

# **10th International Conference on Thermal Equipment, Renewable Energy and Rural Development (TE-RE-RD 2021)**

E3S Web of Conferences Volume 286 (2021)

Online

10 - 12 June 2021

## **Editors:**

**Gabriel Paul Negreanu  
Nicolae-Valentin Vladut**

**Mohand Tazerout  
Can Ertekin**

ISBN: 978-1-7138-3478-6

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution 4.0 International License. License details:  
<http://creativecommons.org/licenses/by/4.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For additional information, please contact EDP Sciences – Web of Conferences at the address below.

EDP Sciences – Web of Conferences  
17, Avenue du Hoggar  
Parc d'Activité de Courtabœuf  
BP 112  
F-91944 Les Ulis Cedex A  
France

Phone: +33 (0) 1 69 18 75 75

Fax: +33 (0) 1 69 28 84 91

[contact-edps@webofconferences.org](mailto:contact-edps@webofconferences.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>Researches on Increasing the Dissolved Oxygen Concentration in Stationary Waters</b> .....	1
<i>Boltinescu (Roza) Marilena Monica, Sima Nicolae Vlad, Albu Dorina Nicoleta, Petrouel (Bănică) Mihaela, Constantin Mihaela</i>	
<b>Numerical Investigation on Combustion and NO<sub>x</sub> Emissions of a CH<sub>4</sub> / Kerosene Afterburner</b> .....	9
<i>Mangra Andreea Cristina, Barbu Ene</i>	
<b>Numerical Modelling of Heat Convection Processes in the Ducts of Two-Stage Heat Exchanger</b> .....	20
<i>Kolev Zhivko, Kadirova Seher</i>	
<b>Improving the Lifetime of an Electro-Compressor for Autoclave with Optimized Buffer Tank</b> .....	30
<i>Vlăducă Iulian, Borzea Claudia Irina, Petre Carmen Gheorghiu, Hripcu Romeo Dorin, Maier Raluca Lucia, Ringheanu Vicen.iu Liviu, Stanciuc Ramona Manuela</i>	
<b>Cost Analysis at Different Energy Sources for Heating of an Air-Supported Dome for Indoor Tennis</b> .....	41
<i>Gavrilov Ventsislav, Penkova Nina, Zlateva Penka, Mladenov Boian</i>	
<b>The Effects of Split Direct Injection on the Operation of a Tractor Diesel Engine Fueled by Biodiesel B20</b> .....	51
<i>Niculae Andrei Laurentiu, Rashid Adnan Kadhim, Chiriac Radu</i>	
<b>Improving Energy Performance of a Cement Manufacturing Factory by Using Waste Heat Recovery Systems, Estimated Vs. Actual Achievements</b> .....	59
<i>Scripcariu Mircea, Gheorghiu Cristian, Gheorghiu Miruna, Dobrica Alexandra Gabriela</i>	
<b>Experimental COP Evaluation of a 65-Litre Household Refrigerator Running with R600a</b> .....	68
<i>Alqaisy Saleh J., Hmood Kamel S., Aboaltooq Mahdi Hatf Kadhum, Apostol Valentin, Pop Horatiu, Al Douri Jamal, Bădescu Viorel</i>	
<b>The Heat Transfer Performance of MWCNT, CuO, and Al<sub>2</sub>O<sub>3</sub> Nanofluids in an Automotive Engine Radiator</b> .....	77
