

## ISSUE CONTENTS LIST WITH GRAPHICAL ABSTRACTS

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### THE ROAD TO ENVIRONMENTAL CHEMISTRY IN THE REPUBLIC OF MOLDOVA PAVED BY THE ILLUSTRIOUS SCIENTIST AND RENOWNED ECOLOGIST VALERIU ROPOT

Tudor Lupascu and Maria Sandu

This paper presents the main scientific and innovative results are presented, which were obtained by the talented chemist and renowned ecologist Valeriu Ropot throughout his scientific career. The results of scientific investigations are bestowed and analysed concerning the quality of the waters of the Dniester and the Prut Rivers, Dubasari reservoirs on the Dniester River, as well as the main bodies of water in the Republic of Moldova. The paper also includes the practical recommendations for reducing the negative impact on the environment, of the discharge of hundreds of thousands of tons of brine into the Dniester River, because of the accident at the mineral fertilizer plant in the Stebnik town, Ukraine. Moreover, the paper presents the results of studies aimed at developing methods for determining organic and inorganic pollutants in natural waters.

### REVIEW PAPER

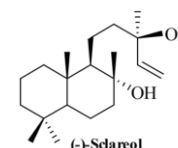
#### NATURAL PRODUCT CHEMISTRY AND SYNTHESIS

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### FROM (-)-SCLAREOL TO NORLABDANE HETEROCYCLIC HYBRID COMPOUNDS

Alexandru Ciocarlan

This review relates to chemistry of the well-known biologically active natural labdane diterpenoid (-)-sclareol easily available from Clary sage (*Salvia sclarea* L.). It is mainly used in industry, especially for synthesis of fragrance compounds and natural analogs. The paper covers achievements on the synthesis, structure determination and biological activity of molecular hybrid compounds bearing hydrazide and thiosemicarbazone fragments or diazine, 1,2,4-triazole, carbazole, 1,3-thiazole, 1,3,4-oxadiazole, 1,3,4-thiadiazole units prepared based on it.



### RESEARCH PAPER

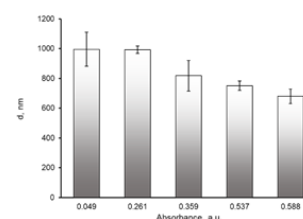
#### ECOLOGICAL CHEMISTRY

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### NEW ASPECTS FOR THE ESTIMATION OF THE STATE OF THE NATURAL WATER

Viacheslav Shvydkiy, Sergei Dolgov, Alexander Dubovik, Mikhail Kozlov, Alisa Povkh, Lyudmila Shishkina, Gheorghe Duca

This paper presents a study of the hydrochemical composition and physicochemical properties of natural water samples from various sources in the Voronezh and Moscow regions. Two model systems are proposed for assessing the state of the aquatic environment: UV spectroscopy with spectrum decomposition by the Gauss method and spontaneous aggregation of lecithin in a polar medium. Based on the performed investigation, it was determined that the size of lecithin aggregates decreases, and the value of their zeta potential increases with an increase in the content of hydrophobic compounds in natural water.



### RESEARCH PAPER

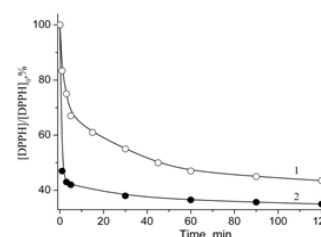
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### PREPARATION OF COMPOSITES BASED ON CAFFEIC ACID AND FUMED SILICA AND EVALUATION OF THEIR ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES

Oksana Stavinskaya, Iryna Laguta, Pavlo Kuzema, Iryna Skorochoch, Alla Roy, Ivan Kurdish

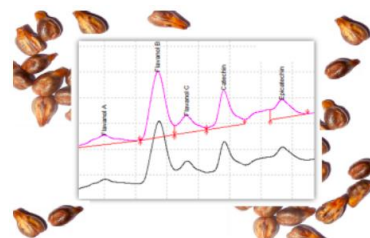
The work was aimed at preparing the CA+A300 composite consisting of caffeic acid (CA) and fumed silica (A300) and at comparing the properties of CA in the solution and in the composite. The results showed that the solution and the composite are effective antioxidant/antimicrobial agents and that inclusion of CA in the CA+A300 composite provides its gradual release into solutions and reaction mixtures, thus ensuring a prolonged action of the compound.



