



“Gheorghe Asachi” Technical University of Iasi, Romania



ANTIBACTERIAL ACTIVITIES OF BEECH BARK (*Fagus sylvatica* L.) POLYPHENOLIC EXTRACT

Corneliu Tănase^{1*}, Sanda Coșarcă¹, Felicia Toma¹, Anca Mare¹, Adrian Man¹,
Amalia Miklos², Silvia Imre¹, Irina Boz^{3,4}

¹University of Medicine and Pharmacy of Tirgu Mures, Gheorghe Marinescu, 38, 540139,
Tirgu Mures, Mures, Romania

²Center for Advanced Medical and Pharmaceutical Research (CCAMF), University of Medicine and Pharmacy of Tirgu Mures,
Gheorghe Marinescu, 38, 540139, Tirgu Mures, Mures, Romania

³Integrated Centre for Environmental Science Studies in the North-East Development Region – CERNESIM, Alexandru Ioan Cuza
University of Iasi, Bd. Carol I, 11, 700506, Iasi, Romania

⁴Institute of Biological Research, Lascar Catargi 47, 700107 Iasi, Romania

Abstract

The study provides information about separation and identification of natural bioactive compounds from beech (*Fagus sylvatica* L.) bark with potential therapeutic applications such as antibacterial activity against human pathogens. Beech is a common material used in the wood industry, but its bark is separated from the wood and is considered a by-product. In this study, natural compounds with biological activity were obtained from beech bark by hot water extraction. The high-performance liquid chromatography (HPLC) was used to analyze the phenolic compounds in the beech bark extracts. Spectrophotometric methods were employed for the determination of total phenolic content. Microdilution technique was used for testing the antimicrobial activity of the extract. The following strains were tested: *Staphylococcus aureus*, *Methicillin-resistant Staphylococcus aureus*, *Klebsiella pneumoniae*, *Escherichia coli* and *Pseudomonas aeruginosa*. The yield of extracted polyphenols was of 22.952 mg gallic acid/g dry bark. The compounds identified by HPLC were vanilic acid, catechin, taxifolin and syringin. The extracts were active against *Staphylococcus aureus* and *Methicillin-resistant Staphylococcus aureus*. The effect of polyphenolic extract on Gram-negative bacteria was absent at a concentration of 30 mg/mL beech bark extract. Altogether, the use of pure water for extraction of polyphenols from beech bark proved to be an effective eco-friendly method. This method sustains the concept of “green” chemistry by involving the use of renewable plant resources and also by using water as solvent.

Key words: antibacterial, beech bark, green biotechnology, biorefinery, polyphenols

Received: May, 2017; Revised final: February, 2018; Accepted: March, 2018; Published in final edited form: April 2018

* Author to whom all correspondence should be addressed: e-mail: corneliu.tanase@umftgm.ro; Phone: +40 265 215 551