<i>Mahdi Al-Araji Karaar, Almoussawi M.A., Alwana Kareem J.</i>	
<b>Using CFD to Improve the Performance of a Heat Exchanger from a Gasifier</b> .....	87
<i>Dumitrescu Liliana, Maican Edmond, Pavel Ioan, Dumitrescu Cătălin, Găgeanu Iuliana, Pătru. Andrei</i>	
<b>Analytical Model for Estimating the Production and Composition of Gas Resulted Through Gasification</b> .....	94
<i>Mihăescu Lucian, Piuă Ionel, Simion Iulia, Negreanu Gabriel Paul</i>	
<b>Review Regarding Defrosting Methods for Refrigeration and Heat Pump Systems</b> .....	105
<i>Al Douri Jamal, Hmood Kamel S., Apostol Valentin, Pop Horatiu, Alqaisy Saleh J., Beatrice Ibrean Elena</i>	
<b>Reevaluation of Bamboo as Biomass</b> .....	118
<i>Vanghele Nicoleta Alexandra, Matache Andreea, Stanciu Mariana Mădălina, Mihalache Dumitru Bogdan</i>	
<b>Valorization on the Energy Potential of Pistia Stratiotes in Sustainable Agriculture-Review</b> .....	126
<i>Matache Andreea, Vanghele Nicoleta Alexandra, Matache Mihai Gabriel, Petre Ancu.a Alexandra</i>	
<b>Investigation of the Thermodynamic and Thermal Properties of Clary Sage (Salvia Sclarea L.) Essential Oil and Its Main Components</b> .....	138
<i>Tasheva Stanislava, Gandova Vanya, Prodanova-Stefanova Vanya, Marinova Krasimira, Dimov Milen, Dobрева Krasimira, Stoyanova Albena</i>	
<b>Investigation of the Thermodynamic and Physicochemical Properties of Lavender Oil (Lavandula Angustifolia Mill.)-Ethanol-Water System</b> .....	147
<i>Gandova Vanya, Tasheva Stanislava, Prodanova-Stefanova Vanya, Dobрева Krasimira, Dincheva Ivayla, Stoyanova Albena</i>	
<b>Performance of Cylindrical Solar Still with Hemispherical Cover: CFD Simulation Study</b> .....	161
<i>Abd Qahtan A, Hachim Dhafer M, Abd Al-Wahid Wisam A</i>	
<b>Energy Efficiency in the Building Materials Industry. Case Study: Brick Manufacturing in Romania</b> .....	171
<i>Gheorghiu Cristian, Scripcariu Mircea, Gheorghiu Miruna, Dobrica Alexandra Gabriela</i>	
<b>Archimedean Screw as Fish-Friendly Turbines for Harnessing Hydropower Potential</b> .....	182
<i>Purece Cristian, Corlan Lilica</i>	
<b>The Comparison of Thermal Comfort Test Results in Selected Traditional and Modern Buildings</b> .....	196
<i>Krawczyk Natalia, Krakowiak Justyna</i>	
<b>A Study of the Transient Processes in the Physical Model of the Electric Power Systems with Predominant Part of the Renewable Energy Sources</b> .....	207
<i>Nedelchev Ivaylo, Zhivomirov Hristo, Kamenov Yoncho</i>	
<b>Study of Regime Parameters of the Fermenter in the Production of Biogas from Animal Liquid Waste Materials</b> .....	217
<i>Zlateva Penka, Terziev Angel, Yordanov Krastin</i>	

