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Development of medical drugs: Synthesis and *in vitro* bio-evaluations of nanomedicinal zinc–penicillins polymeric hydrogel membranes for wound skin dressing by new chemical technology

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Abstract

The present investigation on zinc-penicillins hydrogel membrane system is largely based on the delivery of drugs through the functionalization of polymers for the purpose of sustained release of new development drugs. Zinc(II)–penicillin complex, [Zn(pin-G)(Cl)].6H₂O, was synthesized through the chemical reaction between penicillin G potassium (pin-G) with zinc(II) chloride salt in the binary solvent mixture of the 50/50 (v/v) (CH₃OH/H₂O). This complex was identified using microanalytical analyses, conductance, FT-IR/¹H-NMR spectra, thermo gravimetric analyses, X-ray diffraction (XRD) and surface morphological analyses (scanning electron microscopy (SEM) and transmission electron microscopy (TEM)). FT-IR analysis confirm that, the zinc(II) metal ion is coordinated through carbonyl groups of amide and β-lactam groups as well as oxygen atom of carboxylate group. Thermal analysis gave an information about the presence of six uncoordinated water molecules outside sphere of chelation. Research paper is one of an attractive points that deal with the development of medical drugs and make them more efficient, and it was preparing the active materials in the nanometer image. The purpose of this research was to design and develop of nanomedicinal zinc–penicillins hydrogels by esterification of polyvinyl alcohol (PVA) with gelatin. Hydrogels are one of the most promising types of 3-dimensional cross-linked hydrophilic polymeric networks being used for various biomedical applications. This study was addressed the measurement of anti-microbial activity against Gram-negative bacteria and positive bacteria which recorded an efficient behavior.

Keywords: Zinc, penicillin, nanometer, hydrogels, spectral analysis, antimicrobial activities, drug delivery.

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