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التخليق الحيوي لجسيمات الفضة النانوية من مستخلص أوراق نبات
الصبار *Aloe vera* وتحديد فاعليتها التثبيطية ضد البكتريا المعزولة من
أخماج الجروح والحروق

رسالة مقدمة الى
مجلس كلية العلوم_جامعة ديالى
وهي جزء من متطلبات نيل درجه الماجستير في علوم الحياة

من قبل الطالبة
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بإشراف

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Introduction

Burns and wounds are the most common public health issues around the world. Many factors may contribute to this, such as heat, chemical agents and electricity. Despite the presence of bacteria most burns and wounds cure through natural repair mechanisms (Rose and Chan,2016). Therefore, the healing process can be slowed down or stopped in some cases, Not only due to the influence of the microbial flora, but also due to the interference of many other autoimmune causes. The presence of dead tissue, as well as uncontrolled and ineffective inflammatory responses, have a major impact on the normal healing process of burns and wounds(Javia *et al.*, 2018).

Wound is described as a breakdown of the skin's protective function; the loss of continuity of epithelium, with or without loss of underlying connective tissue (i.e. muscle, bone, nerves) (Phoon and Hwang, 2020). Skin injuries, especially chronic wounds, are one of the most common medical problems around the world. Impaired angiogenesis will cause many problems during the wound healing and skin regeneration processes because of its critical role in tissue regeneration. As a result, inducing or promoting angiogenesis can be a potential strategy for accelerating wound healing (Nour *et al.*, 2021).

Wound infections are commonly contaminated by a variety of microbes which may be transmitted by the patient's natural flora or by the environmental or dermatological bacteria of medical staff (Farina Junior *et al.*,2013).

The increased risk of infection in burn patients due to weakened immunity, which can lead to sepsis, and there are a variety of causes that can lead to infection, including raw skin, immunodeficiency, and intrusive operations conducted in a healthcare facility, in addition, long term hospitalization (Ahmed,2012; Chaudhary *et al.*, 2019).

Medicinal plants, which are also called medicinal herbs, plants were used have been discovered and have been used since prehistoric times in traditional medicine practices, medicinal and nutritious materials for work, and used in pharmaceuticals to treat many ailments(Ahn, 2017), plants make hundreds of chemical compounds for functions including defense against insects and fungi, and diseases and herbivorous mammals (Shakya, 2016).

The efficacy of medicinal plants and their secondary metabolites as microbial inhibitors has been shown in recent studies. The discovery or alteration of new antimicrobial compounds to enhance antibacterial activity for medication, disinfection, or antiseptis is an important field of study (Ng *et al.*, 2021).

Nanomaterials synthesis is currently one of the most prominent research topics.They are small sized particles ranging in size from 10 to 100nm. Nanoparticles are used in biomedical applications as they offer many advantages to larger particles including a higher surface to volume ratio and better magnetic properties (McNamara and Tofail, 2017).

Silver nanoparticles (AgNps) are among the most explored nanoparticles, because of their antimicrobial activity against a variety of commensal and pathogenic strains, Silver nanoparticles are believed to be inhibitory against a variety of fungi as well as viruses, in addition to bacterial strains (Mekawey and Helmy, 2017). Through binding to bacterial DNA, proteins, and enzymes, silver inhibits bacterial metabolism, resulting in bacteriostatic effects (Hashim, 2012). Because of their high surface area to volume ratio and special chemical and physical properties, nanoparticles have emerged as novel antimicrobial agents. AgNps interact with one another.With bacteria, you can do a lot of harm to them (Lee and Jun, 2019).

The current study aimed to:

1. To identify the common bacteria isolates from burns and wounds.
2. To identify the isolates that are resistance to antibiotics
3. Determine the antibacterial activity of *Aloe vera* aqueous extract against pathogenic bacterial isolates from wounds and burns infections.
4. Using the *Aloe vera* extract for preparing the Ag NPs
5. Transform Infrared Spectroscopy (FTIR), X-ray Diffractometer (XRD), UV-VIS spectrum, Atomic force microscopy (AFM) and Scanning electron microscope (SEM).
6. Determine the antibacterial activity of *Aloe vera* the nanoparticles against bacterial isolates causing wounds and burns infections (multidrug resistance) by using *Aloe vera* extract.

الخلاصة

اشتملت الدراسة الحالية على جمع 200 عينة سريرية (مسحات مباشرة للحروق والجروح) من فئات عمرية مختلفة خلال الفترة من بداية تشرين الثاني 2020 وحتى نهاية كانون الثاني 2021 من المرضى الراقدين في مستشفى بعقوبة التعليمي ومستشفى البتول في مدينة بعقوبة. تم زراعة العينات على أوساط اكار الدم وماكونكي. وشخصت العزلات البكتيرية باستخدام اوساط انتقائية وتفرقية. ثم أجريت اختبارات البايو كيميائية في تأكيد تشخيص كل من العزلات البكتيرية. اعتماداً على نتائج التشخيصات البايو كيميائية الانواع البكتيرية ظهرت كما يلي:

Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa, Klebsiella pneumoniae, Escherichia coli, Proteus . mirabilis and Acinetobacter baumannii

تم اختبار الحساسيه لمضادات الميكروبات لجميع العزلات البكتيرية المختلفه ل 14 مضاد للميكروبات باستخدام طريقه الانتشار القرصي وأظهرت النتائج ان العديد من العزلات البكتيرية كانت متعدده المقاومه للمضادات الحيويه (MDR).

تعتبر طريقه التخليق الحيوي للجسيمات النانويه مجالاً مهماً للغاية نظراً لفوائدها الاقتصاديه والصديقه للبيئه ، تم إجراء التخليق الحيوي لجسيمات الفضة النانويه بواسطه نترات الفضة (AgNo3) كمولد والمستخلص المائي لنبات الصبار كعامل اختزال ، وكان اللون الذي تغير من الأصفر الفاتح إلى البني الغامق مؤشراً على تكوين جسيمات الفضة النانويه.