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***In-vitro* Antimicrobial Activity of *Guiera senegalensis* Leaves against
Uropathogenic Microorganisms**

**A thesis submitted for the Partial fulfillment of the requirement of master
Degree (M.Sc.) in Microbiology**

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DECLARATION

I declare that the work in this Dissertation entitled: **In-vitro Antimicrobial activity of *Guiera senegalensis* leaves against uropathogenic microorganisms** has been carried out by me in the Department of Microbiology, Faculty of Pure and Applied Sciences. The information derived from literature has been dully acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree at this or any other institution.

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Signature Date: November 2017

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DEDICATION

This work is dedicated to all my dearest parents whom I always ask Allah to get them to paradise, spiritual father my uncle Ahmed Abdullah Jumah, my family and my lovely sister Nora Ibrahim and especially to my children who always used to encourage me to get a high degree. It is also dedicated to all researchers who like to go ahead on their studies to find the beneficial outcomes to the human life.

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ABSTRACT

Microorganisms have evolved defense mechanisms against antimicrobial agents and are resistant to some antibiotics. The present study was aimed at evaluating the antimicrobial activity of methanolic and aqueous extracts of *Guiera senegalensis* (Moshi medicine) against uropathogenic microorganisms. The antimicrobial activities of the extracts were assayed by the Agar Disc Diffusion and Nutrients Broth Dilution Techniques. The results of the activity showed that, all extracts were active against all the tested isolates of uropathogenic organisms (*Staphylococcus aureus*, *Enterococcus faecalis*, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Pseudomonas aeruginosa* and *Candida albicans*). The aqueous extract of the leaves showed inhibition zones ranging from 12 to 31.7mm, the methanolic extract of the leaves showed zones of inhibition ranging from 11.00 to 31.7mm while the methanol portion and hexane portion of the leaves extract showed inhibition zones ranging from 12.3 to 31.3 mm. Most of the extracts exhibited Minimum Inhibitory Concentration (MIC) in the range of 3.125 to 12.5mg/ml and Minimum Bactericidal Concentration (MBC) in the range of 12.5 to 25mg/ml. The methanol extract and the aqueous extracts were observed to be more potent activity than the methanol portion and hexane portion and the variations of the zones of inhibitions of one extract to another indicate that the efficacy of differ according to the solvent used. *Guiera senegalensis* leaves methanolic and aqueous extracts were qualitatively phytochemical analyzed for its bioactive components and indicated that the extracts contain bioactive compounds such as alkaloids, tannins, saponins, flavonoids, glycosides and steroids which many give the extracts their potential antimicrobial activity against the tested microbial strains. The presence of bioactivity, bioactive secondary metabolites, low Minimum Inhibitory Concentration (MIC) and low Minimum Bactericidal Concentration (MBC) justifies the traditional uses of the leaves of *Guiera senegalensis* for therapeutic purposes. The tested extracts of *G. senegalensis* exhibited $LD_{50} = 286$ which is considered moderate rate of toxicity; therefore it is can be used as antimicrobial agents to treat microbial infections. It is recommended to make more studies such as microbiological, biochemical, pharmaceutical and in-vivo (using experimental animals) cytotoxicity tests to validate and verify the safe use of the plant for the treatments.

الملخص

بعض الكائنات الحية الدقيقة لها القدرة علي مقاومة المواد المضادة للميكروبات و مقاومة بعض المضادات الحيوية.هدفت هذه الدراسة لتقييم النشاط المضاد لمستخلصات اوراق نبات الغبيش المستخلصة بالميثانول والماء والهكسين ضد الميكروبات التي تصيب المسالك البولية. تم قياس النشاط المضاد للميكروبات باستخدام طريقة الانتشار في الاجار باستخدام تقنية تخفيف المستخلصات بتركيزات مختلفة. وايضاً تم تحديد الحد الادني للتركيز المثبط من المستخلص ضد الكائنات الحية باستخدام طريقة التوزيع في الاجار عن طريق اقل تركيز مثبط من المستخلص. اثبتت الدراسة ان كل المستخلصات نشطة ببيولوجيا وفعالة ضد ميكروبات المسالك البولية المختبرة وهي الايشريشيا القولونية والمكورات العنقودية المعوية والمكورات العنقودية الذهبية وبكتريا الالتهاب الرئوي والسيدوموناس ايروغينوسا و الزانفة الزنجارية وفطر المبيضات البيضاء (*Staphylococcus aureus, Enterococcus faecalis, Escherichia coli, Klebsiella pneumoniae, Proteus vulgaris, Pseudomonas aeruginosa and Candida albicans*). اعطي المستخلص المائي لاوراق نبات الغبيش فعالية تتراوح بين 12-31.3 مم ومستخلص الميثانول بين 11.5-31.7مم والمستخلصات المتجزأة بالهكسان تتراوح بين 12.3-27.3مم) بين 10.5-27مم ضد الميكروبات المختبرة. معظم المستخلصات اعطت تركيزات مثبطة الحد الادنى يتراوح بين 3.125-12.5ملجرام /مل والحد الادنى القاتل للبكتيريا يتراوح بين 12.5 - 25 ملجرام/ملل . تحليل المستخلص المائي و مستخلص الميثانول اظهرت وجود المواد الحيوية كالفلافونيدات ، التانيدات، الالكالويدات ، الصابونيات، الجلايكوزيدات و الاستيرويدات تايد قدرة المستخلصات الفاعلة ضد الميكروبات المختبرة.اظهرت مستخلصات الماء والميثانول فعالية اكثر عن المستخلصات المتجزأة واختلف حلقات التثبيط من مستخلص لآخر يؤكد ان فعالية المستخلص تختلف باختلاف المذيب. وجود المواد الحيوية النشطة المثبطة للمكروبات والتركيزات القاتلة للبكتيريا يبرر امكانية استخدام اوراق نبات الغبيش كدواء شعبي او تقليدي. تم التأكد من السمية لهذا المستخلص عن طريق يرقات الجمبري في المختبر واثبتت الدراسة ان المستخلص أمن لذلك يمكن استخدامها كمضادات حيوية ضد بعض الميكروبات . من نتائج التجارب نجد انه يمكن استخدام مستخلصات اوراق نبات الغبيش كعلاج بديل للمضادات الحيوية لمعالجة الاصابة بميكروبات المسالك البولية. ختاماً توصي الدراسة باجراء مزيدا من الدراسات والبحوث في النبات في مجالات الاحياء الدقيقة والكيمياء الحيوية والصيدلانية و اختبارات السمية باستخدام حيوانات التجارب لضمان سلامة استخدام النبات في العلاج.

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