

## F.21. INFLUENCE OF TEMPERATURE ON THE EXTRACTION OF FAT-SOLUBLE COMPLEX FROM SEA BUCKTHORN AND ROSEHIP FRUITS

GHENDOV-MOȘANU ALIONA, STURZA RODICA

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

**Abstract.** Sea buckthorn and rosehip fruits have a promising source of lipophilic bioactive compounds, which include carotenoid pigments, which are soluble in organic solvents such as acetone, ethyl ether, hexane, etc. But these solvents cannot be used in the food industry because of their toxicity. Refined deodorized sunflower oil may be recommended as a solvent for carotenoid extraction for functional food formulation. Lipophilic bioactive compounds in sea buckthorn and rosehip fruits are characterized by increased antimicrobial activity against pathogenic microorganisms, which cause food poisoning. The aim of the research was to determine the influence of temperature on carotenoids extraction yield and antioxidant activity in fat-soluble extracts of sea buckthorn and rosehip fruits. Native dried berries were used for the research. Extraction of fat-soluble bioactive compounds was performed at temperatures of 30 °C, 45 °C and 65 °C. The physico-chemical quality indices

## BACAU 2021 Conference Proceedings – ABSTRACTS

(acidity index, peroxide index, conjugated diene and triene contents, p-anisidine index) of the fat-soluble extracts of sea buckthorn and rosehip fruits obtained at different extraction temperatures were compared with those of sunflower oil, used as a solvent. It is attested that these physico-chemical indices of sea buckthorn and rosehip extracts based on sunflower vegetable oil vary insignificantly and correspond to the rules established for refined deodorized sunflower oil. It was found that the temperature variation from 30 to 65 °C changed the yield of carotenoids in the fat-soluble extracts of sea buckthorn and rosehip fruits, showing that the highest rate of pigments was reached at 45 °C and then decreased at 65 °C. In berry extracts, zeaxanthin and lycopene had the highest yield: for sea buckthorn - 9.55 and 9.40 mg/100g d.w. and for rosehip - 14.62 and 14.41 mg/100g d.w. respectively. Heat treatment reduced the extraction efficiency of carotenoids by forming different of cis - isomers and reducing the content of trans-isomers. In addition, carotenoids have different ability to form cis -isomers. It is attested that carotenoid pigments are responsible for antioxidant activity in the oily extracts of sea buckthorn and rosehip fruits. The high values of antioxidant activity, determined by the DPPH test correspond to the extraction efficiency of carotenoids at 45 °C. Thus, in sea buckthorn extracts the maximum value of antioxidant activity was 86.81% free radicals inhibited, and for rosehip - 91.54% free radicals inhibited. Probably, the increased antioxidant activity of the oily extracts was due to the synergistic interaction between the carotenoids in the berries and the tocopherols, which were present in the sunflower oil. The cis -isomers of carotenoids, which have lower antioxidant properties than trans-isomers, contributed to the decrease of the values of antioxidant activity at a temperature of 65 °C. It was shown that in the oily extracts of sea buckthorn and rosehip fruits, the correlation between the total carotenoid content and the antioxidant activity is very good, the coefficient of determination  $R^2$  being 0.99 and 0.98 respectively.

**Keywords:** fat-soluble bioactive compounds, carotenoids, extraction, temperature, antioxidant activity.

**Acknowledgments:** The authors would like to thank the Project AUF-MECR 20-21 Reduire les risques de contamination chimique et microbiologique des aliments, running at Technical University of Moldova.