ICOSTEE 2024

International Conference on Science, Technology, Engineering and Economy

31st May 2024



Faculty of Engineering
University of Szeged

International Conference on Science, Technology,
Engineering and Economy

ICOSTEE 2024

BOOK OF ABSTRACTS



31st May 2024

Faculty of Engineering University of Szeged

Building A Mars tér 7, Szeged, Hungary

Publisher:

University of Szeged Faculty of Engineering

Mars tér 7, H-6724 Szeged, Hungary

Responsible publisher:

Prof. Dr. István Bíró

Edited by:

Prof. Dr. István Bíró

Prof. Dr. Zsuzsanna László

Prof. Dr. József Sárosi

Réka Dobozi

Ákos Ferenc Fazekas

József Mihalkó

ISBN:

978-963-306-986-8

Scientific and Organization Committee

Joint organization with the Agricultural and Bioengineering Scientific Committee of Hungarian Academy of Sciences

Chair of the Conference

Prof. Dr. István Bíró
Dean of the Faculty of Engineering, University of Szeged

Co-chair of the Conference

Prof. Dr. Zsuzsanna László
Vice Dean of the Faculty of Engineering, University of Szeged

Chair of the Coordination Committee

Prof. Dr. József Sárosi
Vice Dean of the Faculty of Engineering, University of Szeged

Scientific Committee

Prof. Dr. Diána Bánáti
Prof. Dr. Livia Cveticanin
Prof. Dr. Gergely Eugen-Ioan
Prof. Dr. Cecilia Hodúr
Prof. Dr. Erwin-Christian Lovasz
Prof. Dr. József Popp
Prof. Dr. Zita Seres
Prof. Dr. Péter Sipos
Dr. Ferenc Farkas
Dr. József Gál
Dr. György Hampel
Dr. Szabolcs Kertész
Dr. Krisztián Kis
Dr. Katalin Pappné Sziládi
Dr. János Simon
Dr. Balázs P. Szabó
Dr. István Tibor Tóth
Dr. Brigitta Zsótér

Organization Committee

Ádám Bálint
Dr. Sándor Beszédes
Réka Dobozi
Ákos Ferenc Fazekas
Magdolna Kiss
Dr. Edina Lendvai
József Mihalkó
Dr. Valéria Nagy
Richárd Pesti
Petra Veszelovszki

Table of content

Session 1. Bio- and Environmental Engineering 9

Enhancing sustainability in carbon dioxide hydrogenation through process intensification 10

Reactor chamber design effect on flue gas conversion 11

Flow dynamics assessment with integrated 3D printed turbulence promoters to mitigate membrane fouling in ultrafiltration module 12

Potential applications of monitoring methods based on dielectric behaviour in wastewater and sludge treatment and utilization processes 13

HYSPLIT and K-means clustering application for trajectory analysis to determine source regions of secondary inorganic aerosols at Hungary's Kecskemet background monitoring Station 14

Effect of ball-milling and water matrices on the degradation of trimethoprim by biochar-activated peroxymonosulfate 15

Effects of foot orthosis and kinesio tape on spatiotemporal and kinetic gait parameters during running in individuals with flatfoot 17

Investigation of the use of persulfate salts in advanced oxidation processes using trimethoprim as model compound 18

Enhancing and monitoring the anaerobic digestion of wastewater sludge 20

Assessment and validation of shallow groundwater vulnerability to contamination based on fuzzy logic and DRASTIC method for sustainable groundwater management, South-east Hungary. 21

Immobilization of TiO_2 and TiO_2/CNT nanoparticles using polydopamine to fabricate photocatalytically active PVDF membranes for filtration of oil emulsions 22

Enhancing membrane separation efficiency through the utilization of 3D-printed turbulence promoters derived from recycled PET bottles, with integration into filtration module 23

Effect of 3D printed turbulence promoter on fouling 24

Enhancing the biodegradability of meat industry sludge with metal nanoparticles coupled microwave irradiation 25

Impact of pyrolysis temperature on the physical and chemical properties of banana leaves biochar. Ammonium adsorption case study 26

Physicochemical properties of macroporous sugar beet pulp used as biosorbent 27

Intensification and monitoring of anaerobic fermentation of sewage sludge from the meat industry 28

Application of oxidoreductases immobilized on biochar for effective removal of CECs from wastewater 29

Use of nanofiltration membrane in the removal of carbofuran, acetamipride and propiconazole from waterQ 30

Removal of carbamazepine from water by polyamide nanofiltration membranes in a cross-flow system 31
Detectable Potassium reduction in various wastewater treatment systems 32
The effect of persulfate ions on the heterogeneous photocatalytic efficiency of zinc oxide 33
Maximization of TiO_2 content of PVDF membranes produced by blending and blending/spray-coating methods 34
Recent application of xanthan in removal of water contaminants 35
Utilization of biodiesel industry effluent for xanthan production in lab-scale bioreactor 36
Tbiomechanical analysis and modeling of different traction patterns in adolescent idiopathic scoliosis subjects 37

