USAMV BUCURESTI
CENTRUL DE CERCETARE PENTRU STUDIUL CALITATII PRODUSELOR AGROALIMENTARE

UNIVERSITY OF AGRONOMIC SCIENCES AND VETERINARY MEDICINE OF BUCHAREST

Research Center for Studies of Food Quality and Agricultural Products

Scientific and technical report

for the project

„Natural phenolic systems for dietary lipid protection obtained from shrubs of the genus Vaccinium and their bioaccessibility during the gastrointestinal digestion" - BIOXVACCINI –

Phase III. Evaluation of lipid protection from oxidation by Vaccinium functional food products under in vitro digestion conditions

Period covered: 01.02.2021 – 31.07.2021

In Phase III of the project, the best formulations (Vaccinium products with the the highest phenolic content) identified in Phase II were tested for their antioxidant activity towards lipid oxidation in a simulated static *in vitro* digestion model (oral, gastric and intestinal phases). The physico-chemical conditions for the oral, gastric and intestinal phases of digestion were simulated according to the standardized protocol for *in vitro* static digestion proposed by Minekus et al. (2014) (COST FA1005 Action INFOGEST) with slight modifications.

For this study, the dried bilberry leaves (3, 6, 10 and 20 mg) were used for the assessment of the antioxidant activity at the gastric and intestinal stages of digestion. To investigate the lipid protective capacity of the bilberry leaf poder, sunflower oil-in-water emulsion stabilized by PL as models of dietary lipids was used. The quantification of oxidation products was assessed by conjugated dienes (CD) and Total aldehydes assays.

The phenolic bioaccessibility after ingestion was analyzed by UPLC/MS. The results obtained allowed the identification and quantification of chlorogenic acid which is the major phenolic compound in bilberry leaves.

The results obtained during the Phase III of the BIOXVACCINI project were disseminated by participating in **5 international conferences** and in **1 scientific publication**:

International conferences:

1. Bujor, O.-C., Popa E. E., Popa M. E., *Leaves and stems of Vaccinium species used as potential antioxidants and antimicrobial ingredients in foods*, the first edition of **Advances in Food Chemistry (AdFoodChem 2021) International Conference**, 15-17 April 2021, (poster).

2. Bujor – Nenița Oana – Crina, Popa M. E., *Procyanidin variation in leaves and stems of wild and cultivated Vaccinium species,* "**The XXX International Conference on Polyphenols (ICP2021)" - fully virtual conference**, 13-15 July 2021, Turku (Finlanda).

3. Oana-Crina Bujor, Elisabeta Elena Popa, Mona Elena Popa, „*Procyanidins Characterization, Antioxidant and Antifungal Activities of Lingonberry Leaves and Stems*" **ICPCB 2021: International Conference on Polyphenol Chemistry and Bioactivity"** – digital (online) conference, 19 - 20 July 2021, Helsinki (Finlanda).

4. Bujor-Nenița Oana-Crina, Popa Mona Elena, Project Bioxvaccini in the International Exhibition of Research, Innovations and Inventions PRO INVENT, 18th Edition – ONLINE, 18-20 November 2020, Cluj-Napoca, Romania - **Diploma of Excellence and Gold Medal.**

5. Bujor-Nenița Oana-Crina, Popa Mona Elena, Project Bioxvaccini, *INOVALIMENT - The first International Fair of Food Inventions and Innovations*, 23-27.11.2020, **Second Prize at Innovation Section (**https://inovaliment.ro/premii-inovaliment2020/).

Scientific publication

1. **Oana-Crina Bujor, Elisabeta Elena Popa, Ioana Oprica, Mona Elena Popa,** Phenolic content, antioxidant and antimicrobial activities of *Vaccinium* plants depend on the species and the aerial parts. Preparation for publication in Molecules journal (IF 3,267).

References

1. Gobert et al. (2014). Fruits, vegetables and their polyphenols protect dietary lipids from oxidation during gastric digestion. Food & Function, 5, 2166-2174.
2. Minekus et al. (2014). A standardised static in vitro digestion method suitable for food – an international consensus. Food & Function, 5, 1113–1124.
3. Mikkelsen, A., & Skibsted, L. H. (1995). Acid-catalyzed reduction of ferrylmyoglobin - product distribution and kinetics of auto-reduction and reduction by NADH. *Zeitschrift Fur Lebensmittel-Untersuchung Und-Forschung*, 200(3), 171-177.
4. Ursini, F., & Sevanian, A., (2002). Postpradial oxidative stress. *Biological Chemistry*, *383*, 599–605.