### PROPERTIES OF WINEMAKING BY-PRODUCTS OF FETEASCA NEAGRA GRAPE SEEDS

Angela Gurev, Veronica Dragancea, Alexei Baerle, Natalia Neteaba, Olga Boestean, Svetlana Haritonov, Boris Gaina

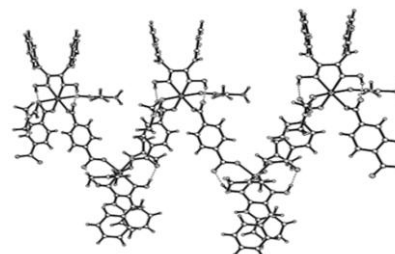
The composition of the lipophilic and hydrophilic extracts from the Feteasca Neagra ground seeds, grown in three different vineyards, was studied. The physicochemical indicators of the seeds, the oil quality indicators and the total content of polyphenols and flavonoids in the extracts were determined. Some phenolic and flavanol constituents were identified and quantified using reversed-phase HPLC by gradient-elution. The Trolox equivalent antioxidant capacity assay proved the increased antioxidant activity of the hydrophilic extracts, with the highest DPPH• scavenging effect of almost 91.70 and 93.81%, an equivalent of 281.66 and 288.27  $\mu\text{M/L}$  Trolox. It was concluded that the seeds recovered from Feteasca Neagra by-products are a rich source of functional compounds, with significant antioxidant properties.



### NOVEL Zn(II) BINUCLEAR AND Ni(II) 1D POLYMERIC COORDINATION COMPOUNDS BASED ON DIANILINEGLYOXIME AND DICARBOXYLIC ACIDS: SYNTHESIS AND STRUCTURE

Dumitru Ureche, Ion Bulhac, Sergiu Shova, Paulina Bourosh

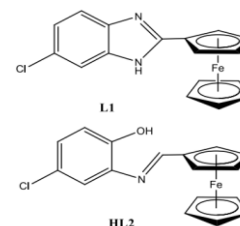
Two coordinating compounds of zinc(II) (**1**)  $[\text{Zn}_2(\text{DAnH}_2)_2(1,3\text{-bdc})_2(\text{DMSO})_4]$  and nickel(II) (**2**)  $[\text{Ni}(\text{DAnH}_2)(1,4\text{-bdc})(\text{DMF})_2]_n$  were obtained based on dianilineglyoxime ( $\text{DAnH}_2$ ), 1,3-benzenedicarboxylic acid ( $1,3\text{-bdcH}_2$ ) and 1,4-benzenedicarboxylic acid ( $1,4\text{-bdcH}_2$ ), where DMSO is dimethylsulfoxide and DMF is dimethylformamide. The molecular and crystalline structure of reported compounds was established by infrared spectroscopy and single crystal X-ray diffraction, and for **1**, additionally, the  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectroscopy was used. According to the data, the Zn(II) molecular complex is a binuclear and the Ni(II) is a 1D polymeric compound.



### SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL ACTIVITIES OF FERROCENE LIGANDS AND THEIR BINUCLEAR COMPLEXES

Ozan Süleyman Ürgüt, Aydin Tavman, Muazzez Gürkan Eser

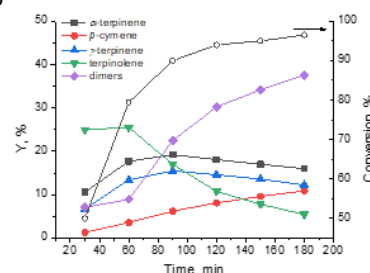
In this paper, the 6-chloro-2-ferrocenyl-1H-benzimidazole and (*E*)-((4-chloro-2-hydroxyphenylimino)methyl)ferrocene ligands and their Fe(III), Co(II), Cu(II), Zn(II) and Pd(II) complexes were synthesized. The structure of ligands and metal complexes was characterized by different methods. In addition, magnetic moment, molar conductivity measurements and antibacterial activity of the ligands and the complexes were investigated.



### ISOMERIZATION OF LIMONENE ON ZEOLITE-CONTAINING CATALYSTS BASED ON KAOLIN

Lyubov Patrylak, Stepan Zubenko, Serhyi Konovalov, Anzhela Yakovenko, Volodymyr Povazhnyi, Oleksandra Pertko, Yulia Voloshyna, Oleksandr Melnychuk, Mykhailo Filonenko

The aim of the work was to study the isomerization of limonene on zeolite-containing biporous acid catalysts based on kaolin (from Ukraine). Results of this study show that at 160°C, the maximum isomer yield was 60–65% with an 80–90% conversion. The studied samples do not have a significant accumulation of carbonaceous deposits because limonene has high solubility, which helps to remove intermediate products of transformation from the surface of the samples.



