamarind flour and elderflowers powder has potential applications in the food industry since their use is a promising strategy for producing functional foods.

Keywords: gluten-free products, raw materials, tamarind flour, elderflowers powder

P29

Mineral analysis of fresh meat products

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Among meat products, foods known as common foods are the most consumed. Dietary ones are often related to tradition or racial traits. These meat by-products have traditionally been sold in low-income markets, but for a variety of reasons—perhaps increased tourism—their consumption appears to be increasing, and some by-products are becoming niche gourmet varieties in demand on market. Advantageously, consumption of these meat by-products and edible portions helps to increase animal for slaughter. In addition, these edible meat by-products are an excellent source of nutrition such as essential amino acids, minerals and vitamins. Food scientists have long paid special attention to dietary minerals, primarily because of their important role in human nutrition as both, essential and potentially toxic elements.

The aim of our study is to analyze some fresh meat products based on an innovative technique, the method of X-ray fluorescence, using XRF Analyzer X-MET8000.

As we could observe the XRF method can be applied for the determination of micro and macro-elements with nutritional value, but compared to other products in the case of meat-based products for the application of the method it is necessary to obtain the ash, through drying and calcination, at the appropriate temperatures. The method cannot be applied to fresh products.

The acquisition of XRF Analyzer was financed by Interreg–IPA Cross–border Cooperation Romania-Serbia Programme, through the project "Modern technologies for monitoring land covered with waste in order to restore their initial use", 2019-2021, code e-MS: RORS 365.

Keywords: micro-elements, macro-elements, instrumental analysis

P30

Obtaining an innovative product using gooseberry fruits

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The aim of the present study consisted in the nutritional evaluation of gooseberry fruits, the analysis of their mineral composition and the identification of attractive ways of use for consumers. Gooseberries belong to the family *Saxifragaceae*, genus *Grossularia*. Gooseberry is a fruit-bearing shrub that is cultivated for its particularly tasty fruits. Gooseberries are fruits characterized by a high-water content, being recommended for revitalizing the body, due to their refreshing effect, sweet-sour taste and low-calorie content. Gooseberries are rich in minerals, trace elements and, above all, vitamin C. Fully ripe gooseberries can be used not only for food, but also for therapeutic purposes, being recommended as diuretics, for lithiasis, arthritis, rheumatism and gout. Gooseberries stimulate cells that secrete insulin, the antioxidants in the fruit regulate blood glucose levels and inhibit the production of glycosylated hemoglobin.

Gooseberry jellies are part of the category of desserts characterized by a homogeneous, gelatinous texture with an intense gooseberry flavor and a sweet-sour taste. Obtaining the jellies and characterization of the product were carried out in the Food Analysis laboratory of the Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara.

The innovative character of the product consists in the use of gooseberries as the main raw material in a market where these fruits are very little used, obtaining a tasty, healthy and nutritious product with a specific aroma, which can be consumed in several ways.

Keywords: gooseberry jellies, minerals, bioactive compounds

P31

Obtaining and characterization of an acid dairy product with added fruit

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Fruit yogurt is a popular and delicious alternative to regular yogurt, in which fresh fruit, fruit pulp or fruit syrup is added to give it a pleasant taste and aroma. This combination of yogurt and fruit brings the nutritional benefits of yogurt, such as protein, calcium, and probiotics, along with the vitamins and fiber of the fruit.

The aim of this work was to obtain and characterize from an organoleptic and physico-chemical point of view a yogurt with the addition of passion fruit and compare it with a similar commercial product. The organoleptic examination followed the appearance, consistency, color, smell and taste, and the physico-chemical examination followed the water content, dry substance, acidity and the presence of starch.

Conclusions: 1. From an organoleptic point of view, the yogurt obtained by us was the most appreciated, obtaining higher marks in the case of all the examined parameters, except for the smell, which received the same marks, maximum, in both cases. 2. From a physico-chemical point of view, the analyzed parameters allow the yogurts to fall within the maximum limits allowed by the regulations in force. 3. The innovative character of this product was the use of passion fruit and honey additions, which contributed to obtaining an acidic dairy product with the addition of fruit with a special, tasty aroma, well appreciated by consumers, which can be recommended for consumption by all categories of ages.

Keywords: yogurt, passion fruit.

P32

Obtaining and characterizing a meat product with the addition of seeds

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Minced meat products have a less positive image due to the fast food industry and over-processing of meat, but by adding seeds to meat products we change both the taste and structure of the product, as well as their physico-chemical properties and increase the amount of vitamins, minerals and fatty acids. The purpose of this work was to obtain a home-made product of minced meat with the addition of seeds and to compare it with a product of minced meat with the addition of seeds purchased from supermarket.

From a sensory point of view, the consistency, taste, smell, appearance and color of the product were evaluated, and from a physico-chemical point of view, easily hydrolyzable nitrogen, salt, acidity and the presence of starch were determined.

Conclusions: 1. Following the sensory analysis, most of the characteristics evaluated in the two types of rolls were higher evaluated in the case of the home-made one, respectively in the case of taste, aroma and structure, the only characteristic better appreciated in the case of the commercial roll being the color. 2. The physico-chemical examination revealed that the commercially purchased roll was relatively fresh, although it was within the validity period on the date of the examination, unlike the one obtained by us, which was of prime freshness.

