



WROCLAW UNIVERSITY
OF ENVIRONMENTAL
AND LIFE SCIENCES

7-9 September 2022
Wrocław, Poland



EXPERIMENTAL,
THEORETICAL
AND INDUSTRIAL
INNOVATIVE DRYING
AND DEWATERING
TECHNOLOGIES

4th
**Nordic
Baltic
Drying
Conference**



CONFERENCE

PROGRAM

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ORGANIZING COMMITTEE:

President:	Odilio Alves-Filho	NewDryTech, Norway
Chairwoman:	Anna Michalska-Ciechanowska	UPWr, Poland
Chairman:	Adam Figiel	UPWr, Poland
Chairwoman:	Agnieszka Kita	UPWr, Poland
Secretariat:	Svetlana Alves	NewDryTech, Norway
	Paulina Nowicka	UPWr, Poland
	Jessica Brzezowska	UPWr, Poland
	Aleksandra Hendrysiak	UPWr, Poland
	Krzysztof Lech	UPWr, Poland
	Klaudia Masztalerz	UPWr, Poland

GENERAL INFORMATION

VENUE

Q Hotel Plus Wrocław,
Zaolziańska 2 St., 53-334 Wrocław, Poland

CONFERENCE WORKING HOURS:

Wednesday - September 7, 2022:	5:00 pm - 7:30 pm
Thursday - September 8, 2022:	8:30 am - 5:20 pm
Friday - September 9, 2022:	8:30 am - 5:00 pm

REGISTRATION:

Wednesday - September 7, 2022:	5:00 pm - 7:30 pm
Thursday - September 8, 2022:	8:30 am - 9:00 am

SOCIAL PROGRAM:

Guided tour 'Visiting Wrocław'

Wednesday - September 7, 2022:	2:00 pm - 5:00 pm
Meet at the Q Hotel Plus Wrocław	1:30 pm
The price for the tour is 15 €	

Get Together Meeting

Wednesday - September 7, 2022:	6:00 pm - 7:30 pm
Q Hotel Plus Wrocław	

Get Together Dinner

Thursday - September 8, 2022:	7:30 pm - 9:30 pm
Q Hotel Plus Wrocław	

Banquet in Restaurant La Maddalena

Friday - September 9, 2022:	8:00 pm - 11:30 pm
ul. Pomorska 1, 50-215 Wrocław	
Not included in the Students fee	
Price for students is 45 €	

Guided tour 'Visiting KSIĄŻ Castle in Wałbrzych'

Saturday - September 10, 2022:	10:00 am - 4:00 pm
Meet at the Q Hotel Plus Wrocław	9:30 am
The price for the tour is 30 € + transport fee	



PROGRAM OVERVIEW

Thursday - September 8, 2022

09:00	OPENING AND WELCOME
	KEYNOTE LECTURES
09:30	Prof. Dr. Alves-Filho
10:15	Prof. Dr. Figiel
11:00	Coffee break
	KEYNOTE LECTURES
11:30	M.Sc. Jensen
12:15	Prof. Eikevik
13:00	Lunch
	DRYING INTENSIFICATION AND MODERN TECHNOLOGIES
14:00	Dr. Srzednicki
14:20	Dr. Havlík
14:40	Dr. Laukkanen
15:00	Dr. Masztalerz
15:20	Mrs. Zielinska
15:40	Dr. Dadan
16:00	Coffee break
16:20	POSTER SESSION



PROGRAM OVERVIEW

Friday - September 9, 2022

	KEYNOTE LECTURES
09:00	Prof. Dr. Carbonell-Barrachina
09:45	Dr. del Castillo
10:30	Coffee break
	DRYING FOODS AND BIOMATERIALS
10:50	Dr. Borompichaichartkul
11:10	M.Sc. Maksimowski
11:30	M.Sc. Brzezowska
11:50	M.Sc. Hendrysiak
12:10	M.Sc. Zubaidi
12:30	M.Sc. Okpala
12:50	M.Sc. Haładyn
13:10	Lunch
	INDUSTRIAL EXHIBITION SESSION
14:10	Dr. Parosa
15:10	Coffee break
15:30	ROUND TABLE OF INDUSTRY AND ACADEMIA
16:00	CLOSING CEREMONY

Thursday - September 8, 2022

OPENING AND WELCOME

09:00 **Opening of NBDC 2022**
Odilio Alves-Filho - President of NBDC
NewDryTech AS, Waister AS/Norway

09:15 **Welcome to Participants on Behalf of Wrocław University of Environmental and Life Sciences**
Anna Michalska-Ciechanowska – Chairwoman of NBDC 2022

