



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Synthesis and characterization of new hydrogels based on biopolymers for different applications

*A Thesis Submitted for the Degree of Ph.D. in
Organic Chemistry*

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(M.Sc. 2016)

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سببنا أنك لا تعلم لنا
إلا ما علمتنا أنك أنت
العليم العظيم

صدق الله العظيم

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Dedication

To

My Parents and My Husband

I have to thank Allah for choosing

Them to be my family

Thank you for

Supporting and helping me

Thank you



ORIGINAL ARTICLE

New sustainable chemically modified chitosan derivatives for different applications: Synthesis and characterization



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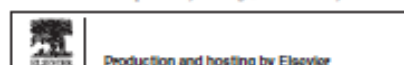
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Abstract The functionalization of chitosan (CS) by terephthaloyl chloride (TPC), glutaraldehyde (GA), and 4/4-(ethyl carbamoyl) benzoyl chloride) benzene sulfonamide was performed under different reaction conditions to yield the new hydrogels (I, II, III) respectively. However, hydrogel (I-NPs) was prepared from reaction of chitosan with (TPC) via ionic gelation technique using sodium tripolyphosphate (TPP) as a cross-linker. Moreover, hydrogel (I) was loaded (Au, Ag and ZnO) nanoparticles to give the nanoformulations (I-Au NPs, I-Ag NPs and I-ZnO NPs) respectively. Structural and morphological analysis of the new chitosan derivatives hydrogels and NPs formulations were characterized by FTIR, elemental analysis, TGA, DSC, XRD, SEM and TEM. From swelling study, chitosan derivatives hydrogels revealed higher swelling degree compared to (CS) with increasing time, temperature and pH values which reached maximum at pH 7 then decreased at pH 10. In addition, the maximum sorption capacities of Congo Red (CR) in aqueous solution were in the range 81–88%. Moreover, adsorption equilibrium isotherm results displayed favorable Langmuir model than Freundlich model. Furthermore, chitosan derivatives hydrogels showed broad spectrum antimicrobial activities against Gram-negative bacteria, Gram-positive bacteria and fungi with the inhibition zone diameter ranged from 13 to 25 mm compared to (CS) hydrogel which revealed inhibition zone diameter ranged from 11 to 16 mm, especially by the nano formulation

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