3. Regarding the presence of starch, the more intense color obtained with the addition of iodine, in the case of the commercial roll, confirms the greater amount of breadcrumbs added, according to the recipe. 4. In the case of salt, both values obtained place the rolls in the category of dietary products, according to the regulations in force.

Keywords: meat product, seeds.

P33

Obtaining and characterizing of some pâtés with the addition of tomatoes and basil

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Pat**é** is a ready-to-eat meat product, very popular and known throughout the world due to its affordable price, but also for its highly valued sensory properties, such as its intense flavor and smooth texture. The purpose of this work was to obtain and characterize, from an organoleptic and physico-chemical point of view, two types of pat**é**, respectively chicken liver pat**é** and rabbit liver pat**é**, with the addition of tomatoes and basil, for freshness and flavor. For the organoleptic examination, the appearance, consistency, color, smell and taste were observed. During the physico-chemical examination, were made determinations of water content, salt content, the presence of starch and acidity.

Conclusions: 1. From an organoleptic point of view, the most appreciated was the pâté obtained from meat and poultry liver, obtaining higher marks in the case of all the examined parameters, except for the smell, which received the same marks, maximum, in both cases. 2. From a physico-chemical point of view, the analyzed parameters allow the pates obtained to fall within the maximum limits allowed by the regulations in force. 3. The innovative character of these products was the use of the addition of dried tomatoes and basil, which contributed to obtaining tasty and aromatic pâtés, well appreciated by consumers, and they can be recommended for consumption by all age groups.

Key words: chicken pate, rabbit pate, dehydrated tomatoes, basil

P34

Study regarding the production and characterisation of raw-dried salami with almonds

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Dried fermented meat products are one of the oldest and most remarkable groups of processed meats and are a key aspect of the identity, culture and heritage of many regions.

The great interest in traditional dry fermented meats is particularly remarkable in Europe, due not only to their high economic weight, but also to their unique sensory characteristics, which are a consequence of the raw material and the manufacturing process.

The main aim of the work was to obtain an innovative raw-dried salami product with added almonds.

In order to highlight the nutritional benefits of the obtained product, it was analysed from a sensory and physical-chemical point of view in the physical-chemical analysis laboratory of the Interdisciplinary Research Platform, U.S.V. "King Mihai I" from Timișoara.

From a sensory point of view, the appearance, consistency and taste were observed.

From a physico-chemical point of view, the following were monitored: water content, ash, protein, fat, NaCl and freshness.

The water content (max. %) in raw-dried products is a maximum of 50%, according to Order 210/2006 on the physico-chemical properties of meat products of the cured meat type. The values recorded for the sample of salami with almonds was 40.22% slightly lower than the control salami sample of 41.83%. The protein content set by Order 210/2006 for raw-dried meat

products is a minimum of 16%, the results for salami with almonds were 21.22% slightly higher than the control salami sample (19.59%). For the salami with almonds sample the fat content was 31.22% slightly lower than the control sample for which the protein content was 31.91%. Both values are within the maximum limit of 50% set by Order 210/2006. In terms of saturated fatty acid content, the sample of salami with almonds had a lower content (7.5 g/100g) than the control sample (10.78 g/100g). These differences are due to the high fat content of the almonds (57.8%) and the low saturated fatty acid content (4.56%). The NaCl content (g/100g) of the sample of salami with almonds studied was 3.55%, and that of the control salami sample was 3.89 g/100g, the maximum limit of 6% established by Order 210/2006 on the conditions of acceptability of the physico-chemical properties of meat products of the sausage type not being exceeded. Order 210/2006 on the conditions of acceptability of the physico-chemical properties of meat products of the sausage type set a maximum permissible limit of 60 mg/kg and the nitrite content in the sample of salami with almonds was 0 mg/kg and in the sample of control salami 30 mg/kg.

For the sample of salami with almonds, the mineral content recorded was higher (2.45 g/100g) than for the control salami sample (1.85 g/100g).

The carbohydrate content of the sample of salami with almonds studied was 1.34% slightly higher than the value recorded for the control salami sample (0.93g/100g). The energy value determined for the sample of salami with almonds was 366.22 Kcal/100g, compared to the control salami sample for which a value of 369.27 Kcal/100g was recorded. In the case of the reference consumption for the sample of salami with almonds, a reference consumption of 18.31% was recorded compared to the sample of salami control for which a reference consumption of 18.45% was recorded.

As a result of the sensory analysis carried out for the two salami samples the highest total but also individual score for each characteristic was obtained for the salami sample with almonds.

Keywords: dry-cured salami, almond, physical - chemical composition, organoleptic analysis, sensorial analysis

P35

Preparing and evaluation of new nutritious products from quail meat

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The objective of this study is preparation of new nutritious products from quail meat compared to other products prepared from chicken meat as control and commercial products which bought from supermarket. The proximate composition, chemical, physical and sensorial properties were evaluated.The different products were prepared as sausage form quail meat (SQ), chicken meat (SC) and commercial (SCo), and, kofta from quail meat (KQ), chicken meat (KC) and commercial (KCo), and, nuggets from quail meat (NQ), chicken meat (NC) and commercial (NCo). The result observed that the chemical composition of products that prepared from quail meat recorded the highest content of protein and ash, on contrary, the lowest content of fat compared with products that prepare from chicken meat as controlor commercial. All products that prepared from quail meat recorded high content of K, Ca, Mg, P, Fe, Zn, Se and vitamin A, Kofta was the highest one followed by nuggets then sausage products. While sausage products that prepared from both quail and chicken meat as control recorded the highest content of vitamin E, followed nuggets and kofta, respectively compared with commercial products. The results indicated decreasing cooking loss after preparing of quail meat products followed by both chicken meat products as control and commercial product, increasing water capacity (WHC) of KQ and plasticity of SQ and NQ.

