while it is very little developed in the environmental field. Our research is based on the use of this biomatrix in agro-alimentary wastes valorization. The research is concentrated on chemical modification of corn starch with succinic anhydride and the complexing of this biomatrix with other polysaccharides extracts from agro-alimentary wastes. This complex matrix has the capacity to encapsulate other compounds from agro-alimentary products. Vegetable oils are important in the complexion of this biomatrix and it is used in the depollution domain. The most important results obtained are for corn starch modification with a solubilization temperature of 95 °C in DMSO, used as a solvent, and a reaction time of 72 hours, for alkylating agent. The obtained starches are characterized by 1H NMR technique in order to verify the alkylation procedure. Complexion with vegetable oil and other polysaccharides extracted from agro-alimentary wastes are also characterized by 1H NMR technique and microscopic images. All these new nanomaterials are used in different domains as wastes valorization and environmental depollution.

Keywords: nanomaterials, corn starch, agro-alimentary wastes, vegetable oil, biomatrix.

F.14. ANALYSIS OF THE FORCED OXIDABILITY OF GRAPE SEED, WALNUT AND CORN OILS

SUBOTIN IURIE, DRUŢĂ RAISA, COVACI ECATERINA, STURZA RODICA

Technical University of Moldova, Department of Oenology and Chemistry, 168, Stefan cel Mare Str. Chisinau MD-2004, Republic of Moldova

Abstract. Lipid oxidation is one of the major causes of decreased nutritional value of foods, limiting their shelf life. This phenomenon leads to the formation of oxidative degradation products, which essentially change the nutritional and organoleptic qualities of the products. However, even worse is the fact that the consumption of metabolites of oxidative degradation of lipids is the cause of oxidative stress of the human body and, respectively, causes multiple morbid conditions of the human health. A study on the process of forced oxidation of grape seed oils, walnuts and corn in the presence of hydrogen peroxide and Cu (II) ions was realized. The thermo-oxidation of the oil caused a significant decrease in the saponification index, which indicates a significant degree of polymerization and leads to an increase in the viscosity of the studied sunflower oil. To highlight the impact of heat treatments, the analysis was performed by IR spectroscopy and the possible mechanisms of forced oxidation of unsaturated fatty acids under the influence of heat factor were analyzed. It was established that the applied treatment favored both the formation of carbonyl secondary compounds and the simultaneous formation of hydroperoxides and triglycerides containing hydroxylated groups. The accumulation of hydroperoxides and triacylglycerides that have hydroxyl functions have facilitated the course of polymerization reactions, which are to increase the viscosity of the studied thermo-oxidized sunflower oil. Analogous to the forced oxidation of sunflower oil, the formation during oxidation of trans-isomers of polyunsaturated acids was attested. The study investigated and identified the minimum concentrations of antioxidants needed to reduce the oxidation of the analysed oils.

Keywords: vegetable oil, thermal oxidation, IR spectroscopy, peroxide index, acidity index, epoxides, trans- and cis- fatty acid isomers, antioxidants.

Acknowledgements: The research was funded in the framework of State Project 20.80009.500727 Physico-chemical mechanisms of redox processes with electron transfer involved in vital, technological and environmental systems.