

## **Removal of Reactive Blue 221 dye by adsorption onto Crosslinked Chitosan Particles: Kinetic Studies**

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### **ABSTRACT**

The contact time between the pollutant and the adsorbent is of significant importance in the wastewater treatment by adsorption. A rapid uptake of pollutants and establishment of equilibrium in a short period signifies the efficacy of that adsorbent for its use in wastewater treatment. In this study, the adsorption characteristics of Reactive Blue 221 (RB221) from aqueous solution onto chitosan particles crosslinked with glutaraldehyde have been investigated. The effect of contact time for the adsorption of RB221 by the chitosan particle was studied for a period of 72 h for initial dye concentrations of 60 mg/l at 25°C. Adsorbant dosage was 0.1 g/50 ml of dye solution at pH 6. The adsorption capacities of the synthesized chitosan was 27.36 mg/g for dye RB221. Kinetics of adsorption was determined by analyzing adsorptive uptake of the dye from aqueous solution at different time intervals. In order to investigate the adsorption processes of RB221 on the chitosan particles, four kinetic models were used, including pseudo-first-order, pseudo-second-order, Bangham and intra-particle diffusion models. The pseudo-second-order kinetic model provided the best fit to the experimental data for the adsorption of RB221 textile dye. Overall, this study indicates the chitosan particles as an effective adsorbent for the removal of Reactive Blue 221 dye from the aqueous solutions.

**Keywords:** Adsorption, Chitosan, Kinetics, Reactive Blue 221.



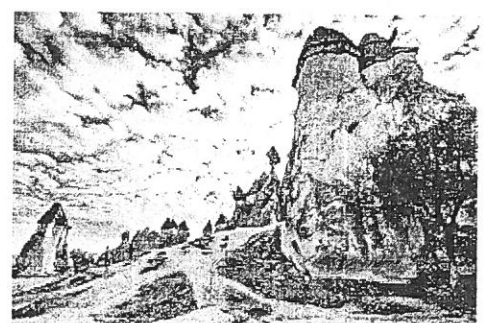
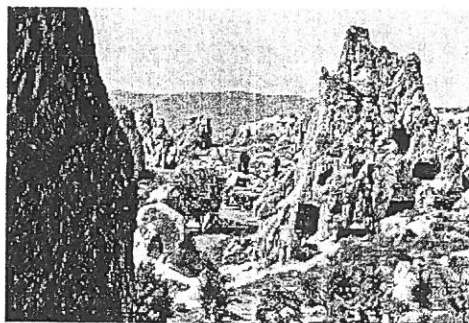
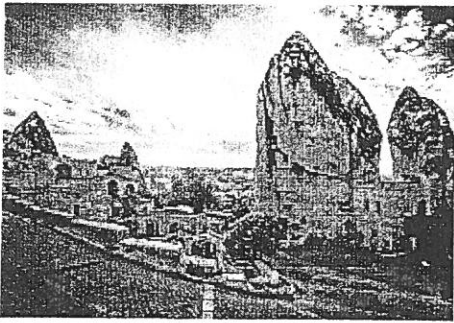
2<sup>nd</sup> INTERNATIONAL CONFERENCE ON  
CIVIL AND ENVIRONMENTAL ENGINEERING

8 – 10 May 2017

DoubleTree by Hilton Hotel Avanos – Cappadocia, Nevşehir, Turkey

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## Important Dates

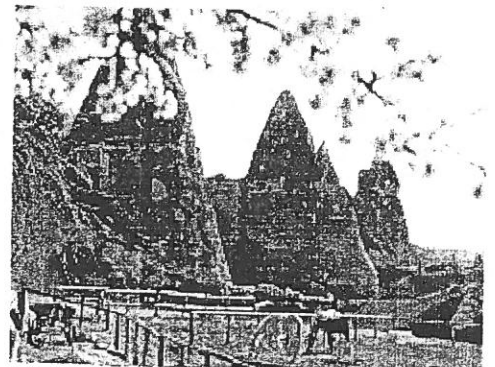
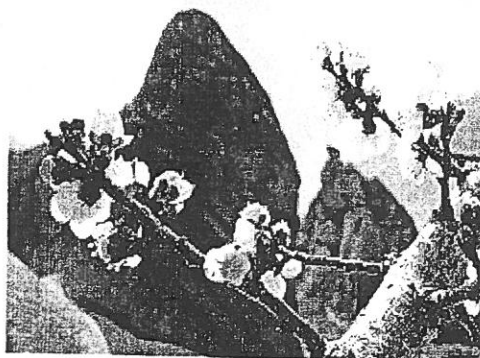
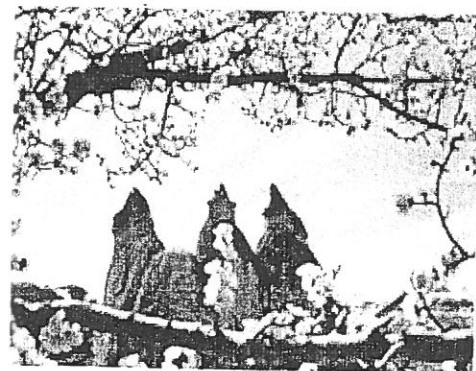
Events	Date
Submission Deadline of Extended Abstracts	April 15, 2017
Registration Deadline	April 15, 2017
Submission Deadline of Full Papers	April 15, 2017
The 2nd ICOCEE - Cappadocia Date	May 8 - 10, 2017

The 2nd ICOCEE – Cappadocia is a peer review conference.