All products were accepted from panelists while slightly significant difference among these products ($P > 0.05$). SC was the highest score in colour, taste, odour, texture and overall acceptability compared with SQ and SCo. Generally products were prepared from quail meat which showed high acceptance in sensory evaluation by panelists.

Keywords**:** quail meat, chicken meat, sausage, kofta, nuggetsp products, minerals, vitamins, nutritious

P36

Production of biodegradable sodium caseinate film containing titanium oxide nanoparticles and grape seed essence and investigation of physicochemical properties

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In this study sodium caseinate film was produced and the effect of titanium oxide nanoparticles and grape seed essence as factors that enhances film properties was investigated. For this purpose, nanocomposite films based on sodium caseinate were modified with different levels of nanoparticles of 0 to 1.5 % and grape seed essence at levels of 0 to 500ppm based on the central composite experimental design (CCD). The effects of these variables on physical/mechanical properties, water vapor permeability and antioxidant properties were investigated. The morphology and chemical structure of different films were evaluated by SEM and FTIR techniques. The results showed that the addition of titanium oxide nanoparticles has improved the mechanical properties of the films. In this regard, films prepared from 1.5% and 500 ppm nanoparticles have the highest tensile strength. The results of scanning electron microscopy test showed that the addition of nanoparticles led to the indirect penetration of water, which reduced the permeability of the films to water vapor to 4.89 kg/m. The addition of grape seed essence caused the antioxidant effects of the produced films, so that the films containing 250 ppm showed antioxidant activity of 86.74%. Overall, the results showed that the addition of nanoparticles and grape seed essence had positive effects on the physical and chemical properties of sodiumcaseinate.

Keywords: biodegradable, biopolymer, antioxidant, active, nanocomposite

P37

EU regulation on the use of antioxidants in meat preparation and in meat products

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Antioxidants for foodstuffs during processing or before packing protects colour, aroma and nutrient content. As regards food safety regulations, long-term efforts have been made in terms of food standards, food control systems, food legislation and regulatory approaches. These have, however, generated several questions on how to apply the law to the diverse food businesses. To answer these questions, a thorough examination of the EU legislator's choices for food preservation and definitions are provided and discussed with factors affecting microbial growth.

***Keywords*:** ascorbic acid; meat preparation; meat products, meat spoilage

P38

Trade in selected raw materials of animal origin in the EU

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The aim of the work presented in the article was to assess the scale of trade in raw materials of animal origin as part of trade between the European Union and third countries. The research material consisted of data published by the European Union in 2018–2022 within the TRACES system and trade data of the World Bank (World Integrated Trade Solution). Meat trade in the world far outweighs other raw materials and products of animal origin. It has accounted for no less than 43% of trade in recent years. Meat exported from the European Union is mainly beef, pork and poultry. Theworld dairy market is dominated by a small number of countries,with EU member states accounting for more than a third of world exports. It should be noted that international trade in animal raw materials, which amounted to 152 billion euros in 2020, is dominated by exports from several countries,including the EU.

Key words: trade, meat, milk.

P39

Use of bio-modified raw materials of plant and animal origin in technology of functional foods

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Development of prescription solutions using plant additives based on the principles of combinatorics is promising in thefood industry and is widely used. Studies of the health of the population the structure of nutrition, the body's food have shown a serious deficiency of physiologically active ingredients in food, including meat-based. The most effective way from the technological viewpoint of solution of the problem of eliminating micronutrient deficiency in the diet is the development and creation of industrial production of enriched foods, with the addition of missing micronutrients in quantities corresponding to the physiological needs of a person.

We investigated a combined stuffing system based on semi fat pork, bio-modified lungs of cattle, rabbit minced meat ofmanual boning. We established the regularities of the influence of flour made from bio-modified seeds having mung's functional and technological properties of model minced meat using beef of the second rate, bio-modified lungs of cattle and rabbit meat of manual boning. The formula-component composition of sausage breads based on combined minced meat with the use of computer modeling methods is substantiated; the complex assessment of quality indicators is given. The developed recipe of sausage bread is different from the control sample – sausage bread with a high mass fraction of protein – 18.8 %, carbohydrates - 10.5%, including dietary fiber – 6.6%. The yield of the finished product increased by 11.2 % compared to the control sample.

Key words: rabbit meat, food combinatorics, sausage bread, functional and technological properties

P40

Valuation of goji berries as natural antioxidants in chicken pâté

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Antioxidants are added to freshly processed meat and meat products to prevent lipid oxidation, slow the development of off-flavours and improve colour stability. In the food industry, they are classified as natural antioxidants and synthetic antioxidants. Synthetic antioxidants are not recommended because of their toxic and carcinogenic effects.