KEYNOTE LECTURES

Chair Anna Michalska-Ciechanowska

09:30 **Green Drying Technologies and Heat Pump Applications to Convert Wastes to Valuable Products**
O. Alves-Filho, S. Alves
NewDryTech AS/Norway

10:15 **Novel Drying Methods in Preservation of Bio-Based Side Stream and By-Products**
A. Figiel, K. Masztalerz
Wrocław University of Environmental and Life Sciences/Poland

11:00 Coffee break

KEYNOTE LECTURES

Chair Odilio Alves-Filho

11:30 **CO₂ Neutral Sugar Production by Steam Drying of Beet Pulp**
A.S. Jensen
EnerDry ApS/Denmark

12:15 **High Temperature Heat Pumps in Drying Systems**
T.M. Eikevik
Norwegian University of Science and Technology/Norway

13:00 Lunch

Thursday - September 8, 2022

DRYING INTENSIFICATION AND MODERN TECHNOLOGIES

Chair	Adam Figiel
14:00	Review of Drying Systems with Low Energy Consumption G. Szrednicki University of New South Wales/Australia
14:20	Fluidized Bed Drying of Biomass - Fluidization Characteristics of Wood Chips <u>J. Havlík</u> , T. Dlouhý Czech Technical University in Prague/Czech Republic
14:40	Experimental Study on Veneer Drying in a Conductive Dryer <u>T. Laukkanen</u> ¹ , H. Holmberg ¹ , O. Paajanen ² , P. Lopez Trablou ¹ ¹ Aalto University, Department of Mechanical Engineering/Finland ² Mikkeli University of Applied Sciences/Finland
15:00	The Influence of the Pretreatment Method on the Physico-Chemical Properties of Sunflower Seeds Cake Products <u>K. Masztalerz</u> , K. Lech, A. Figiel, J. Brzezowska, A. Michalska-Ciechanowska Wrocław University of Environmental and Life Sciences/Poland
15:20	Effect of Atmospheric Pressure Air Plasma Jet Pretreatment on the Drying Kinetics and Physicochemical Properties of Okra Pods Subjected to Hot Air Impingement Drying <u>S. Zielinska</u> ¹ , D. Zielinska ² , H.-W. Xiao ³ ¹ Wrocław University of Science and Technology/Poland, ² University of Warmia and Mazury in Olsztyn, ³ China Agricultural University/China
15:40	The Comparison of the Influence of Pulsed Electric Field Treatment Combined with Vacuum and Convective Drying on the Process Kinetics and Selected Properties of Dried Carrot <u>M. Dadan</u> , A. Matys, A. Baranska, K. Rybak, M. Nowacka, D. Witrowa-Rajchert, A. Wiktor Wrocław University of Environmental and Life Sciences/Poland
16:00	Coffee break

Thursday - September 8, 2022

16:20

POSTER SESSION

Estimation of Potatoes Moisture Diffusion Coefficient by Means of a Non-Linear Estimator

C. Martínez Vera, M.V. Mendoza, A.R. Medina, Z.O. Hernández
Universidad Autónoma Metropolitana-Iztapalapa/Mexico

Influence of Dairy By-Products as Carriers and Low Temperature Spray Drying on Bioactive Compounds of Sour Cherry Concentrate

A. Barańska¹, A. Michalska-Ciechanowska², A. Jedlińska¹, A. Wojdyło²,
K. Samborska¹

¹Warsaw University of Life Sciences/Poland,

²Wrocław University of Environmental and Life Sciences/Poland

Use Thymus Vulgaris Essential Oils for the Prevention of Nosocomial Infections

F. Boudjella¹, S. Zaoui¹, F. Bahri¹, J. Wanner²

¹University of Mostaganem/Algeria, ²Kurt Kitzing GmbH/Germany

Use Thymus Fontanesii Boiss & Reut Essential Oils for the Prevention of Nosocomial Infections

S. Zaoui¹, F. Boudjella¹, F. Bahri¹, A. Szumny²

¹University of Mostaganem/Algeria,

²Wrocław University of Environmental and Life Sciences/Poland

Influence of a Constant, Heterogeneous Magnetic Field on the Thermal Drying Process

A. Ocieczek, Z. Otremba

Gdynia Maritime University/Poland

Application of Hyper Spectral Imaging in Drying of Agricultural Products

E. Taghinezhad¹, A. Szumny², A. Figiel²

¹University of Mohaghegh Ardabili/Iran,

²Wrocław University of Environmental and Life Sciences/Poland

Oven-Drying Process Impacts Positively on the Pulp Oil of *Canarium schweinfurthii* Engl. Fruit

