

## ISSUE CONTENTS LIST WITH GRAPHICAL ABSTRACTS

### RESEARCH PAPER

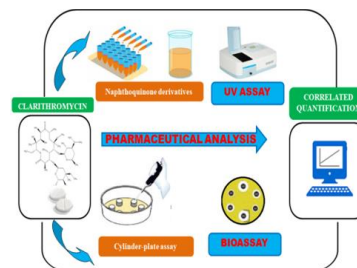
#### ANALITICAL CHEMISTRY

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### COMPARATIVE ANALYSIS AND APPLICATION OF NOVEL SPECTROPHOTOMETRIC APPROACHES AND BIOASSAY FOR FAST MACROLIDE QUANTIFICATION IN TABLETS

Abdelghani Mahmoudi and Silvia De Francia

Novel spectrophotometric method and bioassay using the *Bacillus subtilis* strain were developed for clarithromycin analysis. Experimental conditions were optimised and validated according to ICH guidelines. A comparative study was established, and the methods were successfully applied for the quantification of clarithromycin in solid dosage forms and can be used for pharmaceutical purposes.



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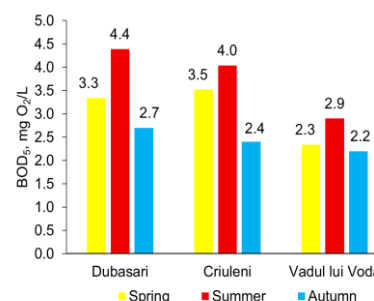
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### DYNAMICS OF THE SELF-PURIFICATION PROCESSES IN THE WATERS OF THE DNIESTER RIVER DURING THE YEARS 2015-2024 (DUBASARI – VADUL LUI VODA SECTION)

Maxim Cisteacov, Gheorghe Duca, Vladislav Blonschi, Viorica Gladchi, Angela Lis, Elena Bunduchi

The study represents an analysis of the dynamics of self-purification processes in the Dniester River waters over ten years, conducted based on five hydrochemical and kinetic parameters. The study results demonstrated that the Dniester River waters are also loaded with reducing compounds, especially from the Răut and Ichel tributaries, which diminishes the intensity of the self-purification processes. However, after the last sampling point, a slight trend toward restoring initial properties was observed.



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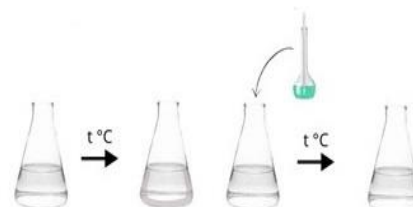
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### STUDY OF THE EFFICIENCY OF APPLICATION OF SCALE INHIBITORS FOR WATER

Inna Trus, Vita Halysh, Mariia Tverdokhlib, Olena Makarenko, Evhen Chuprinov, Vadim Fedin

A promising method of water conditioning for water circulation systems with the use of a scale stabiliser was considered. To inhibit the scale formation, antiscalant RT-2024-4 was used and the ability to mitigate the scale formation was tested. Water of various origins with different hardness was used during experiments.



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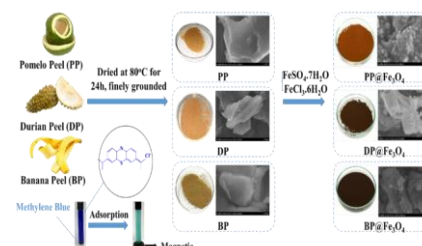
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### COMPARISON OF THE METHYLENE BLUE DYE REMOVAL ABILITY OF MAGNETIC MATERIALS SYNTHESIZED FROM VARIOUS TYPES OF FRUIT PEELS

ThanhThuy Tran, ThanhNha Tran, AnhThi Hoang, VanTrong Nguyen

The magnetic materials were synthesised from pomelo peel (PP@Fe<sub>3</sub>O<sub>4</sub>), durian peel (DP@Fe<sub>3</sub>O<sub>4</sub>), and banana peel (BP@Fe<sub>3</sub>O<sub>4</sub>) for the adsorption of methylene blue. under the optimal conditions, adsorption efficiencies of 97.7%, 97%, and 98.9%, respectively. These materials were employed to assess the COD index in select water samples.



