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CELEBRATION OF ACADEMICIAN ISAAC BERSUKER'S 95TH BIRTHDAY!

Gheorghe Duca, Aculina Aricu, Natalia Gorinchoy, Iolanta Balan

The 95th birthday of academician Isaac Bersuker was celebrated at the scientific seminar "Spontaneous Symmetry Breaking and Jahn-Teller Effects". The event, which took place on February 10, 2023, was organized by the Institute of Chemistry of The Moldova State University and the Academy of Sciences of Moldova and was moderated by academician Gheorghe Duca, head of the Center for Physical and Inorganic Chemistry, academician Ion Tighineanu, president of the Academy of Sciences of Moldova and Dr. hab. Aculina Aricu, director of the Institute of Chemistry.

REVIEW PAPER

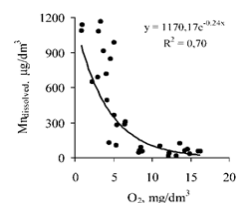
ECOLOGICAL CHEMISTRY

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BIOAVAILABILITY AND MIGRATION FEATURES OF METALS IN "BOTTOM SEDIMENTS – WATER" SYSTEM UNDER THE ACTION OF DIFFERENT ENVIRONMENTAL FACTORS

Petro Linnik, Vladislav Zhezherya, Rostyslav Linnik

The results of research on the metal mobility and the peculiarities of their migration in the 'bottom sediments – water' system of surface water bodies are summarized. The distribution of metals between different fractions of the solid phase of bottom sediments affects the potential metal mobility and their migration in the "bottom sediments – water" system.



RESEARCH PAPER

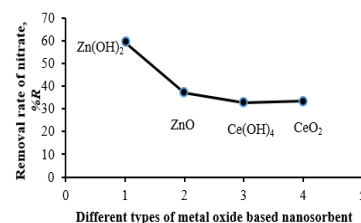
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SYNTHESIS AND CHARACTERIZATION OF ZINC OXIDE AND CERIUM DIOXIDE NANOPARTICLES WITH POSSIBLE APPLICATION FOR NITRITE IONS REMOVAL IN WATERS

Zainab Abdul-Zahra and Rashed Rasheed

This work is dedicated to the synthesis of ZnO and CeO₂ nanoparticles with possible application for nitrite ions removal. The obtained nanoparticles were characterized by X-ray diffraction, scanning electron microscopy, atomic force microscopy, FTIR spectroscopy and UV-vis spectroscopies. Further, the produced nanoparticles were used to adsorb NO₂⁻ ions from aqueous solutions. The results showed that the nanoparticles which were heated at 90°C (hydroxide forms) presented a higher activity for nitrite ions removal than those that were heated at 400°C (oxide forms). This may be related to nitrite ions preferential adsorption to hydroxide forms rather than to oxide forms; in both cases (90°C and 400°C), zinc oxide nanoparticles presented higher nitrite removal activity.



RESEARCH PAPER

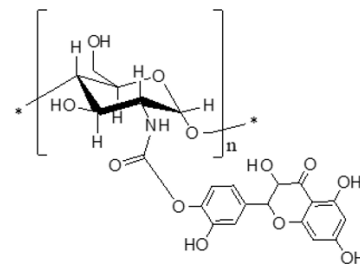
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SYNTHESIS OF QUERCETIN FUNCTIONALIZED CHITOSAN AND DETERMINATION OF ANTIOXIDANT PROPERTIES

Maria Gonta, Gheorghe Duca, Elena Sirbu, Stefan Robu, Larisa Mocanu

This paper presents the synthesis of a copolymer with reducing properties obtained by functionalizing chitosan with quercetin and determining the antioxidant activity of the derivatives obtained depending on the molar mass of the polymer. For this purpose, low molecular weight chitosan was obtained by oxidizing industrial chitosan with hydrogen peroxide and functionalizing with quercetin by the covalent grafting method. The comparative antioxidant properties of the composite obtained by grafting technical chitosan with quercetin and by grafting low molecular weight chitosan were studied by the DPPH (2,2-diphenyl-1-picrylhydrazyl radical) method. The obtained results indicate that a decrease in the molecular weight of chitosan contributed to its grafting with quercetin. As a result, the functionalized polymer composite acquired a higher antioxidant activity and can be successfully used to inhibit the oxidation of various organic substrates in the cosmetic, food and pharmaceutical industries.



