

Poster session 2 - Analytical Chemistry

P-0594

GOLD AND SILVER NANOPARTICLES MODIFIED BY RECEPTORS FOR ANIONS RECOGNITION**P. ZVATORA¹, J. KOKTAN¹, L. VEVERKOVA¹, T. BRIZA¹, V. KRAL¹**¹ *Institute of Chemical Technology Prague, Department of Analytical Chemistry, Prague 6, Czech Republic*

Development of receptors which are designed for anion recognition is an important branch of chemistry. The design of synthetic receptors for selective sulfate over phosphate recognition in aqueous media has been a significant challenge. Many of these compounds are not soluble in water. This problem can be solved by immobilization on the nanoparticles surface.

Nanoparticles were prepared by method based on the reduction of noble metals salts by reduction agents. The immobilization of polymethinium salt and two porphyrin-brucine derivatives were carried out by two different ways of ionic interaction. First, direct immobilization of selector molecules on nanoparticles, second, immobilization of selector molecules on 3-mercaptopropionic acid premodified nanoparticles. Such prepared nanoparticles were characterized by UV-Vis spectroscopy. This method was used for study of interactions of anions with the modified nanoparticles in water.

Immobilization on nanoparticles, in some cases, prevents the selector molecules from aggregation in water. Various spectral changes were observed in experiments with free versus immobilized selectors in water depending on a type of used system and selected anions. The results showed that type of used nanoparticles have positive or negative affected to stability of these systems in water and have a strong influence on their interactions.

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Keywords: Anions; Nanoparticles; UV/Vis spectroscopy;

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CHEMICAL COMPOSITION OF DIFFERENT OREGANO (ORIGANUM VULGARE L.) ESSENTIAL OILS: RELEVANCE FOR THE ACTIVITY AGAINST FOODBORNE AND SPOILAGE BACTERIA**J. S. AMARAL¹, A. E. RIBEIRO², S. ALVES³, A. GONCALVES⁴, P. POETA⁴**¹ *REQUIMTE/Pharmacy Faculty of Porto, and ESTiG/Polytechnic Institute of Braganca, Braganca, Portugal*² *LSRE/IPB, Polytechnic Institute of Braganca, Braganca, Portugal*³ *University of Trás-os-Montes and Alto Douro, Veterinary Science Department, Vila Real, Portugal*⁴ *University of Trás-os-Montes and Alto Douro, Veterinary Science Department and Center of Studies of Animal and Veterinary Sciences, Vila Real, Portugal*

Herbs and spices have been used for centuries in culinary for seasoning and flavouring purposes. More recently, there has been a growing interest regarding the use of some plants and its essential oils (EO) for their activity against foodborne pathogens and food spoilage bacteria. Due to its potential in extending the self-life of foods and its better acceptability by consumers who demand more “natural” foods, the use of EO can be an interesting alternative to substitute, at least partially, synthetic preservatives.

Oregano EO has been reported to possess a broad antimicrobial activity spectrum. Nevertheless, its activity is strongly dependent on the chemical composition which is known to differ with plant genotype, geographical origin and environmental conditions. Considering that most works focus on wild oregano but nowadays most is cultivated and sold in supermarkets, in this study we evaluated the chemical composition and antibacterial activity of commercially available oregano EO (EO1) and the EO extracted by hydrodistillation from oregano purchased from an aromatic plants supplier (EO2). The chemical profile of the essential oils, determined by gas chromatography-mass spectrometry (GC-MS), was very different with EO1 presenting carvacrol (68.3%), *p*-cymene (4.2%), thymol (3.8%) and gamma-terpinene (3.7%) as main compounds, while terpinen-4-ol (24.8%), *p*-menth-2-en-1-ol (13.9%), *p*-cymene (8.8%) and gamma-terpinene (7.4%) were the major ones in EO2. The antibacterial activity was determined against 7 Gram-positive and 3 Gram-negative bacterial strains by agar-diffusion method. Both oils inhibited all tested strains but the antibacterial activity was stronger for commercial EO with some strains presenting inhibition halos two times higher. This can be mainly ascribed to the higher content of phenolic derivatives, such as carvacrol and thymol, in EO1. These results demonstrate that oregano EO can be used for its antimicrobial effect against foodborne pathogens. Nevertheless, for this purpose it should be carefully chosen regarding its chemical composition.

Keywords: Gas chromatography; Biological activity; Mass spectrometry; Natural products;