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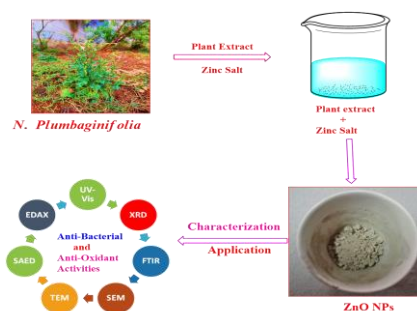
NATURAL PRODUCT CHEMISTRY AND SYNTHESIS

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**BIOGENIC ZNO NANOPARTICLES: STRUCTURAL CHARACTERIZATION AND BIOACTIVITY EVALUATION**

Abhimanyu Parasram Pawar, Kishor Sudhir Naktode, Arvind Janardhan Mungole, Srinivas Angac

Zinc oxide nanoparticles (ZnO NPs) were synthesized using *Nicotiana glauca* plant extract through a green approach. XRD, FTIR, and EDX confirmed their hexagonal wurtzite structure and high purity. SEM and TEM showed spherical ZnO NPs (16–24 nm), with a band gap of 3.33 eV. FTIR spectra displayed a peak at 480  $\text{cm}^{-1}$ , confirming Zn–O bond formation. The ZnO NPs exhibited strong antibacterial activity against *P. aeruginosa*, *E. coli*, *K. pneumoniae*, and *S. aureus* at 100  $\mu\text{L}$  using the well diffusion method. They also showed excellent antioxidant potential, scavenging DPPH radicals with 75.59% inhibition at 250  $\mu\text{g/mL}$ . This eco-friendly synthesis method offers a sustainable approach for ZnO NP production, highlighting their potential for biomedical and pharmaceutical applications.



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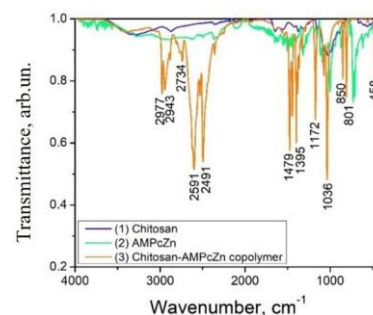
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**SYNTHESIS OF CHITOSAN GRAFTED WITH AMINOMETHYL ZINC PHTHALOCYANINE FOR PHOTODYNAMIC THERAPY**

Stefan Robu, Tamara Potlog, Ion Bulimestru, Ion Lungu, Olga Sadohina, Alexandrina Druta, Petru Bulmaga, Iacob Gutu

This study presents the synthesis of a novel polymer analogue derived from aminomethyl zinc phthalocyanine (AmPcZn) and chitosan (CH). The polymer was produced by grafting AmPcZn onto chitosan using ethyl chloroformate as a coupling agent. The resulting CH–AmPcZn polymers, containing 10%, 20%, 30%, and 60% AmPcZn, were characterised using FTIR and UV-Vis spectroscopy. The UV-Vis analysis showed that absorbance increased with higher concentrations of AmPcZn in the CH–AmPcZn solutions.



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**PREPARATION AND CHARACTERIZATION OF BIOCHAR-IRON OXIDE-PALYGORSKITE COMPOSITES FOR URANIUM(VI) REMOVAL FROM AQUEOUS SOLUTIONS**

Ihor Pylypenko, Iryna Kovalchuk, Mykola Tsyba, Yurii Lytvynenko, Oleksandr Shyrokov

This paper presents palygorskite/biochar/iron oxide composites for uranium (VI) removal from water. The composites, containing magnetite and hematite, achieved maximum uranium adsorption (100.2  $\mu\text{mol/g}$ ), with pH increase enhancing the process. Magnetite facilitated uranium (VI) reduction to uranium (IV), proving effective for in situ water remediation.



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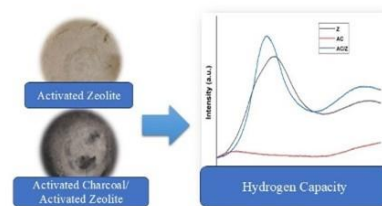
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**HYDROGEN STORAGE PERFORMANCE OF ACTIVATED NATURAL ZEOLITE AND ITS MODIFICATION WITH ACTIVATED CHARCOAL**

Latifah Hauli, Chika Lutfi Adiningrum, Muhammad Safaat, Indri Badria Adilina, Silvester Tursiloadi, Lenny Marlinda, Dian Susanthy, Muflikhah Muflikhah

The purpose of this research was to activate Lampung natural zeolites, modify them with activated charcoal, and evaluate how well they store hydrogen. The highest hydrogen capacity value, 0.57 mmol/g, is found in activated natural zeolite, according to the Hydrogen-temperature programmed desorption data (H<sub>2</sub>-TPD).