## Conference Topics

The 2nd ICOCEE - Cappadocia is an interdisciplinary scientific forum focusing on first Civil and Environmental Engineering for the presentation of technological advances and scientific research results in a wide spectrum. The ICOCEE - Cappadocia is soliciting state-of-the-art research papers in the following areas of interest:

Air Pollution & Control	Building Materials	Architectural Restoration
Noise Pollution & Control	Construction Management	Engineering Economics
Solid Waste Management	Construction Technologies	Engineering Law, Politics and Policy
Water Technologies	Digital Methods	Ecology
Wastewater Technologies	Geotechnical Engineering	Hydrobiology
Water & Soil Pollution	Hydraulic Engineering	Engineering Education
River Basin Management	Structural Engineering	Climate Change
Environmental Impact Analysis	Structural Mechanics	Renewable Energy Sources
City and Regional Planning	Transportation Engineering	Eco-Tourism
Recreation, Parks & Environment	Green Buildings	Geology, Geophysics and Mining





**International Conference on Civil and Environmental Engineering  
2nd ICOCEE - Cappadocia  
Conference Programme**

08:00-10:30	<i>Conference Registration*</i>
10:30-12:00	<i>Opening &amp; Award Ceremony</i>
12:00-13:00	<i>Welcome Lunch</i>
13:00-13:20	<b>Invited Speaker: Prof. Dr. Abdulazim YILDIZ</b> , Çukurova University, Turkey. <i>New Developments in Constitutive Modelling of Soft Clays.</i>
13:20-13:40	<b>Invited Speaker: Prof. Dr. Mehmet ÇAKMAKCI</b> , Yıldız Technical University, Turkey. <i>Membrane Distillation Applications for Water and Wastewater Treatments.</i>
13:40-14:00	<b>Invited Speaker: Prof. Dr. Osman SAMSUN</b> , Sinop University, Turkey. <i>How to manage our protein resources in our seas as sustainable.</i>
14:00-14:30	<i>Coffee Break</i>

\* Conference Registration for Delegates will be carried out on 8 May 2017. Daily Delegates will register on the day when they will present their study.

	<b>Session 1 - A</b>	<b>Session 1 - B</b>	<b>Session 1 - C</b>	<b>Session 1 - D</b>	<b>Session 1 - E</b>	<b>Session 1 - F</b>
	<b>Chair: Hakan Dulkadiroglu</b>	<b>Chair: Senem Bilici</b>	<b>Chair: Gilray Saitoglu</b>	<b>Chair: Cemile Çakır</b>	<b>Chair: Hakan Musa Arslan</b>	<b>Chair: Hanife Sari Erkan</b>
14:30-14:40	Possibility of Wastewater Reuse in a Dairy Factory	Structural Deformation Measurement Using MATLAB Image Processing Toolbox	Management of Electrical and Electronic Equipment wastes in Turkey	The Role of Forests in the Prevention of Noise Pollution	Determination of Punching Shear Capacity of Flat Plates Retrofitted with FRP	Membrane Bioreactor (MBR) Technology for Wastewater Treatment: Approaches to Membrane Fouling Control
14:40-14:50	Role of Nanomaterials in Water and Wastewater Treatment Applications	An Investigation about Reinforcement Criteria of High Ductility Shear Wall in Turkish Earthquake Codes	Concentration and Type of Bacteria and Fungi in Various indoor and outdoor Environments	Determination of Carbon Sequestration of Dereli Forest Management Chiefdom	The Birth of Building Prefabrication in the Context of the Spirit of the Space	Calcium Removal from Paper Mill Wastewater by Microbial Carbonate Precipitation: Pre-treatment for Submerged Membrane Bioreactor