CHARACTERIZATION OF PROPOLIS FROM MOLDOVA'S CENTRAL REGION: CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES

Serghei Pogrebnoi, Nicolae Eremia, Dmitri Bilan, Lucian Lupascu, Natalia Bolocan, Gheorghe Duca, Svetlana Armasu, Dumitru Terteac, Vitalie Cebanu, Serghei Tincu, Alexandru Znagovan, Iulia Neicovcena, Olga Coseleva, Valerina Slanina, Fliur Macaev

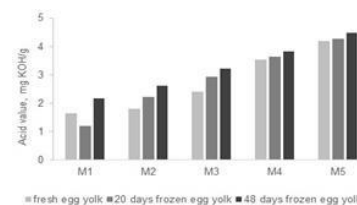
The chemical composition and antimicrobial activity of propolis ethanolic and water-ethanolic extracts from the central zone of Moldova have been investigated by GC-MS and liquid chromatography. There were found 21 amino acids, of which the most abundant were glutamic acid, alanine, leucine and isoleucine. The propolis extracts exhibited strong antioxidant (53.7 mg ascorbic acid eq./g extract or 113.4 mg Trolox eq./g extract and 87.5 mg ascorbic acid eq./g extract or 162 mg Trolox eq./g extract for ethanol, and water-ethanol extract, respectively) and antimicrobial activity (from 0.0055 up to 0.07%), suggesting their potential as natural agents for therapeutic use.



MAYONNAISES FROM FRESH OR FROZEN EGG YOLK WITH RAPESEED AND SESAME OILS -THE INFLUENCE OF EGG YOLK FREEZING AND STORAGE TIME AND OILS RATIO

Andra Tamas, Sabina Nitu, Simona Popa, Mirabela Padure

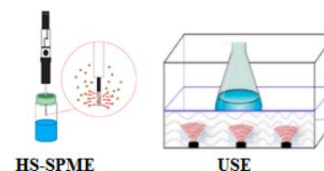
It was studied the rheological behavior of mayonnaise prepared from fresh/frozen yolks, whit oily phase made up of mixtures of oils, taking into account the freezing time of the yolk, the ratio between the oils, as well as the storage time. It was found that the mayonnaises prepared from frozen egg yolks and those with an oily phase in which sesame oil is predominant, have a higher consistency. The oxidation stability was evaluated by determining the acid values, which increase slightly with the freezing time of the egg yolk and with the amount of sesame oil in the oily phase. Also, were carried out studies in CIELAB color space.



VOLATILE COMPOUNDS IDENTIFIED IN TRADITIONAL CROATIAN COW'S AND GOAT'S CHEESES MATURED IN LAMBSKIN SACK DETERMINED BY GC-MS ANALYSIS

Ani Radonić and Marina Zekić

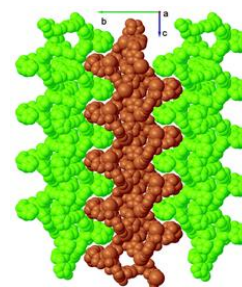
The aim of this study was to determine the volatile compounds of Croatian cheeses in a sack of lamb skin produced from either raw cow's or goat's milk and relate them to the aroma of these traditional cheeses. Cheese extracts were obtained by headspace solid-phase microextraction and ultrasonic solvent extraction and analysed by gas chromatography-mass spectrometry.



