

Abstract

Mesoporous Silica Systems Loaded with Polyphenols [†]

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Abstract: In this work, we obtain mesoporous silica systems loaded with polyphenolic compounds (p-coumaric acid, trans-ferulic acid, epicatechin, and catechin). Polyphenolic compounds are used as biologically active agents for the treatment of various diseases. These compounds have high antioxidant activity. As a carrier, two types of mesoporous silica have been proposed and obtained according to the classical templating method with cetyltrimethylammonium bromide, CTAB, under alkaline conditions. Polyphenols (p-coumaric acid, trans-ferulic acid, epicatechin, and catechin) were loaded under vacuum into the mesoporous silica. The materials obtained were characterized by Scanning Electron Microscopy, X-ray Diffraction, the Brunauer–Emmett–Teller Method, Complex Thermal Analysis–DTA–TG and Fourier Transform Infrared Spectroscopy. In this study, mesoporous silica systems were obtained and further loaded with p-coumaric acid, trans-ferulic acid, epicatechin and catechin. The results highlight that the materials can be used as drug delivery systems, with the results being promising (simulated gastric fluid, SGF, and simulated intestinal fluid, SIF) for various environments. The proposed loading methodology is suitable for loading these natural agents, mostly, inside the pores.

Keywords: mesoporous silica; p-coumaric acid; trans-ferulic acid; epicatechin; catechin



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