K.O. Omeje¹, B.O. Ezema¹, J.N. Ozioko¹, H.C. Omeje², E.C. Ossai¹, S.O.O. Eze¹, C.O.R. Okpala³, M. Korzeniowska³

¹University of Nigeria/Nigeria, ²University of Port Harcourt/Nigeria, ³Wroclaw University of Environmental and Life Sciences/Poland

The Color and Structural Changes of Ultrasound-Assisted Dried Organic Apples Pre-Treated by a Pulsed Electric Field

M. Nowacka, K. Rybak, M. Dadan, D. Witrowa-Rajchert
Warsaw University of Life Sciences/Poland

Determination of Drying Kinetic of Fermented Beetroots Based on the Measurements of Incident and Reflected Power

B. Pszczółkowski, M. Zielinska, I. Staniszewska, K. Nowak,
K. Zuk-Golaszewska

University of Warmia and Mazury in Olsztyn/Poland

Influence of Freeze- and Vacuum Drying on the Physical and Chemical Properties of Fruit Juice Powders Enriched with Herbal Infusions

A. Kucharska-Guzik, J. Brzezowska, M. Kułaga

Wroclaw University of Environmental and Life Sciences/Poland

Moderating the Physical and Chemical Properties of Blackcurrant and Chokeberry Powders with the Addition of Vegetable Juices and Selected Drying Methods

M. Kułaga, J. Brzezowska, A. Kucharska-Guzik

Wroclaw University of Environmental and Life Sciences/Poland

Physico-Technological Characteristics of Dried Pumpkin

M.B. Sabolović, R. Marović, S.R. Brnčić, M. Brnčić

University of Zagreb/Croatia

Thursday - September 8, 2022

16:20

POSTER SESSION

Clean Label Information and Quality Parameters: Dried Figs Available in Spanish Market

C. Teruel-Andreu, N. Jiménez-Redondo, M. Cano-Lamadrid, E. Sendra, F. Hernández
Miguel Hernández University of Elche/Spain

Recent Trends in the Hybridization of Freeze-Drying Systems in the Drying of Food

N.S. Chibuzo¹, A. Figiel², E.O. Okpomor³
¹Federal University of Agriculture/Nigeria, ²Wroclaw University of Environmental and Life Sciences/Poland, ³University of Nigeria/Nigeria

The Effect of Non-Thermal Pretreatment on Energy Consumption and Drying Kinetics of Black Garlic

K. Lech¹, K. Masztalerz¹, T. Drózdź², P. Kietbasa², A. Figiel¹
¹Wroclaw University of Environmental and Life Sciences/Poland, ²University of Agriculture in Krakow/Poland

How Can We Further Reduce Greenhouse Gas Emissions from Dishwashing and Drying of Dish?

R. Renström
Karlstad University/Sweden

The Influence of Drying Conditions on the Release of Volatile Organic Compounds from Medicinal and Aromatic Plants

J. Łyczko¹, A. Kiełtyka-Dadasiewicz^{2,3}, M. Skrzyński¹, K. Klisiewicz¹, A. Szumny¹
¹Wroclaw University of Environmental and Life Sciences/Poland, ²University of Life Sciences in Lublin/Poland, ³Garden of Cosmetic Plants and Raw Materials/Poland

The Influence of the Pasteurization Process on the Color of Juices Obtained from Potatoes with Purple Flesh

A. Tkaczyńska, E. Rytel
Wroclaw University of Environmental and Life Sciences/Poland

Thursday - September 8, 2022

16:20

POSTER SESSION

The Effect of Inulin and Trehalose on Physico-Chemical Properties of Plant-Based Powders

U. Skórniak, K. Moczydlak, A. Hendrysiak, N. Dibagar
Wroclaw University of Environmental and Life Sciences/Poland

Characterization of a Fruit-Based Powder Produced by Different Carrier Agents and Drying Strategies

K. Moczydlak, U. Skórniak, A. Hendrysiak, N. Dibagar
Wroclaw University of Environmental and Life Sciences/Poland

Optimization of the Rosehip (*Rosa Canina* L.) Drying Process

A. Zimmer, K. Masztalerz, K. Lech
Wroclaw University of Environmental and Life Sciences/Poland

Hot Air-Assisted Contact Infrared Dryer – a New Solution for Production Dried Fruit Snacks of Functional Properties

D. Konopacka, S. Siarkowski
The National Institute of Horticultural Research/Poland

Effect of Convective and Vacuum-Microwave Drying on the Polyphenolic Compounds and Pro-Health Properties of Peach Fruit

