

Extended Abstract

# Influence of Mesoporous Silica Functionalization and Pore Size on Resveratrol Release Profiles <sup>†</sup>

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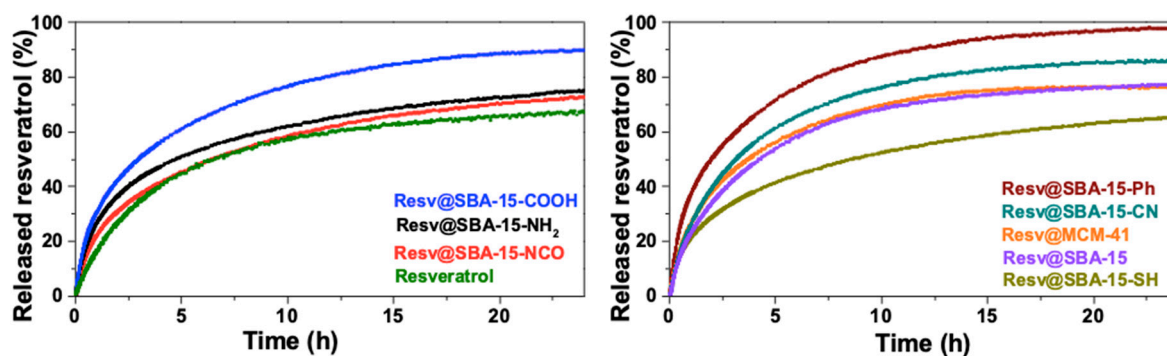
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Encapsulation of biologically active compounds in nanocarriers is a promising approach for controlling their release profiles and biological activity. Mesoporous silica nanoparticles (MSNs) are good candidates for developing drug delivery systems due to their biocompatibility, high porosity, and facile synthesis [1]. Moreover, the MSN surface properties can easily be tailored through functionalization with various organic groups [2]. SBA-15 and MCM-41 were obtained by sol-gel synthesis. The carriers were functionalized with 3-aminopropyl, 3-mercaptopropyl, cyanopropyl, isocyanatoethyl, phenyl, and carboxyl groups. Resveratrol was chosen as a model drug having low aqueous solubility, which limits its bioavailability. The carriers and resveratrol-loaded samples were characterized by small- and wide-angle X-ray diffraction, FT-IR spectroscopy, scanning electron microscopy, N<sub>2</sub> adsorption desorption isotherms, and thermal analysis. The resveratrol release profiles (Figure 1) were obtained in phosphate buffer solution (PBS) pH 6.8, at 37 °C and compared with the dissolution of biologically active compound in the same conditions. The experimental results were fitted with a theoretical kinetics model, consisting of biologically compound adsorption and desorption, followed by diffusion processes.



**Figure 1.** Resveratrol release from functionalized SBA-15 carriers in comparison with pristine silica with different pore size.

The resveratrol release profiles can be tailored by silica surface functionalization. Linking organic moieties on silica surface able to form strong hydrogen bonds, like carboxyl, isocyanatoethyl, or amine, it was possible to slow down the resveratrol sustained release. The best results in term of resveratrol enhanced solubility in PBS pH 6.8 were obtained for phenyl-functionalized SBA-15 carrier due to its hydrophobic nature.

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