



“Gheorghe Asachi” Technical University of Iasi, Romania



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## SYNTHESIS AND BIOEVALUATION OF MAGNETIC PARTICLES BASED ON CHITOSAN AND PHYTOCOMPONENTS FROM *Eugenia carryophyllata* AQUEOUS EXTRACT

Ion Anghel<sup>1\*</sup>, Alexandru Mihai Grumezescu<sup>2,\*</sup>, Alina Georgiana Anghel<sup>3</sup>, Crina Saviuc<sup>4</sup>,  
Cristina Croitoru<sup>4</sup>, Dan Eduard Mihaiescu<sup>2</sup>, Carmen Mariana Chifiriuc<sup>4,5</sup>

<sup>1</sup>“Carol Davila” University of Medicine and Pharmacy, ENT (Otolaryngology), 6 Traian Vuia, 020956 Bucharest, Romania

<sup>2</sup>University Politehnica of Bucharest, Faculty of Applied Chemistry and Materials Science, Department of Science and Engineering of Oxide Materials and Nanomaterials, 1-7 Polizu Str., 011061 Bucharest, Romania

<sup>3</sup>Coltea Hospital, Otolaryngology ENT Clinic, Bucharest, Romania

<sup>4</sup>University of Bucharest, Faculty of Biology, Department of Microbiology, 1-3 Portocalelor Alley, 060101 Bucharest, Romania

<sup>5</sup>Research Institute of the University of Bucharest- ICUB, 91-95 Spl. Independentei, Bucharest, Romania

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### Abstract

In this study we report the preparation and evaluation of the antimicrobial activity of a new hybrid material based on chitosan (CH), magnetite (Fe<sub>3</sub>O<sub>4</sub>) and phytocomponents from the *Eugenia carryophyllata* aqueous extract (AE). CH/Fe<sub>3</sub>O<sub>4</sub> was prepared by chemical precipitation of Fe<sup>2+</sup> and Fe<sup>3+</sup> ions in aqueous solution of sodium hydroxide and CH. *E. carryophyllata*'s dried buds were hydrodistilled under microwave conditions. The AE was separated in three equal parts, one for the chloroform extraction, one for the extraction with CH beads and the other for the extraction with CH/Fe<sub>3</sub>O<sub>4</sub>. The chemical composition of the AE and phytocomponents extracted with CH and CH/Fe<sub>3</sub>O<sub>4</sub> was established by Gas Chromatography-Mass Spectrometry (GC-MS) analysis. The high content of eugenol and  $\alpha$ -cariophyllene has been assessed in CH, CH/Fe<sub>3</sub>O<sub>4</sub> and chloroform extraction fractions. The microbicidal and anti-biofilm activity of CH/AE and CH/Fe<sub>3</sub>O<sub>4</sub>/AE were tested against several microbial strains, either reference ones or recently collected from patients with microbial otitis, rhinosinusitis or pharyngo-tracheal fistula after total laryngectomy treated and operated in ENT Clinic, Coltea Hospital, Bucharest. The present study showed that the hybrid material based on chitosan (CH) and phytocomponents extracted from *E. carriophyllata* (AE), and respectively on CH, magnetic nanoparticles and AE, proved to be efficient against the majority of the tested strains, both in planktonic and adherent state, the CH/Fe<sub>3</sub>O<sub>4</sub>/AE specifically inhibiting the development of biofilms formed by *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Candida albicans* strains isolated from otolaryngological infections.

**Key words:** essential oil, *Eugenia carryophyllata*, hybrid material, magnetic particles based on chitosan

Received: March, 2012; Revised final: August, 2012; Accepted: September, 2012

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\* Author to whom all correspondence should be addressed: e-mail: ionangheldoc@yahoo.com; grumezescu@yahoo.com; Phone: +40765349326