Session 2. Economics, Marketing, Management and Logistics 38

The role of statistics in supply chain management 39
Risk-taking factors in a dynamic approach 40
Waste management problems in Laos 41
Economic perspectives of alpaca farming in Hungary 42
Analysis of the marketing and sales strategy of a small Hungarian prosthesis manufacturing company 43
Current issues of the applicability of artificial intelligence in relation with the work of Supreme Audit Institutions 44
he importance of honey in a healthy nutrition 45
Investigating the meaning of the concept of "clean label" and evaluating its content through a consumer survey 46
The relationship between supplementation and sport 47

Session 3. Food Science, Safety and Technologies 48

Reverse osmosis filtration of hawthorn fruit extract (*Crataegus monogyna* Jacq.): Optimization for bioactive compound concentrates, permeate flux and fouling index by response surface methodology 49
Searching for probiotics in traditional Mongolian fermented milk product 50
Numerical simulation of yogurt viscosity during fermentation 51
Investigation of low temperature heat treatment (sous vide) of white button mushroom (*Agaricus Bisporus*) 52
Chemical composition and antioxidant activity of Lavander (*Lavandula angustifolia*) essential oil and lipophilic extracts 53
Presence of food-borne and toxigenic molds in wheat and corn products 54
Dielectric monitoring of microwave extraction processes 55

Statistical investigation of the correlation between the intake of bisphenol A (BPA) from carbonated and energy drinks and the occurrence of reproductive problems in 156 subjects 56
Development of spreadable meat product made from Mangalica liver 57
The examination of apple shelf life from consumer storage perspective 58
Cascade membrane system for selective separation of functional compounds from dairy by-products 59
Soil microbiota's impact on maize grain nutrition 60
Non-thermal plasma for improved fractionation of lignocellulose biomass – different strategies .. 61
Oleogel containing beeswax and monoglycerides as a potential substitute for confectionery palm fats 62
Comparison of color coordinates measured with different devices in case of ground spices 63
Possibility of using new biopolymer/polyethylene bilayer film for packing coffee 64
Farmers' decisions in the Southern Great Plain region as a result of the 2022 drought 65
Insights into Saffron's anti-inflammatory properties; lab studies and beyond 66
Knowledge graph to build a database on Human Milk Microbiota 67
Analysis and fermentation monitoring of wines from Csongrád wine region 68
Unveiling household food waste: Survey results from the housholds from Vojvodina Region, Serbia..... 69
The examination of the loss of Frankfurters before packaging at a Hungarian meat industry company 70
Osmotic treatment of orange and pink sweet potato-mass transfer rate and efficiency 71
Comparison of the effect of homogenization and sonication on the texture properties of goat milk yogurt 72
Comparative analysis of polyphenol extraction from olive pomace: A study on microwave-assisted and traditional methods 73
Investigating the potential of Marloo variety for spontaneous cabbage fermentation 74
Comparison of the novel and traditional extraction techniques for the isolation of thyme bioactive compounds 75
Potential solutions to lifestyle and socio-economic inequalities and dealing with the prevalence of non-communicable diseases in low and middle-income communities in South Africa..... 76
Evaluation of the effects of sorghum flours on the viability and development on *Drosophila* larvae 77
Dynamic modelling of the molecular composition of human milk..... 78
Assessing the health promoting effect of malt, using *Drosophila melanogaster* model system..... 79
The influence of the process parameters of the biopolymer pouches synthesis on the quality of packaged edible oil..... 80

Comparative analysis of milling technologies in dark and milk cocoa topping production for ice cream 81
Native triticale as a stand-in for barley malt 82
Antimicrobial activity of some medicinal plants from teritory of Serbia 83
Design and development of a monitoring system based on wireless data collection for food industry purposes 84
The relationship between the nutrient content of potatoes and the structure stability, color changes, of their freeze-dried products 85
Effect of the food composition on the microbial kinetics in plant-based milk 86
The potential of future superfood-microgreens: Bioactivity and bioactive content of three *Brassicaceae* microgreens 87
The effects of ultrasonic treatment in canning technology 88
Thermal degradation of anthocyanin in blueberry juice as affected by sucrose and vitamin C 89
The influence of the type and concentration of plasticizer on the properties of biopolymer films based on wild flax (*Camelina Sativa*) 90
Rheological analysis of microalgae 91
Examination of the surface changes of UV-C treated carrots 92
Duckweeds: sustainable novel foods 93
Effect of drying methods on quality of fruit pomace 94
Physico-mechanical properties of purple wheat in Hungary 95
Evaluation of rheological, sensory and nutritional qualities in gluten-free bread formulations 96

