



Caseinates Loaded with Red Propolis Extract

Isabel Cristina Celerino de Moraes PORTO^{1*}, Clinston Paulino de ALMEIDA¹, Nataly Miranda do NASCIMENTO¹, Amanda Barbosa WANDERLEY¹, João V. Lessa de OLIVEIRA¹, Felipe J. L. Barbosa dos SANTOS¹, Valdemir da Costa SILVA¹, Irinaldo Diniz BASÍLIO-JÚNIOR¹, Giselda Macena LIRA¹, Marta Maria da CONCEIÇÃO², Ana Flávia Oliveira dos SANTOS³, Ticiano Gomes do NASCIMENTO^{1*}

¹ Post-Graduate Program of Pharmaceutical Sciences, School of Nursing and Pharmacy and Post-Graduate Program of Nutrition, College of Nutrition, Federal University of Alagoas, Maceió, Brazil

² Department of Food Technology, Federal University of the Paraíba, João Pessoa, Brazil

³ Department of Pharmacy, University Centre of Maceió/CESMAC, Maceió, Brazil

*isabelcmporto@gmail.com; ticianogn@yahoo.com.br

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*Corresponding author /Yazışılan yazar

Abstract

This work aimed to characterize microcapsules of caseinates loaded with red propolis extract (RPE) using different analytical and biological methods. Five compositions of microcapsules of caseinates loaded with RPE at concentrations between 10% and 50% were prepared using sodium casein from bovine milk as encapsulating agent and colloidal silicon dioxide as a flow agent. The caseinates were produced using colloidal dispersion technique and submitted to the spray-drying technique. The caseinates were characterized using SEM analysis, thermal analysis, FTIR, Fluorescence analysis, electrophoresis, dissolution studies, antioxidant and antibacterial activities. SEM images showed spherical particles in the range from 3.24 µm to 20.5 µm. FTIR, NMR spectra in solid-state and thermal analysis also demonstrated the encapsulation of the RPE. Dissolution study revealed limited to poor water-solubility of flavonoids in the compositions CSRPE18% and CSRPE28%, but good water solubility of naringenin in the compositions CSRPE35% and CSRPE50%. Excellent antioxidant activity and antibacterial activity were demonstrated only from CSRPE50% and CSRPE35% compositions. Thermal analysis, water-solubility dissolution assay and antioxidant activity have indicated a high protein binding between sodium casein and flavonoids from RPE in the CSRPE18% and CSRPE28% compositions resulting in a controlled release of the flavonoid. However immediate release of flavonoids in the compositions CSRPE35% and CSRPE50% was detected. The Fluorescence and thermal analysis allied to the dissolution, antioxidant and antibacterial tests were important analytical techniques to elucidate the interaction between flavonoid-protein and flavonoid release kinetic from caseinates soluble complex.

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