Therefore, based on the confirmation of the above effects, the food industry now prefers natural over synthetic products and manufacturers therefore prefer to use natural antioxidants.

The main aim of the work was to obtain a chicken meat pâté in which different proportions of goji were added in order to protect the product against lipid oxidation. Four types of pâté were obtained, one obtained according to the basic recipe and three samples in which the meat in the composition was replaced by goji in different proportions (5%, 10% and 15%).

In order to highlight the nutritional benefits of goji berries, the two products were analysed from a sensory and physical-chemical point of view in the physical-chemical analysis laboratory of the Interdisciplinary Research Platform, U.S.V. "King Mihai I" from Timișoara.

From a sensory point of view, the appearance, consistency and taste were observed.

From a physico-chemical point of view, the following were monitored: water content, ash, protein, fat, NaCl and freshness.

The maximum water content of the pâté is 74%, according to Order 210/2006. Following the analyses carried out, the values recorded for the water content of the pâté samples ranged from 58.81-60.96%.

In the pate samples studied, the protein content was recorded in the range 15.03-19.75%, which is above the minimum value of 9% set by Order 210/2006 for pate. It can also be observed that the protein percentage increases with the increase in the proportion of goji in the samples analysed, which can be considered that this product may have particular nutritional benefits.

The fat content values recorded for the samples analysed ranged from 22.24 - 14.36%, with the highest fat content recorded for the chicken pâté sample and the lowest value recorded for the 30% goji cheese pâté. From the analysis of the experimental data it can be seen that the fat percentage decreases with increasing goji content, this value being below the maximum allowed limit of 30%. The NaCl content (%) of the samples analysed was between 1.56-1.69%, the maximum limit of 2% set by Order 210/2006 on the conditions of acceptability of cooked meat products was not exceeded. From the analysis of the experimental data, it can be seen that the value range recorded for the pate samples was between 0.65 - 0.99%, with the mineral content increasing as the goji content increased. The energy value calculated for the pate samples studied was in the range 267.12-217.24 Kcal/100 g and the reference intake was between 13.36-10.86%. The Kreiss reaction provides information on the freshness of fats found in foods of animal origin. The Kreiss reaction was negative in the determination of the pâté samples, which means that the products were fresh.

As a result of the sensory analysis carried out for the four pâté samples, the highest total and individual score for each characteristic was obtained for the pâté with 10% goji. In conclusion from a sensory point of view spirulina in moderate proportions improves the characteristics of the product in which it is added.

Keywords: chicken meat, goji fruit, antioxidant, pate, physical - chemical composition, organoleptic analysis, sensorial analysis

P41

Monitoring the technological process of obtaining sausages from "*Mangaliţa*" meat, evaluation and comparison of quality indicators.

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In this paper were studied several specialized bibliographic data on meat and meat products, raw materials, processing methods as well as installations / equipment used in obtaining sausages.

Based on the data recorded in the meat processing unit, respectively from the technological flow of obtaining Mangaliţa meat sausages and with the help of Microsoft Office Excel, a mathematical model was designed for assessing losses, calculating specific consumption and manufacturing yield.

The specific consumption recorded was 1,119 Kg of raw and auxiliary materials to obtain 1Kg of Mangalica meat sausages. The manufacturing efficiency recorded is 89,333%.

Also within this work was carried out a physico-chemical evaluation of quality indicators: humidity, protein substances, fatty substances, total ash, sodium chloride, carbohydrates and energy value for Mangaliţa meat sausages and comparison of the results obtained with the values prescribed in the legislation, norms in force as well as the results obtained by other researchers in the field of meat products.

When comparing the results with the legislation and rules in force, the following conclusions emerged:

- the value obtained for the water content was 41,09 g/100g product, well below the maximum allowable limit of 66 g/100g product;

- the value obtained for the protein content was 16,06 g/100g product, well above the minimum allowable limit of 10 g/100g product;
- the value obtained for the fat content was 31,16 g/100g product, slightly exceeding the maximum allowable limit of 30 g/100g product;
- the value obtained for the salt content was 2,96 g/100g product exceeding the maximum allowable limit of 2 g/100g product;
- the value obtained for the total ash content was 2,51 g/100g product below the maximum allowable limit of 3 g/100g product;
- the value obtained for carbohydrate content was 9.81 g/100g product well below the values taken from the literature (1.34 g/100g product - 3.88 g/100g product);
- the energy value for the 6 sausage samples followed the following hierarchical order: pork sausages – sample 2 < pork sausages – sample 1 < pork sausages – sample 4 < pork sausages – sample 5 < pork sausages – sample 3 < Mangalița meat sausages p.p.

Keywords: pork sausages, mangalița, technological process, quality indicators

P42

Processes and technologies used to obtain caraway sausages, evaluation of their quality indicators

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The consumption of dishes from freshly ground meat is widespread due to its pleasant taste and ease of cooking. Pork is one of the most important sources of animal-based protein worldwide. Sausages are one of the most consumed processed meat products.