<b>Renewable Energy as an Integral Part of the Bulgarian Energy Mix</b> .....	223
<i>Stankova Todorka, Toneva Daniela</i>	
<b>Improving the Efficiency of Crystalline Silicon Solar Cell Through Regulating Their Temperature Using Thin Films of Polyvinyl Alcohol</b> .....	229
<i>Naser Ali Kadhim, Hachim Dhafer Manea, Abed Qahtan A</i>	
<b>Experimental Researches on Poultry Manure Combustion in Co-Combustion with Biomass</b> .....	237
<i>Lăzăroiu Gheorghe, Negreanu Gabriel Paul, Pi.ă Ionel, Grigoriu Rodica Manuela, Ciupăgeanu Dana-Alexandra</i>	
<b>Defining of Criteria for Flue Gas Decarbonization Efficiency in Methanation Reactors with Membrane Technology</b> .....	247
<i>Lăzăroiu Gheorghe, Mihăescu Lucian, Ciupăgeanu Dana-Alexandra, Grigoriu Rodica-Manuela, Bondrea Dana-Andreya</i>	
<b>Evaluation of the Influence of the Windbreak Trees on the Change of Wind Shear in Weakly Complex Terrains</b> .....	253
<i>Terziev Angel, Pantelev Yancho, Iliev Iliya, Beloev Hristo</i>	
<b>A Theoretical Study on the Mass Input and Output and Energy of the Biomedical Waste Incinerator</b> .....	260
<i>Jaber Sari, Aljawad Alaa Aldin, Prisecaru Tudor, Pop Elena</i>	
<b>The Environmental Situation of the Ash Medical Waste in Baghdad City, Iraq</b> .....	269
<i>Jaber Sari, Aljawad Alaa Aldin, Prisecaru Tudor, Pop Elena</i>	
<b>Selective, Weighted Morphological Research, by Dividing the Equipment for Biocompost Production by Submorphologies</b> .....	280
<i>Olan Mihai, Păun Ani.oara, Găgeanu Paul, Ungureanu Nicoleta, Bunduchi George, Zaica Alexandru</i>	
<b>Desorption Capacity of Raw Energy Bars with Fruits of Zizyphus Jujuba Mill. - Bulgaria</b> .....	288
<i>Durakova Albenă, Vasileva Adelina, Gogova Tzvetana, Temelkova Milena, Krasteva Rumyana</i>	
<b>Sorption Characteristics of Ready-Made Mixtures Containing Oatflakes, Apples, and Cinnamon</b> .....	295
<i>Durakova Albenă, Vasileva Adelina, Choroleeva Kornelia</i>	
<b>An Experimental Investigation of Working with Ordinary and Electromagnetic Nozzles</b> .....	303
<i>Kehayov Dimitar, Atanasov Atanas, Cujbescu Dan</i>	
<b>Experimental Research on Obtaining Pelletized Feed Recipes with Applicability in Semi-Intensive Aquaculture Systems</b> .....	309
<i>Vocea Iulian, Moga Corina Ioana, Biri. Sorin-.tefan, Constantin Gabriel-Alexandru, Boruz Sorin, Matache Mihai Gabriel</i>	
<b>Determination of Qualitative Working Indices of Harrows with Elastic Fangs</b> .....	316
<i>Cujbescu Dan, Matei Gheorghe, Kehayov Dimitar, Atanasov Atanas</i>	
<b>Experimental Research for Obtaining Functional Ingredients from Jerusalem Artichoke and Hemp Seeds</b> .....	324
<i>Găgeanu Iuliana, Persu Cătălin, Gheorghe Gabriel, Popa Diana, Dumitrescu Liliana</i>	
<b>Strength Analysis and Modal Analysis for the Load-Bearing Structure of the Equipment for Opening and Compartmentalizing Watering Furrows, Using 1D</b> .....	331
<i>Cardei Petru, Sfiru Raluca, Oprescu Marius, Muraru Vergil, Muraru Cornelia</i>	
<b>Analysis of the Resistance Frame of the Equipment for Opening and Compartmentalizing Watering Furrows, Using 3D Finite Elements</b> .....	339
<i>Cardei Petru, Oprescu Marius, Constantin Nicolae, Biri. .tefan-Sorin, Muraru Sebastian</i>	
<b>Storage of Grains and Technical Plants Through Active Ventilation for the Purpose of Maintaining the Quality of Stored Products</b> .....	348
<i>Pcun Aniuoara, Stroescu Gheorghe, Zaica Alexandru, Yasbeck Khozamy Samir, Zaica Ana, Cristea Oana, Uefan Vasilica, B.l.atu Carmen</i>	
<b>Experimental Research of Equipment for Burying in the Ground the Drip Irrigation Lines</b> .....	357
<i>Manea Drago., Marin Eugen, Gheorghe Gabriel, Persu Catalin, Mitroi Roxana</i>	
<b>Kinematics of the Seedling Plant with Vertical Distributor and Buckets</b> .....	364
<i>Mitrache Paul-Marius, Ciupercă Radu, Sărăcin Ioan</i>	
<b>Biological Water Treatment in a Recirculating Aquaculture System</b> .....	374
<i>Laza Evelin-Anda, Caba Ioan Ladislau, Olan Mihai, Vladut Valentin</i>	
<b>Technology for Biohumus Production, an Alternative to Conventional Fertilizers for Bio Agriculture</b> .....	381
<i>Laza Evelin-Anda, Cristea Oana, Ungureanu Nicoleta</i>	
<b>Precision Sowing of Vegetable Seeds Using Electrically Operated Distribution Devices</b> .....	387
<i>Muscalu Adriana, Tudora Cătălina, Vlădu.oiu Lauren.iu, Vlad Constantin, Dorogan Angela</i>	
<b>Advanced Method of Managing Soil Conservation Works in Smart Farms</b> .....	395
<i>Marin Eugen, Mateescu Marinela, Băl.atu Carmen</i>	
<b>Photodegradable Organic Pollutants from Wastewater</b> .....	403
<i>Stoian Oana, Covaliu Cristina Ileana, Paraschiv Gigel, Nita-Lazar Mihai, Moga Ioana-Corina</i>	
<b>Pollutants Resulting from Intensive Poultry Farming Activities and Their Impact on the Environment</b> .....	411
<i>Mitroi Roxana, Stoian Oana, Covaliu Cristina Ileana, Manea Drago</i>	