P. Nowicka, A. Wojdyło, K. Lech
Wroclaw University of Environmental and Life Sciences/Poland

Vacuum-Impregnation of Apple Slices with Rhubarb Juice

J. Poliwoda, U. Kłobus, M. Paślawska
Wroclaw University of Environmental and Life Sciences/Poland

Friday - September 9, 2022

KEYNOTE LECTURES

Chair Trygve Eikevik

09:00 **Sensory Evaluation and Economical Aspects of Dried Food Products (Fruit, Vegetables, and Aromatic Herbs): Fundamentals and Applications**

Á. Calín-Sánchez¹, A. Michalska-Ciechanowska², A. Figiel²,
Á. Carbonell-Barrachina¹

¹Universidad Miguel Hernández de Elche/Spain,

²Wrocław University of Environmental and Life Sciences/Poland

09:45 **Spray Drying Technology for the Sustainable Production of Instant Coffee Fruit Cascara**

M.B. López-Parra, J.A. Mendiola, A. Iriondo-DeHond, M.D. del Castillo
Instituto de Investigación en Ciencias de la Alimentación/Spain

10:30

Coffee break

DRYING FOODS AND BIOMATERIALS

Chair Ángel Carbonell-Barrachina

10:50 **Microencapsulation of Sunflower Sprout Extract via Spray Drying and its Bioactivity**

A. Chantri, C. Borompichaichartku
Chulalongkorn University/Thailand

11:10 **The Effect of Instantization Process on Bioactive Potential of Hot Brewed and Cold Brew Coffee Concentrates According to Different Drying Techniques**

D. Maksimowski, J. Brzezowska, A. Hendrysiak
Wrocław University of Environmental and Life Sciences/Poland

11:30 **Drying-Dependent Valorization of Cranberry Pomace Extracts for Natural Food Additives in Powder Form**

J. Brzezowska, A. Hendrysiak, A. Wojdyło, A. Michalska-Ciechanowska
Wrocław University of Environmental and Life Sciences/Poland

Friday - September 9, 2022

DRYING FOODS AND BIOMATERIALS

Chair George Srzednicki

11:50 **Effect of Juice Pretreatment and Carrier Type on the Physico-Chemical Properties of Rosehip Powders**
A. Hendrysiak¹, A. Michalska-Ciechanowska¹, J. Brzezowska¹,
D. Bocquel², F. Maruel², N. Nicolet², W. Andlauer²
¹Wrocław University of Environmental and Life Sciences/Poland
²Univeristy of Applied Sciences & Arts Western Switzerland Valais Wallis/
Switzerland

12:10 **Preserving Antioxidants from Elderberry Juice through Different Drying Techniques**
M. Zubaidi, A. Hendrysiak, A. Nawirska-Olszańska, A. Michalska-Ciechanowska
Wrocław University of Environmental and Life Sciences/Poland

12:30 **Roasting and Sun-Drying Processes to Make Terminalia Catappa Nuts More Consumer Friendly**
I.F. Chukwuma¹, E.C. Ossai¹, F.N. Nworah¹, V.O. Apeh²,
E.O. Abiazem¹, C.O.R. Okpala³
¹University of Nigeria/Nigeria, ²Federal College of Dental Technology
and Therapy/Nigeria, ³Wrocław University of Environmental and Life
Sciences/Poland

12:50 **Fruit Leather - as a New Form of Health-Promoting Fruit Snack Created in the Drying Process**
K. Haładyn, K. Lech, A. Wojdyto, P. Nowicka
Wrocław University of Environmental and Life Sciences/Poland

13:10

Lunch

Friday - September 9, 2022

INDUSTRIAL EXHIBITION SESSION

Chair Arne Sloth Jensen

14:10 **The Effect of the Parameters of Pulse-and-Fluidisation Drying with the Use of Microwaves on the Drying Process and Shaping the Quality of Selected Foodstuffs**

R. Parosa, K. Kowalczyk, M. Natoński, A. Brożyński, M. Nowakowski,
Ł. Łaba, J. Majerska
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15:10 **Coffee break**

15:30 **ROUND TABLE OF INDUSTRY AND ACADEMIA**

16:00 **CLOSING CEREMONY**

ORGANIZERS AND PARTNERS



WROCLAW UNIVERSITY
OF ENVIRONMENTAL
AND LIFE SCIENCES

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Polish Academy of Sciences

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www.pan.pl



Information Portal

ul. Serwituty 25, 02-233 Warszawa, Poland
www.foodfakty.pl



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