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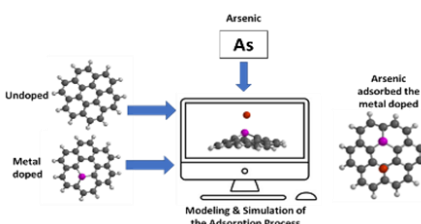
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**INSIGHTS ON METAL DOPED GRAPHENE IN THE ADSORPTION OF ARSENIC VIA DFT CALCULATION**

Ibraheem Olusola Ayeni and Toyese Oyegoke

The impact of doping graphene with metals like Cu, Al, and Mn on its adsorption strength for arsenic (As) was computationally explored for industrial wastewater treatment. The results show that doped graphene outperforms undoped graphene, suggesting that doping can enhance the adsorptive properties of graphene for As removal.



SHORT COMMUNICATION

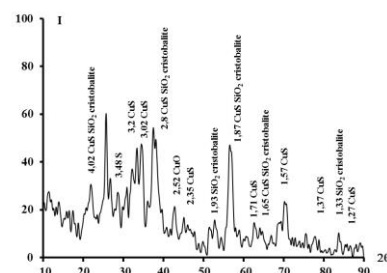
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**USING OF WASTE SORBENT FROM FOOD INDUSTRY FOR THE REMOVAL OF COPPER IONS FROM WATER**

Olha Khudoiarova, Oleg Blazhko, Alina Blazhko

The effectiveness and prospects of using food industry waste sorbents for water purification from copper (II) ions have been studied. The use of a regenerated sorbent made of activated carbon and kieselguhr modified with sulphide and hydrosulphide ions increases the efficiency of removing copper (II) cations from water by 65.5 times. It was established that topochemical reactions occur on the surface of the modified sorbent with the formation of copper (II) sulphide CuS and elemental sulfur. The possibility of topochemical transformations was established by IR-spectral and X-ray phase studies.



SHORT COMMUNICATION

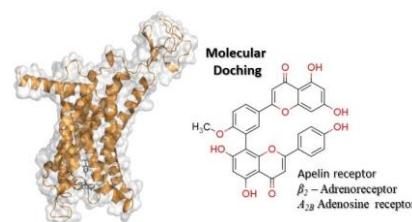
NATURAL PRODUCT CHEMISTRY AND SYNTHESIS

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**MOLECULAR DOCKING STUDY OF SOME ACTIVE PRINCIPLES FROM SILYBUM MARIANUM, CHELIDONIUM MAJUS, GINKGO BILOBA, GELSEMIUM SEMPERVIRENS, ARTEMISIA ANNUA, AND TARAXACUM OFFICINALE**

Daniel Cord, Mirela Claudia Rimbu, Cristiana Tanase, Cristina Tablet, Gheorghe Duca

Interactions between various natural compounds and three selected G protein coupled receptors were investigated through molecular docking. The strongest binding affinities were identified highlighting potential modulators for these receptors.



REVIEW

PHYSICAL CHEMISTRY AND CHEMICAL PHYSICS

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**REVIEW OF THE CHAPTER "ORIGIN OF PUCKERING (BUCKLING) OF PLANAR HETEROCYCLES AND METHODS OF ITS SUPPRESSION" BY N.N. GORINCHOY AND I.B. BERSUKER**

Gheorghe Duca and Marius Andruh

The chapter "Origin of Puckering (Buckling) of Planar Heterocycles and Methods of Its Suppression," authored by N.N. Gorinchoy and I.B. Bersuker, is a comprehensive and insightful contribution to the field of physical chemistry, with a strong emphasis on quantum calculations and computational chemistry. The two authors are well-known in the scientific community for their contributions to the understanding of the structure and reactivity of various classes of compounds, based on the consequences of the Jahn-Teller effect. Published as part of the monograph *Heterocycles: Synthesis, Reactions and Applications* by Nova Science Publishers, Inc. (2020), this chapter spans 60 pages and is structured into an Introduction, three main sections with eight subsections, Conclusions, and a list of 50 relevant references. The authors delve into the structural deviations of heterocyclic compounds, particularly focusing on the phenomenon of puckering or buckling, which significantly influences their properties. The chapter not only elucidates the mechanisms behind these distortions but also provides practical methods for their suppression and the restoration of planar configurations.

INSTRUCTIONS FOR AUTHORS