<b>Considerations on the Importance of the Main Chemical Properties of the Soil in Agrochemical Studies</b> .....	417
<i>Muraru Sebastian, Muraru Vergil, Condruz Paula, Ionel Cornelia Muraru, Sfiru Raluca</i>	
<b>Developing Efficient Practices for Producing Bioethanol from Sweet Sorghum, Evaluating Several Varieties of the Plant and Growing Environments</b> .....	426
<i>Nenciu Florin, Vlădu. Valentin, Nae Gabriel, Popa Lorena-Diana, Constantin Oana Emilia</i>	
<b>Studies and Research on the Tribological Behavior of the Braking Systems of Vehicles. Review</b> .....	435
<i>Cristescu Andreea-Catalina, Filip Ilie, Ipate George, Voicu Gheorghe, Stefan Vasilica</i>	
<b>Identifying New Criteria for Assessing the Impact on the Ecosystem Generated by the Establishment of Jerusalem Artichoke Crops on Difficult and Floodable Soils</b> .....	447
<i>Nenciu Florin, Nae Gabriel, Milian Gabriela, Dumitru Iulian, Matei Gheorghe, Isticioia Simona</i>	
<b>Estimation of the Stress State of Agricultural Harrows with Vertical Axis Rotor, Using Mathematical Models with Finite Elements</b> .....	457
<i>Iordache Valentin Cornel, Saracin Ion</i>	
<b>Research Regarding the Common Problems of Design of the Bunkers – a Review</b> .....	466
<i>Petre Ancuta Alexandra, Stanciu Mariana Mădălina, Mihalache Dumitru Bogdan, Dumitru Drago.</i>	
<b>Integrating Green Tourism and Bioenergy for Sustainable Rural Development: The Example of the Hemp Cluster in Sumy Region in Ukraine</b> .....	476
<i>Shevchenko Hanna</i>	
<b>Designing and Dimensioning of a New Type of Pump that Can Be Used in the Field of Land Reclamation</b> .....	484
<i>Stoican (Prisecaru) Mariana Mirela, Băran Nicolae</i>	
<b>Research on Exhaust Gas Cleaning System (EGCS) Used in Shipping Industry for Reducing SOx Emissions</b> .....	493
<i>Vasilescu Mihail-Vlad, Dinu Dumitru, Panaitescu Mariana, Panaitescu Fanel-Viorel</i>	
<b>Models to Estimate River Temperature. Example for Danube, at Olteni.a in the Context of Climate Change and Anthropic Impact</b> .....	507
<i>Gogoa.e-Nistoran Daniela-Elena, Ionescu Cristina Sorana, Opri. Ioana</i>	
<b>A Method to Analyse Urban Heatwaves. Case Study - Bucharest City (Romania)</b> .....	514
<i>Gogoa.e-Nistoran Daniela-Elena, Antohe Daniel-Marian, Opri. Ioana, Ionescu Cristina-Sorana</i>	
<b>Theoretical and Experimental Researches on the Implementation of Smart Location</b> .....	522
<i>Panaitescu Mariana, Panaitescut Fanel-Viorel, Dumitrescu Marius-Valentin, Panaitescu Valeriu-Nicolaie</i>	
<b>Dimensional Characteristics of Grist Intermediate Products Obtained in the First Two Technological Passages in the Reduction Phase of an Industrial Milling Plant</b> .....	535
<i>Constantin Gabriel-Alexandru, Voicu Gheorghe, Stefan Elena-Madalina, Munteanu Mariana-Gabriela, Musuroi Gabriel, Voicea Iulian</i>	
<b>Installation of Submarine Cables and Pipes in Shallow Waters and Connecting Them to the Shore by the Method of Horizontal Directional Drilling</b> .....	545
<i>Vasilescu Valeriu-Florian, Dinu Dumitru</i>	
<b>Technologies Used for Food Preservation Using Microwaves</b> .....	556
<i>Sorică Elena, Sorică Cristian Marian, Cristea Mario, Grigore Iulia Andreea</i>	
<b>Aspects Regarding the Use of Ultrasounds in the Food Industry</b> .....	566
<i>Sorică Cristian Marian, Vintilă Marian, Vlăduțiu Laurentiu, Sorică Elena, Grigore Iulia Andreea, Cristea Mario</i>	
<b>Pneumatic Actuator Controlled by Proportional Valve. Experimental Results</b> .....	576
<i>Cococi Valentin Nicolae, Călinoiu Constantin, Safta Carmen-Anca</i>	
<b>Electronic System for Control of Temperature of Exhaust Gases and Pressure in Turbochargers of Diesel Automobile Engines</b> .....	583
<i>Kadırova Seher, Okishelov Stiliyan, Kolev Zhivko</i>	
<b>Developing a Comprehensive GIS Tool to Evaluate Representative Parameters Regarding Life Comfort</b> .....	592
<i>Alionte Cristian-Gabriel, Rizescu Dana, Rizescu Ciprian Ion</i>	
<b>Considerations Regarding the Anti-Icing System for the Ship Propulsion Plant with Gas Turbine</b> .....	601
<i>Balan George Iulian, Volintiru Octavian Narcis, Scurtu Ionut Cristian, Ioni.a Florin, Vasile Mirela Letitia, Borzea Claudia</i>	
<b>Numerical and Analytical Study of Seismic Response of Structural Systems with New Formulation Using Energy and Impact Methods</b> .....	610
<i>Babaei Mehdi, Mollaei Somayeh, Petrudi Amin Moslemi, Jalilkhani Maysam, Scurtu Ionut Cristian</i>	
<b>Author Index</b>	