A NEW 2D COORDINATION POLYMER BASED ON ZINC(II), 1,2,3-BENZENETRICARBOXYLIC ACID AND 4,4'-BIS(IMIDAZOL-1-YLMETHYL)BIPHENYL: SYNTHESIS AND CRYSTAL STRUCTURE

Irina Voda

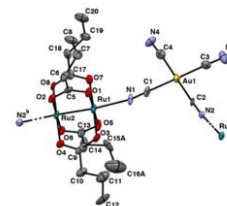
The use of a pillar bridging ligand coordinating through two imidazole rings and multidentate carboxylate ligand with zinc(II) generates a bidimensional coordination polymer $\{[Zn_3(BIBPh)_3(BTC)_2] \cdot H_2O\}_n$. It has been structurally characterised and investigated by IR and thermogravimetric methods. Each metal ion is four coordinated exhibiting a slightly distorted tetrahedral coordination.



GEOMETRICAL ISOMERISM IN Ru₂Au HETEROMETAL ASSEMBLY: CIS-LINKING OF TETRACYANIDOAUATE TO TETRAKIS(μ-BUTANOATO)DIRUTHENIUM

Masahiro Mikuriya, Shun Kawachi, Ryoji Mitsuhashi, Motohiro Tsuboi, Makoto Handa

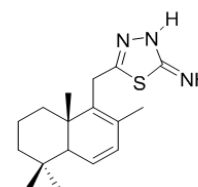
A heterometal complex [Ru^{II}Ru^{III}(n-C₃H₇COO)₄Au^{III}(CN)₄]_n was synthesized. The X-ray crystallography elucidated a chain molecule of alternating arrangement of Ru₂(n-C₃H₇COO)⁴⁺ and Au(CN)⁴⁻ units with *cis*-bridging mode. Magnetic susceptibility data showed that magnetic interaction between Ru^{II}Ru^{III} units (*S*= 3/2) is negligible small with a zero-field splitting parameter *D* of 60 cm⁻¹.



SYNTHESIS AND EVALUATION OF ANTIMICROBIAL ACTIVITY OF TETRANORLABDANE COMPOUNDS BEARING 1,3,4-THIADIAZOLE UNITS

Svetlana Blaja, Lidia Lungu, Alexandru Ciocarlan, Nicoleta Vornicu, Aculina Aricu

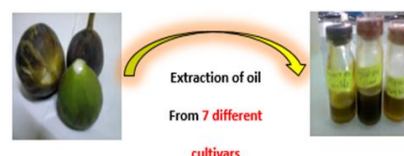
The study describes of novel tetranorlabdane compounds bearing 1,3,4-thiadiazole units and intermediary tetranorlabdane compounds with thiosemicarbazone fragment has been reported. The structures of the new synthesized compounds were confirmed using IR and ¹H, ¹³C, and ¹⁵N NMR spectroscopy. The *in vitro* antifungal and antibacterial activities of the mentioned compounds have been evaluated. The *in vitro* antifungal and antibacterial activities of the tetranorlabdane compounds with thiosemicarbazone and 1,3,4-thiadiazole units have been evaluated. One of the tested compounds has an excellent activity against five strains of fungi and two species of bacteria at minimum inhibitory concentration values of 0.125 and 2.5 μg/mL, respectively.



CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF LIPIDS FROM FICUS CARICA L. FRUITS

Hadjira Naoui, Mohamed Benalia, Soumaya Hachani, Amar Djeridane, Ziyad Ben Ahmed, Veronique Seidel, Mohamed Yousfi

Samples of oils from seven types of *Ficus carica* L. fruits from Algeria were investigated through determinations of their chemical characteristics, quantifying sterols and tocopherols, and analysis of the fatty acids profiles using gas chromatography, and evaluation of antioxidant activity by 1,1-diphenyl-2-picrylhydrazyl (DPPH) method and total antioxidant activity (TAA) using phosphomolybdenum methods. The results showed that the major unsaturated fatty acids of different lipid classes were linoleic (11.70-34.74%) and linolenic (1.15-35.27%), the main saturated fatty acids was palmitic. Additionally, it was demonstrated for the first time that the studied figs oils possessed good antioxidant activity which may be associated with their alleged health benefits.



INSTRUCTIONS FOR AUTHORS