14:50-15:00	Preparation and Characterization of Activated Carbon from Sucrose for the Removal of 2,4-Dichlorophenoxyacetic Acid (2,4-D) Herbicide from Aqueous Solutions	Investigation of the Effects on the Traffic Perception of Regional Differences in Eskişehir	Optimization of Biodiesel Production From Native Crambe Tataria and Crambe Orientalis Grown in Turkey	Geotechnical Evaluation of Livability in Disaster Areas in Güzelyurt County of Aksaray City	An Alternative Suggestion for the Re-Arrangement of Sivas Government Square	Trend Analysis of Hydro-Meteorological Variables of Kızılırmak Basin
15:00-15:10	Sorption Performance of Cyanex 923- Impregnated Polyester Fiber Sheet Toward Hexavalent Chromium and Phenol in Aqueous Solutions	Investigation on Seismic Behavior of Infilled Reinforced Concrete Frames Strengthened with Using Different Type of Precast Concrete Panels	Co-pyrolysis of Polyethylene and Sawmills Powder: Influence of Polyethylene on Pyrolysis Product Value	Relationship Between Sounscapes and Psycho-Acoustic Factors with Environmental Noise	Context of Sustainability: As an Example of Konya Science Center Project	Validation with GC-MSD Instrument in Environmental Water Samples Analysis of Organochlorine Pesticides
15:10-15:20	Problems Encountered During Treatment with MBR of High Strength Landfill Leachate	Investigation of the Effects of Compaction Methods on Performance Properties of Asphalt Concrete	Methodological Approach for the Evaluation of Litter: Ankara City	Trend Analysis of Meteorological Parameters Using Innovative Trend Method	Lessons Learned From Steel Structural Failure under Snow Loading	in Soil Samples by GC-MSD Water Quality in Ponds of Eskişehir/Turkey
15:20-15:30	Waste Sludge Drying Using Electromagnetic Wave Compostability of Water-Based Paint	Computational Analysis of Perforated Rectangular Thin Plates	The Adsorption of Calmoduline via Nicotinamide-Immobilized Poly(HEMA-GMA) Cryogels	Drought Indices: The Case of Erzinçan	Evaluation of Fire Performance of the Prefabricated Concrete Buildings in Turkey	in Soil Samples by GC-MSD Water Quality in Ponds of Eskişehir/Turkey
15:30-15:40	Sludge Originated From Automotive Industry	Shallow Shear Wave Velocity (Vs) Structure of Bornova Plain (Izmir) and Its Surroundings	Cultivation of Spirulina platensis Using Anaerobic Digestion Effluent As a Nutrient Source For Biomass Production	Damages Encountered on the Industrial Facilities Due to Local Settlements Related to Underground Water Drawdown at the 2nd Organized Industrial Zone (Konya) and its Surroundings	Experimental Investigation Of Load Falling Height Of Steel Beam	Length-weight Relationship and Mortalities of Whiting, Merlangius merlangus (Linnaeus, 1758) in the Central Black Sea, Turkey
15:40-15:50	Use of Different Bulking Agents in Composting of Sewage Sludges	Determination Construction Quality Using Non-Destructive Testing Methods	Detection of the Dilution Factors for Anaerobic Digestate to Cultivation of Mixed Culture Microalgae and Detection of Particulate Matters Affect on Cultivation	Ground-water Seepage Losses Estimation in Terkos Lake Using Water Budget Analysis and Analytical solution	Elements Under Impact Load Impact Of Silica Fume on Compressive Strength in Self-Compacting Concrete	Central Black Sea, Turkey Impact of Climate Changes on Fish
15:50-16:00	Effect of Microwave Irradiation Temperature and Holding Time on Municipal Wastewater Sludge Disintegration	Determination of Ground-Building Relationships Using Microtremor Measurements (An Example of Trabzon City)	Deep Sea Discharge Applications and Modeling in the Black Sea Scale of Power Plants Cooling Waters	Experimental Investigations of Flow over Spillway Modeling	Examination Of The Effect Of The Bacteria Added To The Concrete Mixture On The Mechanical And Physical Properties Of The Concrete	Fauna of Black Sea Removal of Reactive Blue 221 Dye by Adsorption onto Crosslinked Chitosan
16:00-16:10	Removal by Biosorption of Dyes in Textile Wastewater	Shear Strength Model for FRC Beams	Determination of Optimum Membrane for Mixed Microalgae Harvesting Nitrogen Limitation Effect On Lipid Accumulation Of Yarrowia Lipolytica Cultivated In Sanitary Landfill Leachate	Trend Analysis of the Streamflow and Suspended Sediment Load	The Effect of Link Beam Length On the Internal Stress Behavior of Eccentric U Type Bracing	Particles: Kinetic Studies Investigation of Boron Levels in Drinking Waters
16:10-16:20	Removal of DDE by Exploiting the Alchoho-Phobic Interactions Poly(HEMA-co-AA) Microparticles	Investigation Of Performance Of Steel Fibre Addition To The Reinforced Concrete Columns	Evaluation of Simultaneous Excess Sludge Reduction Along with Nitrogen Removal in Oxidic-Settling-Anoxic Process Designed to Treat Real Domestic Sewage	The Use of GIS in Determination of Erosion Risk Maps in Bilecik	Fall Cone Test and Water Content Relationship of Sand Clay Mixtures	A Comparative Study for Steadily Discharging Eccentric Wells in Unconfined Aquifer
16:20-16:30	Reason for Alzheimer's	A Novelty Attempt to Produce Building Bricks Using Cement Waste Materials	Investigation of Abrasion Problems in	Investigation of Abrasion Problems in	Cyclic Triaxial Tests on a Nonplastic	An Impact Evaluation of TiO2 and ZnO to Rocket (Eruca sativa L) Plant
16:30-17:00			Water Structures	Water Structures	Silt	ZnO to Rocket (Eruca sativa L) Plant