

F.12. BIOLOGICAL VALUE OF MICROCAPSULES WITH PHYTOCHEMICALS FROM JOSTABERRY DURING STORAGE

ANGELA GUREV*, VERONICA DRAGANCEA, VIORICA BULGARU,
ALIONA GHENDOV-MOSANU

*Technical University of Moldova, 168 Stefan cel Mare Blvd., Chisinau, Republic of
Moldova*

email: angela.gurev@chim.utm.md

Abstract. Phytochemicals in the jostaberry hybrid (*Ribes × nidigrolaria*) are characterized by high antioxidant activity (AA). Several studies have shown that the drying and freeze-drying process makes the fruit sticky and difficult to grind into powder, affecting its biological potential. In addition, flavonoids (including anthocyanins), vitamins and pigments also degrade under unfavorable storage conditions. The aim of this study was to improve handling properties and to evaluate the biological value of biopolymer microcapsules enriched with jostaberry bioactive compounds (JMC), during lyophilization and subsequent storage in the dark at ambient temperature ($22\pm1^{\circ}\text{C}$, relative humidity $\leq 75\%$). Jostaberry fruits were extracted with 70% hydroethanolic solution, and the extracts (JE) were concentrated under vacuum to a dry matter content of 19.59%. The JE were mixed with an aqueous solution of maltodextrin (5%) and sodium alginate (2%) in a 1:1 (v:v) ratio. Subsequently, ascorbyl palmitate (0.5%) and refined, deodorized vegetable oil were added under continuous stirring to form an emulsion. Ionic crosslinking was performed using 0.1 M calcium chloride (CaCl_2). The resulting microcapsules were collected, rinsed with distilled water, freeze-dried, and packaged [Patent MD 1864 Z 2026.02.28]. The encapsulation efficiency was 65.67 %. The biological potential of JMC was evaluated by spectrophotometric determination of total polyphenol content (TPC) and by DPPH and ABTS assays in 60% hydroethanolic extracts of JMC pre-swollen in distilled water. Immediately after production, TPC was 16.5 mg GAE/g of JMC, while AA was 7.78 mg TE/g (DPPH) and 55.72 mg TE/g (ABTS). After 3 months, these values remained stable. After 6 months, TPC decreased by 2.7 %, while AA decreased by 4.2% (DPPH) and 2.8% (ABTS). No significant color changes were observed after 6 months; however, a slight rancid odor developed, attributed to oil oxidation. Microstructural analysis of JMC indicating non-adhesive particles. Some surfaces appeared porous due to ice crystal sublimation during lyophilization, which increased the exposure of the

oil phase to air and susceptibility to oxidation. In conclusion, encapsulation of JE in a biopolymer matrix followed by lyophilization effectively preserved its biological value and antioxidant potential during processing and up to 6 months of storage under ambient conditions.

Keywords: antioxidant activity, bioactive compounds, biopolymer, forest fruits, polyphenols.

Acknowledgments: The research was supported by Institutional Project, subprogram 020405 “Optimizing food processing technologies in the context of the circular bioeconomy and climate change”, Bio-OpTehPAS, being implemented at the Technical University of Moldova.