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Entitled

*PREPARATION AND EVALUATION OF CROCETIN-COATED
BIODEGRADABLE POLYMER ON TOP of MAGNETITE NANOPARTICLES
FOR THEIR ANTICANCER EFFECTS*

by

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Abstract

Liver cancer is still one of the leading causes of cancer-related deaths worldwide. This is due to many reasons including lack of effective drugs, late diagnosis of this type of cancer due to the overlapping of symptoms with many other liver diseases, and lack of effective screening tests. Targeted drug delivery systems offer many promising advantages compared to conventional chemotherapy. Targeted delivery will mitigate the bad side effects of chemotherapy such as drug resistance, low therapeutic value since the drug mostly will be administered through an IV affecting healthy and cancer cells alike, and that leads us to an important point that is patient wellbeing and a promise to a kinder treatment with milder side effects. Iron oxide nanoparticles (MNP) are one of the most researched materials in nanoscience. This is due to its unique chemical and physical characteristics including low toxicity, good biodegradability, good colloidal stability, high surface area, and relatively easy, rapid, and inexpensive production. Within a certain size MNP only show a magnetic behavior in the presence of an external magnetic field. To maintain the nanosized structure of MNP a polymeric coat is necessary to keep the nanoparticles dispersed in solution. The polymer functional groups will also serve as a carrier of drug molecules on its surface. Crocetin is an extract of Saffron a well-known spice in our region. Crocetin showed promising anticancer effects in many studies. In this work, we designed a drug delivery system constituted of MNPs. We tested two types of polymeric coatings including chitosan (CS) and polyethylene glycol (PEG) both polymers known for their use in the medical field. Crocetin was added to both PEG-MNPs and CS-MNPs. Both systems were assessed for their physical and chemical properties and their kinetic release of the drug and finally their effect on the HepG2 liver cancer cell line.

Keywords: Magnetite Nanoparticles, Chitosan, PEG, Crocetin