Following physico-chemical analyses and comparisons with literature data and product standards, in terms of quality indicators (protein, total ash, fat, moisture, sodium chloride and energy value) of the six sausage samples, the following conclusions were drawn:

- Regarding the protein content of the six sausage samples, the lowest values were recorded in the pork sausage sample – sample 3 – 13.02 g / 100g product, above the limit provided by the STANDARD – minimum 10 g / 100g product. The other sausage samples showed higher values in the range, 13.51 g/100g product – 17.3 g/100g product;
- as regards the ash content of the six sausage samples, three of them showed values above the limit laid down in the STANDARD – maximum 3 g/100g product, pork sausages – sample 1, pork sausages – sample 2 and pork sausages – sample 3 recording values in the range (3,06 g/100g product – 3,21 g/100g product), the other sausage samples showed an ash content within the permitted limits;
- Regarding the fat content of the six sausage samples, the highest value was recorded in the sample, pork sausage – sample 3 – 25.1 g/100g product, below the limit provided by the STANDARD – maximum 30 g/100g

product. The other sausage samples showed values in the range, 21.63 g/100g product – 22.81 g/100g product;

- Regarding the water content of the six sausage samples, the highest value was recorded in the sample, pork sausage – sample 1 – 62.34 g / 100g product, below the limit provided by the STANDARD – maximum 66 g / 100g product. The other sausage samples showed values between 56.43 g/100g product – 62.01 g/100g product;
- as regards the salt content of the six sausage samples, four of them showed values above the limit provided by the STANDARD – maximum 2 g/100g product, pork sausages – sample 3, pork sausages – sample 2, pork sausages – sample 1 and pork sausages – sample 5 recording values in the range (2.1 g/100g product – 3.43 g/100g product), the other sausage samples showed a salt content within the permitted limits;
- Regarding the energy value obtained for the six sausage samples, they followed the following order: pork sausage with cumin - p.p.< pork sausage - sample 2 < pork sausage - sample 1 < pork sausage - sample 4 < pork sausage - sample 5 < pork sausage - sample 3, the values obtained being classified in the following ranges (221.2 Kcal/100g - 277.98 Kcal / 100g) respectively (918 Kj / 100g - 1150.04 Kj / 100g)

Following the manufacturing technology, physico-chemical analyzes as well as comparisons made with existing data in the specialized literature, the product pork sausage with cumin – own production falls within the limits provided by the current legislation and norms in the field of meat and meat products.

Keywords: pork sausages, caraway, technological process, quality indicators

P43

Obtaining and characterization of flavored walnut oil

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Walnut kernel (*Juglans regia* L.) is highly appreciated for unique organoleptic characteristics and nutritional value. The quality of the oil is also determined by the age of the walnut tree but also by the methods used to obtain the oil. Walnut oil, extracted from the kernels of the fruit, has been used since ancient times in Romania and in the world. Walnut oil cold pressed from the dried walnuts kernel, has a strong and distinctive walnut flavor. It to be used in the food industry and human nutrition as a flavoring for baked goods and for some sauces. Walnut kernels generally contain about 60% oil but depending on the variety. The aim of this work is the preparation and characterization of some walnut oil flavored samples with aromatic plant. Four varieties of walnut oil flavored were obtained as follows: with garlic (*Allium sativum*) and black pepper (*Piper* nigrum), with pistachio (*Pistacia vera*), pine seeds (*Pinus pinea*) and pepper, with cinnamon (*Cinnamomum zeylanicum*) and vanilla (*Vanilla planifolia*), with cinnamon, raisins and vanilla. It is evaluated on the basis of its taste, smell, color and viscosity. The final product was analyzed the bioactive compounds: antioxidant capacity (by FRAP method), total polyphenols content (by Folin-Ciocalteau method) and ascorbic acid content (with redox indicator 2,6 dichlorophenolindophenol). Cold-pressed walnut oil does not contain ascorbic acid. This bioactive compound is therefore present in the flavored oil sample due to the presence of additives. Cinnamon is the richest in vitamin C; the walnut oils flavored with this spice have the highest content. The highest value of the total antioxidant capacity is found in the sample with cinnamon, vanilla and raisins.

And the content of total polyphenols is different and is influenced by the content of the compounds brought by the spices in the range of flavored oils. Pepper is a good antioxidant and helps reduce high cholesterol levels. What's more important to remember is that walnut oil becomes toxic through frying. It is for this reason that it is indicated to be used cold or when the heat treatment is carried out at a low temperature.

Keywords: flavored walnut oil, bioactive compounds

P44

Characterization of red wines from Buzias-Silagiu wineyard

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The Silagiu red wine tradition is obtained from grape varieties such as Cabernet Sauvignon, Pinot Noir, Burgundy and Merlot. Are known the wineries: Aramic, Thesaurus, Dealul Dorului or Domeniile Sera. Aramic winery is focused by wine production from grapes grown in this area. Wines obtained in the Silagiu area locality are more robust, tannic and structured and those from the Silagiu-Buziaș area are more elegant, fragrant and less structured. The aim of this study was to evaluate the sensory properties and the physico-chemical characteristics (total acidity, sugar content, total dry extract and alcoholic strength) of some red wines from Pinot Noir, Merlot and Burgundy grapes variety from the Buzias-Silagiu vineyard (Banat area - Romania). Due to the natural conditions of the area, the quality of the Pinot Noir wine produced in the Buzias-Silagiu vineyard can compete, in terms of quality, with the well-known Pinot Noir from Burgundy (France). The Pinot Noir from Silgiu is a high quality wine with a changing aroma: notes of red fruits (black currant, black cherry, cherry) in its youth and with a complex taste of raisins, tobacco and black pepper for wine matured. It is a fine, ample, full-bodied, soft wine with a ruby red color. Merlot is probably the best known grape variety in the world. With an intense red color with garnet reflections, a very pleasant aftertaste, fine tannins and medium acidity, Merlot is the most consumed dry red wine. The basic aromatic bouquet of Merlot (notes of ripe cherries, wild berries and raisins) can be enhanced a light spicy note. Burgundy is dry red wine of brick red color with the ruby reflections. It has typical aromas of wild cherries and sour cherries. The acidity is in balance with the alcohol strength and the flavors remain on the palate.