Session 4. Intelligent Systems and Logistics 97

Application of artificial techniques in the poultry industry 98
RealTime-AT: Improved online anomaly detection in streaming multidimensional time series 99
Impact of antenna orientation on localization accuracy using RSSI-based trilateration 100
Sequentional probability ratio test for vibration analysis testing 101
Developing Excel VBA functions for the mathematical modeling of three-dimensional vectors . 102
The risks of using AI 103
Markerless measurement techniques for motion analysis in sports science 104
Effect of foot orthoses on multi-segment foot kinematics: A systematic review 105
A soft exoskeleton for hand finger rehabilitation application using fully elastic pneumatic actuators 106
With ChatGPT about ChatGPT 107
Measurement system for the calibration of accelerometer arrays 108
Augmented reality based industrial digitalization and logistics 109
Pre-processing for enhanced anomaly detection on periodic server farm telemetry data 110

Session 5. Mechanical Engineering, Materials Science and Energetics 111

Production of high-quality gas by pyrolysis 112
Density measurements of nanofluids using pycnometer – review of the existing results 113
Modelling hystheresis with memristors 114
Enhancing hydrodynamic characteristics through the integration of 3D-printed spacers within the VSEP membrane filtration module 115
Alternative method for modeling dynamic systems 116
Numerical study of knee prosthesis wear as a function of prosthesis size 117
Design and implementation of a wireless smart home heating control system: integrating iot for enhanced efficiency 118
Design, implementation, and investigation of ethercat and serial communication servo control system and it's industrial application 119
Thermal optimization and technological transformation of photovoltaic systems 120
Energetic characterization of liquid, solid, and gaseous products derived from plastic pyrolysis 121
Methodology for measuring temperature conditions of heat pump outdoor unit 122
Total knee replacement wear measurement methods 123
Investigation of the cutting of engineering polymers 124
Design and implementation of a 3 degrees of freedom robotic arm powered by pneumatic artificial muscle 125
Design of the drive chain and back suspension of a pneumobile racing car 126
Study and comparison of surface roughness parameters in turning 127
Analysis of the spanwise effect behind a cylindrical body 128
Mechanical properties and microstructural characteristics of steel pipes after long-time hydrogen exposure 129
Modelling of a recently invented solar pot 130
Rotation vectors for multi degree of freedom vibrationi 131
Optimization of parameters for synthesis of alginate based hydrogels 132
The energetic analysis of the pyrolysis of tire and additives mixtures 133
The logic of a technical innovation 134
The consumption of e-cars can be improved with a new mode of operation 135
Mechanical characteristics analysis of 3D printing materials used for integration into filter modules 136
Preparation, characterization and application of magnetic nanoflowers 137

COMPARISON OF THE NOVEL AND TRADITIONAL EXTRACTION TECHNIQUES FOR THE ISOLATION OF THYME BIOACTIVE COMPOUNDS

Sanja Milošević[1], Danica Božović[1], Maja Živanović[1], Nemanja Teslić[2], Nevena Gladikostić[1], Zoran Zeković[1], Branimir Pavlić[1]

[1]Faculty of Technology, University of Novi Sad Blvd. cara Lazara 1, 21000 Novi Sad, Serbia
[2]Institute of Food Technology, University of Novi Sad, Blvd. cara Lazara 1, 21000 Novi Sad, Serbia
e-mail: sanjamilosevic9898@gmail.com

ABSTRACT

Thyme *(Thymus vulgaris)* from *Lamiaceae* family is a widely distributed spice in the world which provides strong medicinal potential. Thymol followed by carvacrol, and linalool, the major volatile compounds in thyme essential oil, express high antioxidant, anti-inflammatory and antibacterial activity. The aim of this research was to select the most efficient technique in terms of antioxidant activity and the amount of bioactive compounds. Within the experiential part of this research, two tipes of essential oil obtained by hydrodistillation (HD) and microwave-assisted hydrodistillation (MWHD), and lipophilic extracts obtained by Soxhlet extraction (Sox) and supercritical fluid extraction (SFE) were subjected to comparison in terms of extraction yield and in vitro antioxidative activity against DPPH (2,2-diphenyl-1-picrylhydrazyl) and ABTS (2,2'-azino-bis-(-3-ethylbenzothiazoline-6-sulfonic acid) diammonium salt) radicals. Moreover, the differences in the essential oils and lipophilic extracts chemical profile were distinguish by gas chromatography-mass spectrometry (GC-MS). Finally, a properly chosen extraction technique can enable obtaining valuable thyme's products that can be applied in various forms to increase the bacteriological safety of food and cosmetic products.

Keywords: Thyme, essential oils, lipophilic extracts, antioxidant activity, GC-MS

Acknowledgements: Science Fund of the Republic of Serbia, 7750168, Novel extracts and bioactive compounds from under-utilized resources for high-value applications–BioUtilize, Ministry of Science, Technological development, and Innovation, Republic of Serbia, 451-03-66/2024-03/ 200134