

## Functionalized DOX Nanocapsules by Iron Oxide Nanoparticles for Targeted Drug Delivery

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**Abstract :** The drug capsulation was used for release and targeted delivery in determined time, place and temperature or pH. The DOX nanocapsules were used to reduce and to minimize the unwanted side effects of drug. In this paper, the encapsulation methods of doxorubicin (DOX) and the labeling it by the magnetic core of iron (Fe<sub>3</sub>O<sub>4</sub>) has been studied. The Fe<sub>3</sub>O<sub>4</sub> was conjugated with DOX via hydrazine bond. The solution was capsuled by the sensitive polymer of heat or pH such as chitosan-g-poly (N-isopropylacrylamide-co-N,N-dimethylacrylamide), dextran-g-poly(N-isopropylacrylamide-co-N,N-dimethylacrylamide) and mPEG-G2.5 PAMAM by hydrazine bond. The drug release was very slow at temperatures lower than 380°C. There was a rapid and controlled drug release at temperatures higher than 380°C. According to experiments, the use mPEG-G2.5PAMAM is the best method of DOX nanocapsules synthesis, because in this method, the drug delivery time to certain place is lower than other methods and the percentage of released drug is higher. The synthesized magnetic carrier system has potential applications in magnetic drug-targeting delivery and magnetic resonance imaging.

**Keywords :** drug carrier, drug release, doxorubicin, iron oxide NPs

**Conference Title :** ICBFE 2014 : International Conference on Biotechnology and Food Engineering

**Conference Location :** Rome, Italy

**Conference Dates :** September 18-19, 2014