It has a medium-lasting astringent aftertaste. The red wines were characterized by a high alcoholic strength and a high total dry extract (12.8-13.8% vol.alc. respectively 26-30 g/l). The total acidity of the red wines investigated in this study is low (3-3.9 g/l H_2SO_4). The sugar content in wine varies according to the grape variety and the ripening period of the raw grapes.

Keywords: red wines, Buzias-Silagiu wineyard, sensory properties, physico-chemical characteristics

P45

Flavored sesame oil in the food industry and in human health

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Sesame (*Sesamum indicum*) is the oldest oilseed crop known, although it accounts for a small proportion of the global vegetable oil produced. First discovered in Babylon and Assyria, sesame oil and seeds have been part of the human diet for over 4000 years. Sesame oil can be obtained either by cold pressing or by first roasting the seeds. The flavor, aroma and color of the cold pressed oil is raw, with a less pronounced flavor and sensation of the raw seeds and a light green color, while the roasted seed oil has a stronger flavor due to the roasting process and a dark brown color. With its very strong and distinct flavor, sesame oil is best used in foods in small quantities. The sesame oil is used for the preservation of the diversity of food oils and for the use of its benefits for the improvement of human health. The sesame oil is highly stable due to the presence of natural phenolic antioxidants such as lignans (sesamol, sesamolin and sesamin) and tocopherols, which contribute to many nutraceutical benefits. The two antioxidant compounds (sesamol and sesaminol) that can have beneficial effects on health. However, compared to other commercial oils, sesame oil can withstand temperatures up to 177^0C, so it can be used in a variety of preparations, even heat-processed, without affecting its quality and nutritional properties. The sesame oil can be flavored with: basil (*Ocimum basilicum*), garlic (*Allium sativum*), cumin (*Cuminum cyminum*) and cinnamon (*Cinnamomum zeylanicum*). Adding garlic, cumin, cinnamon or basil to sesame oil can provide additional benefits. Garlic is known for its antimicrobial and antioxidant properties.

Cumin can aid digestion and may also have anti-inflammatory properties. Cinnamon can help control blood sugar levels and may have antimicrobial and antioxidant properties. Basil may have anti-inflammatory, antioxidant and antimicrobial properties. The roasted seeds are mainly used in Asian countries, and sesame oil and flavored sesame oil have been accepted and used in the West in various salad dressings.

Keywords: sesame oil cold pressed, nutritional properties, human healty

P46

Antioxidant, nutritional and sensory characteristics of some innovative elderberry-based jams

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The elderberry plant (*Sambucus nigra*) is very important because of its medicinal properties, known since ancient times, and of course for its widespread presence in a very wide range of food products (juices, jams, teas, jams, alcoholic drinks, etc.). Elderberry jam contains a variety of biochemical compounds that contribute to its aroma, taste and health benefits. The aim of this work was to obtain an innovative product: elderberry and walnut kernel jam, both plain (J1) and with additions of different essential oils: lemon (J2), orange (J3) and grapefruit (J4), and to analyse the products obtained in terms of vitamin C content (iodometric assay), total polyphenols (Folin-Ciocalteu method), antiradical activity (DPPH assay), proximate composition, energy value and organoleptic properties (5 points hedonic scale method). Laboratory analyses revealed that while the vitamin C content is not significantly altered by the addition of essential oils in the jam (18.65±0.06 mg/100g, 18.58±0.16 mg/100g, 18.62±0.08 mg/100g, 18.59±0.14 mg/100g in D1, D2, D3 and D4 respectively), the content of total polyphenols increases (166.88±0.38 mg gallic acid/g in D1, 178.35±21 mg gallic acid/g in D3, 195.47±0.44 mg gallic acid/g in D2, and 238.28±37 mg gallic acid/g in D4).

It was also found that the addition of citrus essential oils to elderberry and walnut kernel jam contributed significantly to its increased antiradical activity. All jam assortments scored very good (above 4.5) on all sensory characteristics analysed by tasters. Jam variants with added essential oils scored higher for taste, aroma, smell and overall acceptability than the plain D1 variety.

***Keywords*:** elderberry, jam, ascorbic acid, polyphenols, antioxidant activity

P47

Assortments of white bread with added seeds, turmeric powder and sea buckthorn powder

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Bread is one of the oldest man-made foods, having been of great importance since the beginnings of agriculture.