### ONE-POT SYNTHESIS OF SUBSTITUTED BENZIMIDAZOLE DERIVATIVES UNDER ULTRASONIC IRRADIATION USING $ZnFe_2O_4$ REUSABLE CATALYST

Dhanraj Kamble, Anil Shankarwar, Yuvraj Sarnikar, Radhakrushna Tigote, Mubarak Shaikh, Pravin Chavan

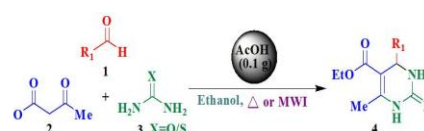
Herein, an efficient one-pot synthesis is described, of substituted benzimidazole derivatives (**3a-j**) from a condensation of various *o*-phenylenediamine (**1a-j**) aromatic aldehyde (**2a-j**) using  $ZnFe_2O_4$  as a nano-catalyst under ultrasonic irradiation conditions. All forms of aldehydes with an electron releasing or electron –withdrawing substituent have a significant yield. The catalyst can easily be recovered after completion of the reaction and reused without affecting its activity. The obtained benzimidazole derivatives showed moderate to good anti-tuberculosis results.



### MILD ACIDIC CHARCOAL CATALYZED SYNTHESIS OF 3,4-DIHYDROPYRIMIDIN-2(1H)-ONE/-THIONE DERIVATIVES

Rajendra Patil, Jagdish Chavan, Shivnath Patel, Vaishali Shinde, Anil Beldar

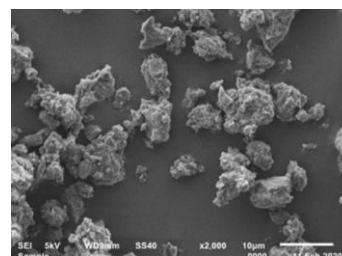
A green and efficient method for the multicomponent synthesis of 3,4-dihydropyrimidin-2(1H)-ones and -thiones using acetic acid supported on activated charcoal as a mild acid catalyst in ethanol under both conventional as well as microwave irradiation conditions has been developed. The catalyst system found more efficient under microwave irradiation conditions than conventional conditions with shorter reaction times and excellent yields.



### RESIN ACIDS AS RAW MATERIAL FOR THE PREPARATION OF CYCLODEXTRIN COMPLEXES LOADED WITH DEHYDROABIETITIC ACID AND CHROMENOL HYBRID

Marina Zveaghintseva, Eugenia Stingaci, Serghei Pogrebnoi, Lucian Lupascu, Alic Barba, Gheorghe Duca, Vladimir Valica, Livia Uncu, Victor Kravtsov, Dumitru Terteac, Alexandr Brinzan, Fliur Macaev

In this work, new methods to obtain complexes from  $\beta$ -cyclodextrin and dehydroabietic acid with chromenol-triazol hybrid with the sizes limits of approximately 0.1-250  $\mu\text{m}$  are reported. Kneading, co-evaporation and co-precipitation for the resolution of racemic 2-tert-butyl-3-(1*H*-1,2,4-triazol-1-yl)-2*H*-chromen-2-ol for obtaining micro- and nanoparticles have been optimized. The obtained  $\beta$ -complexes of  $\beta$ -cyclodextrin loaded with dehydroabietic acid and chromenol hybrid showed good antibacterial activity with MIC and MBC values ranging from 0.72 to 44.45  $\mu\text{M}$ .



### SYNTHESIS AND CHARACTERIZATION OF AMORPHOUS ALLOY $Co_{69}Nb_{25}B_6$

Luciano Nascimento, Adriano Lima da Silva, Ana Cristina Figueiredo de Melo

Amorphous alloy are materials have been around for some time and their applications can be found in many types of industrial products. Currently, the production of the amorphous alloy  $Co_{69}Nb_{25}B_6$  was obtained by high-energy ball milling which allows the formation of phases through solid state reaction through consolidation process. The characterization of the  $Co_{69}Nb_{25}B_6$  alloy was investigated by X-ray diffraction, scanning electron microscopy and by a vibrating sample magnetometer.

