

The present thesis consists of 6 chapters classified into two parts:

I. **State-of-the-art**, which includes two chapters:

**Chapter 1** presents a glance demonstration about the nanomaterials in the pharmaceutical field especially their advantages in drug delivery systems utilizations.

**Chapter 2** introduced the silica nanostructured materials starting from the methods of preparing them, ending with the species that actually can be obtained. This chapter also contains the properties and the biomedical and pharmaceutical application arising from those characteristics.

II. The **original contributions** of present research and its objectives are assembled in the next 4 chapters, followed by general conclusions, list of the references and finally the annexes section.

**Chapter 3** describes the experimental used for obtaining the silica nanostructured materials, including synthesis procedures of silica based nanostructured materials and characterization techniques as well as the procedure of applying them as drug delivery systems.

**Chapter 4** demonstrates the concept for preparing materials and the results have been illustrated and explained by different analytical techniques.

**Chapter 5** presents the drug delivery abilities of silica nanotubes comparing with MCM-41 through using Ibuprofen as drug model followed by using doxorubicin as anti-cancer agent.

**Chapter 6** contains data on the nanostructured silica-titania sieves used as drug carrier for new antibiotic agent izohidrafural and comparison of the loading and the release profile results with MCM-41 as carrier for the same drug. The resulted materials have been tested in two sets of biological assays including another comparison with nitrofurantoin as a common drug used for the same purpose as structural analog with izohidrafural.

The original findings of the research conducted within this PhD thesis stage were subject of 5 papers published in ISI journals. These publications covered the entire original part of this work, in four of them I am the first author, one of them is published in UPB Scientific Bulletin. One more article will be published in the nearest future. During my PhD period I participated in a poster presentation at the 2<sup>nd</sup> International Ocean Research Conference, 2014, Spain.