By applying appropriate recipes and technologies, the processing of wheat flour, as a basic raw material for bread, could be produced a wide range of assortments in order to meet the diversified requirements of human nutrition. The aim of this work was to produce two varieties of white bread: one with the addition of turmeric and flax seeds (P1) and the second with the addition of sea buckthorn powder, sunflower and white sesame seeds (P2) and to analyze these products in terms of total polyphenol content (Folin-Ciocalteu assay), antioxidant activity (DPPH method), nutritional value and sensory properties (5-points hedonic scale assay). P2 bread had the highest concentration of total polyphenols and the best antioxidant activity. From a nutritional point of view, the differences between the two types of bread are very small, in both being best represented total carbohydrates, followed by protein, with P1 bread being slightly richer in dietary fibre and P2 richer in total lipids. Sensory analysis by 20 panelists resulted in scores above 4 on all sensory characteristics analyzed for both bread varieties. With the exception of colour, P3 bread scored the highest, demonstrating a very high level of acceptability.

Keywords: bread, polyphenols, antioxidant activity, sea buckthorn, turmeric, seeds

P48

A short study on the use of edible flowers in cakes

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Edible flowers are not "classical" food products, but have important impact to the quality of food products and human acceptance. The study was focused on a short survey of the use of edible flowers in foods, as well as the application of edible rose (*Rosa* species) or pansy (*Viola tricolor* L.) petals for preparing various cake types (such as "*pandișpan*"). The sensory analysis reveals a good acceptability of such products.

Keywords: edible flowers, food, petals, cakes

P49

Nutritional and sensory properties of edible wild mushrooms

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Mushrooms are raw materials for food products, having important contents of nutritive and biologically active components. Among them, proteins and essential amino acids, fibers, pectin, vitamins (B_1, B_2, B_{12}, C, D and E) and minerals (Zn, Fe, Cu, P and K). Other biologically active compounds are carotenoids, terpenoids, and antioxidant polyphenolics. In this study, the "pâté" type food products based on golden chanterelle mushrooms (*Cantharellus cibarius* Fr.) have been obtained and evaluated for their nutritional (based on the corresponding ingredients – mushrooms cut into small cubes, onion or garlic, butter or olive oil, spices and herbs) and sensory properties. The consumer preferences for the golden chanterelle mushrooms "pâté" samples were compared with other similar products.

Keywords: Nutritional, sensory properties, edible, wild, mushrooms

P50

Nutritional value of chicken liver pate with the addition of mushrooms

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Abstract. The purpose of this work was to obtain an assortment of chicken liver pâté, with the addition of mushrooms, in home conditions [HP] and to assess its nutritional value, compared to commercially obtained types of pâtés. Mushrooms are good source of high-quality protein. It contains 20-35% protein (dry wt. basis) which is higher than vegetables and fruits and is of superior quality. It is rich in lysine and tryptophan, the two essential amino acids that are in deficient in cereals. It is also called white vegetables or "boneless vegetarian meat". Protein is an important constituent of dry matter of mushrooms. Protein content of mushrooms depend on the composition of the substratum, size of pileus, harvest time and species of mushrooms (Sadler M, 2003; Chang R.1996). Pedneault et al. (2006) reported that fat fraction in mushrooms is mainly composed of unsaturated fatty acids. Mushrooms are good for health because it contains zero Fat, low Calories, low Carbohydrates, low Sodium and no Cholesterol. (Kakon, et all., 2012) Also, mushroom contain good quality fibre. It helps in lowering the cholesterol. Sanme et al. (2003) and Manzi et al. (2004) worked on the fiber content of different mushrooms. Fresh mushrooms contain both soluble and insoluble fiber. The soluble fiber (glucans and chitosans), has been shown to help prevent and manage cardiovascular disease by lowering total and LDL cholesterol levels. It also helps regulate blood sugar levels.

Materials and methods: *Obtaining chicken liver pate with mushrooms in home conditions:* The high nutritional value, together with the desired sensory properties, can decisively influence the consumption decision. That's why in the recipe (table 1) along with the basic ingredients and mushrooms, butter and smoked bacon were added, which bring a pleasant taste to the finished product.

Two types of chicken liver pâté (SP and BP), common and appreciated by consumers, were purchased from supermarkets.

In order to assess the nutritional value, the following characteristics were taken into account: fat, protein, carbohydrates, ash and calories.

Table 1. Chicken liver pate recipe with the addition of mushrooms

No	Ingredients	Quantity, [g]
1	Chicken liver	500
2	Red onion	105
3	Mushrooms	100
4	Butter	80
5	Lard	50
6	Egg yolks	47
7	Garlic	21
8	Salt	5
9	Pepper	5

Results and discussions: The results obtained from the determination of the main nourishing characteristics are presented in figure 1.

