Study on *Pseudomonas aeruginosa* Isolated from Infected Patients: Copper Uptake, Hematological Findings and Effect of Some Medicinal Plants

By

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A thesis submitted for the requirement of the award of M.Sc. degree in Clinical Microbiology

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April, 2004
بسم الله الرحمن الرحيم

" و ما أوتيتم من العلم إلا قليلا 

صدق الله العظيم
DEDICATION

TO
MY PARENTS
MY WIFE
MY BROTHER
AND MY SISTERS
ACKNOWLEDGEMENTS

I would like to express my deepest thanks to my supervisors Dr. Humodi A. Saeed of Sudan University of Science and Technology; furthermore, it is not enough to thank the help and advice given by Prof. Muayad M. Abboud and Prof. Khaled A. Al-Tarawneh. Their continuous support is highly appreciated and noted. Many thanks and appreciation are due to Dr. Khaled M. Khleifat of Mutah University, who was a good supporter with his knowledge and experience, who gave me a lot of his time. Thanks are also to the member of the staff of the department of Biological Sciences of Mutah University, especially Mr. Yasseen Al-Ghayse. Thanks are also to the staff members in the Faculty of Science in Sudan University of Science and Technology for their help during my work on this thesis. Thanks are also noted to Dr. Farah Al-Nasir and Mr. Mohammed Al-Bostangi of Faculty of Agriculture of Mutah University. Sincere thanks are also to the staff members in Al-Basheer hospital in Amman / Jordan, for their help and training.

Last but not least, I would like to thank all those, who helped me in a way or another during the preparation of these study.
Abstract

A local strain of *Pseudomonas aeruginosa* was isolated from a patient suffering from burns. The isolated strain was characterized by morphological and biochemical examinations.

This bacterial strain showed high copper uptake when inoculated and incubated with different copper sources such as cupric chloride dihydrate, cupric nitrate 3 hydrate and cupric sulfate, respectively.

A comparison with two other species of bacteria indicated that the copper uptake by *Pseudomonas aeruginosa* was significantly higher than that of *Bacillus thurengenesis* or *Enterobacter aerogenes* (P<0.05). The minimum concentration of copper compound that gave 50% copper uptake was shown to be the lowest in *Pseudomonas aeruginosa*, irrespective of the copper compound being used as a copper source.

An attempt was made to investigate the possible effect of certain medicinal plants and commercial antibiotics on the growth of *Pseudomonas aeruginosa*. Out of 18 different medicinal plants examined, only *Thymus capitatus* (30 mg) gave a zone of inhibition 10mm. These medicinal plants were shown to be more effective against *Bacillus thurengenesis* and *Enterobacter aerogenes* in comparison to *Pseudomonas aeruginosa*.

The hematological findings indicated that patients infected with *Pseudomonas aeruginosa* have significant differences in comparison to the control gave in the several parameters examined serum copper (P<0.05), serum iron (P<0.05), Iron binding capacity (P<0.05), serum ceruloplasmin (P<0.05) and serum transferring (P<0.05). Two types of control groups were used, healthy individuals and uninfected patients who had burn injury.
ملخص

تم عزل بكتيريا الزائفة الزنجارية (Pseudomonas aeruginosa) من مريض يعاني من الحروق الملتهبة و قد تم التعرف عليها عن طريق دراسة الشكل الظاهري والفحوصات البيوكيميائية وقد اظهرت هذه السلالة من البكتيريا مقدرة عالية لإمتصاص معدن النحاس من الوسط المحيط بها عندما تم حقنها وتحضينها على عدد من المركبات كمصادر للنحاس وهي كلوريد النحاس، نترات النحاس، كبريتات النحاس على التوالي.

كما لوحظ أن لهذه السلالة مقدرة لإمتصاص النحاس أعلى من نوعي البكتيريا (Bacillus thurengensis) والذين تم استخدامهما للمقارنة. وقد وجد أن هذه السلالة تحتاج إلى تركيز أقل من المركبات الثلاثة المستخدمة السابقة الذكر للوصول إلى 50% من الامتصاص إذا ما قرونت بالنوعين الأخرى المستخدمين للمقارنة.

ولوحظ أيضا أن لهذه البكتيريا مقاومة عالية للمصادعات الحيوية والنباتات الطبية مقارنة مع البكتيريا الأخرى. إذ تم دراسة تأثير ثمانية عشر نبات طبي على نمو هذه البكتيريا وكان نبات الزعتر (Thymus capitatus) الوحيد الذي أظهر تأثيراً واضحاً على نمو هذه البكتيريا. وبالمقابل فقد اظهرت هذه النباتات تأثيراً على البكتيريا الأخرى المستخدمة للمقارنة.

أظهرت الدراسة أيضاً أن هناك فروقات واضحة في تركيز كل من النحاس وال الحديد وبعض بروتينات الدم مثل (Ceruloplasmin) و (Transferrin) في مصل الدم للمرضى المصابين بهذه البكتيريا إذا ما قورنت بتركيزها في مصل الدم لكل من الأشخاص الإصحاء والمرضى المصابين بالحروق وبدون عدوى أيضاً.
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