

Hydrogels Based on Biopolymers and Bergamot Essential Oil with Biomedical Applications

Elena Berteanu^{1,2,*}, Iris Maria Tuşa^{1,2}, Cătălin Iordachel¹, Maria Paraschiv^{1,3}, Elena Mihai¹, Mihaela-Ionică Enache¹, Alexandrina Rugină¹

¹ National Institute of Research and Development for Biological Sciences, Bucharest

² Romanian Society of Bioengineering and Biotechnology, Bucharest

³ National University of Science and Technology “Politehnica”, Bucharest

* Correspondence: elena.bereteanu@incdsb.ro;

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Abstract: The present study focuses on obtaining a hydrogel carbomer coupled with *Bergamot* essential oil in order to obtain hydrogels with remarkable therapeutic properties. Development of new biomaterials/bioproducts with therapeutic effects in treating various tissue disorders. Carbopol is a synthetic polymer made of carbomers. Carbopol is an active anionic polymer of acrylic acid, which appears as a white powder with low density and forms gels in concentrations between 0.5-1.5%. Carbomer polymers are cross-linked together and form a microgel structure that is useful in biomedical applications [1]. *Bergamot* essential oil has anti-inflammatory, antibacterial, antidepressant, analgesic, and antibiotic effects. The main chemical constituents of Bergamot Essential Oil are: Limonene, Linalyl Acetate, Linalool, Pinene, Bergaptene, Terpeneol, Nerol, Neryl Acetate, β -Bisabolene, Geraniol, Geraniol Acetate, and Myrcene. This study involved the use of the direct method for preparing gels, Carbopol (Synthalen K) 1%. Then the *Bergamot* essential oil was added to the mixture with constant stirring, so a homogeneous dispersion was obtained. Hydrogels P1-P5 were analyzed for pH evaluation. The pH of the gels was recorded using a digital pH meter (Mettler Toledo), and antioxidant activity was measured using the ABTS method. [2,3]. The results showed that biomaterials can be considered as promising candidates for biomedical/biotechnological applications.

Keywords: Carbopol Hydrogel; Bergamot Essential Oil; Biomaterial Development; Antioxidant Activity; Biomedical Applications.

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