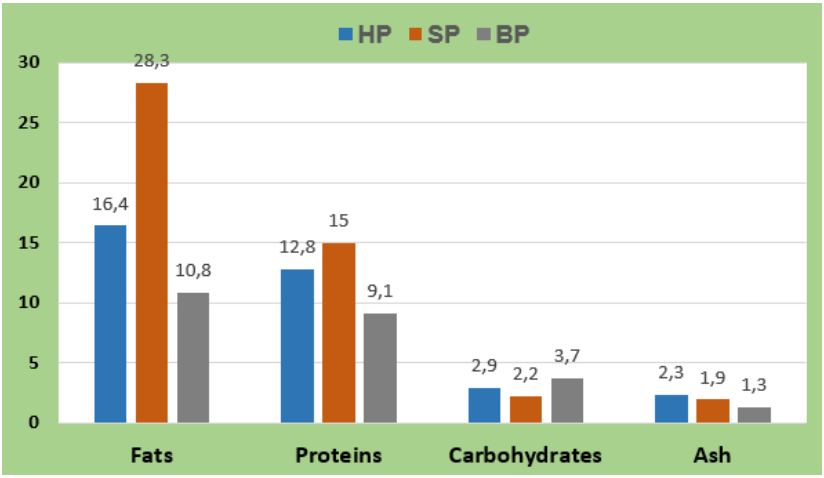

Figure 1. Nutritional value of chicken liver pate

The nutrient content of samples varies within fairly wide limits. In the case of fats, the range of variation is between 28.3% for SP and 10.8% for BP. Homemade pate with mushrooms records a content of 16.4% fat. The protein content was between 15% SP and 9.1% BP.

In terms of carbohydrates, the range is between 2.2% for SP and 3.7% for BP. With a protein content of 12.8%, homemade pâté ranks in the intermediate position. The lowest content of mineral substances was noticed for BP, and the highest for homemade pate with mushrooms.

The energy value of the pâté varies between 311 cal/100g for SP and 149 cal/100g for BP.

Conclusions: The average lipid content (significantly lower than SP and higher than BP), together with the presence of polyunsaturated fatty acids in its composition, makes homemade pâté (HP) a food product beneficial to the health of consumers. The possibility of obtaining in the household, from known components, can be another advantage of this type of food.

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P51

The nutritional and sensory evaluation of soymilk drink

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Soymilk is an alternative to dairy products and it has long been a traditional drink in China, Japan and other parts of Asia [1, 2].

The soya bean, or soybean (Glycine max) is the most important bean in the world, is a species of legume native to East Asia, providing a wide range of vegetable proteins [2]. Soybean is an important source of many bioactive compounds, which are important for the health benefits conferred [3, 4].

Soybean has numerous uses. Various foods are prepared from soybeans both by fermentative and non-fermentative processes. Fermented soy foods include soy sauce, fermented bean paste, nattō, and tempeh. Among the foods made without fermentation from soybeans is soy milk, from which tofu is prepared. This vegetable is the most important protein source for feed farm.

Soymilk is a colloidal solution obtained in the form of water extract from swollen and ground soybeans. Soymilk is a drink with rich content in protein, calcium and has no saturated fat. It is low in calories. It is the perfect alternative for people with lactose intolerance [5]. This kind of drink is especially used for vegetarian people, people with lactose intolerance, and those who hold religious fasting.

The soymilk has been prepared from analyzed grains and then some physical, chemical and nutritional characteristics of milk have been assessed. We investigated moisture and total dry content substance (TDC), total mineral content - ash content, macronutrients content (protein, fat, and carbohydrates

content) for soybeans and soymilk samples. For soymilk, we established total solid content (brix grade), pH, and sensory evaluation.

The investigated homemade soymilk has been prepared (from beans.) without thermal treatment but also by boiling. This drink was produced from hot-water-blanched wet-dehulled beans,

and toasted dry-dehulled beans milled into flour. Each extract was stored at 29 ± 1 °C, 10 ± 2 °C and −3 ± 1 °C for up to 42 days, respectively. The effects of processing method, storage temperature and storage duration on the proximate chemical composition, physicochemical and sensory attributes were studied. Different grinding methods and calcium salts addition influenced soymilk properties and improved the quality.

Keywords: soymilk, soybean, moisture, fat, protein content

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P52

The tomato fruit and Enhancing the health-promoting effects

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The tomato belongs to the Solanaceae family that includes more than 3,000 species. Fruits of tomato are an important source of nourishment for the whole world's population. Its world production is estimated to be around 159 million tons,while the average annual fresh tomato consumption is 18 kg per European and 8 kg per capita in the US [1]. Like many other plant species that are part of our diet, tomato fruits are an important source of substances with beneficial effects on health, including vitamins, minerals and antioxidants [2, 3]. Consumption of tomatoes is considered to be associated with several positive effects on health.

Consumption of tomato fruit has been associated with a reduced risk of inflammatory processes, cancer, and chronic noncommunicable diseases including cardiovascular diseases such as coronary heart disease, hypertension, diabetes, and obesity [2]. The antioxidant metabolites include a group of vitamins, carotenoids, phenolic compounds and phenolic acid, with health-improving effects on our body [2, 3]. The total antioxidant activity of tomato fruits can be of hydrophilic and lipophilic type. The hydrophilic antioxidant activity is conferred mainly by soluble phenolic compounds and vitamin C and shows a significant impact on total antioxidant activity (83%), while the lipophilic type is conferred by carotenoids, vitamin E, and lipophilic phenols (17%) [4]. Many factors such as genetics (cultivar or variety), environment (light, temperature, air composition, and mineral nutrition), and cultural practices (ripening stage at harvest and irrigation system) affect the chemical

composition of tomatoes [5, 6]. In this paper, a global point on tomatoes nutritional importance and mechanisms of action of different phytochemicals against inflammation processes according to the last discoveries is discussed.

In this paper presents a global point on the nutritional importance of tomatoes and the mechanisms of action of various phytochemicals against inflammatory processes according to the latest discoveries.

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