

**NEW HYBRID NANOCARRIERS BASED ON CHITOSAN, CYCLODEXTRINS AND
HYDROXYAPATITE FOR SUSTAINED DRUG DELIVERY OF POORLY DRUGS USED
ON THE TREATMENT OF CANCERS BY PHOTODYNAMIC THERAPY (PDT).**

A. BenMihoub *, Y. Bal **

Laboratoire de Chimie Physique Moléculaire et Macromoléculaire, Université de Blida

*Doctorat on 2nd year (university of Laghouat), e-mail:benmihoubamina@hotmail.fr

** Faculté des Sciences, Université de Blida & Laboratoire des Biomatériaux et des Phénomènes de Transport (Université de Médéa).

Abstract

Encapsulation of hydrophobic porphyrin derivative as photosensitizers (PS) into different forms of nanoparticles (NP) is of a concern in this study for drug delivery and targeting in cancer photodynamic therapy (PDT) applications. New formulations have been developed in this work for the sustained release of the active agent by increasing the solubility. Entrapment of the PS in anionic cyclodextrin (CD) structure was our first alternative. The resulting complex is then included in chitosan (CS) and hydroxyapatite (HAP) nanoparticles according to ionotropic gelation method in the presence of a crosslinking agent and biomimetic media. UV-Vis, FTIR spectroscopies, X-ray diffraction (XRD) and SEM (scanning electron microscopy) are, among others, the methods used to characterize the prepared systems.

The UV-Vis and FTIR results showed that the concentration of CD may play a significant effect on the complexation phenomenon and morphology of each NPs. Indeed, the solubility of PS from CD structure was found to be very significant. Both, the hybrid CS NPs and HAP NPs containing the PS-CD active factor were able to be prepared in spherical form (300- 900 nm and 400- 956 nm respectively) which provide a good interest for drug delivery in PDT technique.

Keywords: photodynamic therapy, nanocarriers, photosensitizer, cyclodextrins, chitosan, hydroxyapatite.