

THE SCIENTIFIC REPORT OF PROJECT PN-III-P1-1.1-PD-2016-0892 – STAGE III

Project title: *The valorisation opportunities of natural products, separated from secondary resources through biorefining process*

Project code: PN-III-P1-1.1-PD-2016-0892

Acronym: BIOPHENOL

Project lead: Corneliu Tanase

Stage III – Assessment of the antimicrobial activity of beech bark polyphenolic extracts

The aim of this stage (2020) included the following activity:

Act 3.1 - Assessment of the antibacterial activity of beech bark polyphenolic extracts

Results: For bacterial strains were used: *Staphylococcus aureus* (ATCC 49444), *Pseudomonas aeruginosa* (ATCC 27853), *Salmonella typhimurium* (ATCC 14028) and *Escherichia coli* (ATCC 25922). The strains were cultured on Muller-Hinton agar stored at 4 °C. The modified microdilution technique was used to evaluate the antimicrobial activity. Minimum inhibitory concentrations (MICs) were performed using 96-well plates. *Staphylococcus aureus* was the most sensitive strains towards all tested solutions, with similar values of MIC (1.56 mg/mL) and MBC (3.12 mg/mL). Additionally, all tested extracts showed a good antibacterial activity on the *E. coli*, *P. aeruginosa*, and *S. typhimurium* strains (MIC—3 mg/mL, and MBC—6 mg/mL) [Tanase C., et al. Biological and Chemical Insights of Beech (*Fagus sylvatica* L.) Bark: A Source of Bioactive Compounds with Functional Properties. Antioxidants (Basel), doi: 10.3390/antiox8090417].

Act 3.2 – Assessment of the antifungal activity of beech bark polyphenolic extracts

Results: Antifungal activities were investigated by using the following fungi: *Candida albicans* (ATCC 10231), *Candida parapsilosis* (ATCC 22019), and *Candida zeylanoides* (ATCC 20356). The minimum inhibitory (MIC) and minimum fungicidal (MFC) concentrations assays were performed using the microdilution method by preparing a serial of dilutions in 96-well plates. All tested *Candida* species, exhibited the sensitivity to aqueous extract of beech bark with 25 mg/mL MIC and 50 mg/mL MFC. The effect of ethanolic extracts on *Candida* species was absent at a concentration of 50 mg/mL. [Tanase C., et al. Biological and Chemical Insights of Beech (*Fagus sylvatica* L.) Bark: A Source of Bioactive Compounds with Functional Properties. Antioxidants (Basel), doi: 10.3390/antiox8090417].

The dissemination of the results obtained within the project, was achieved by:

1. **Corneliu Tanase, Ruxandra Ștefănescu, Béla Darkó, Daniela Muntean, Sonia Socaci.** Biological and Chemical Insights of Beech (*Fagus sylvatica* L.) Bark: A Source of Bioactive Compounds with Functional Properties, in review, *Molecules*, FI – 3,06

2. **Corneliu Tanase**, Ruxandra Ștefănescu, Diana Gabriela Gheorghies, Loredana Dandu, Adrian Nisca, Béla Darkó, Sonia Socaci. Effects of beech bark extract in the sage (*Salvia officinalis* L.) plant growth and volatile oil profile, in review *Agronomy*, FI – 2.265.

29/04/2020

Project director
Conf. dr. Corneliu Tanase