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

By

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DEDICATION

TO
MY PARENTS
MY WIFE
MY BROTHER
AND MY SISTERS

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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 thurengensis* 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 thurengensis* 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 transferrin ($P < 0.05$). 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 البكتريا مقدرة عالية لامتناس معدن النحاس من الوسط المحيط بها عندما تم حقنها وتحسينها على عدد من المركبات كمصدر للنحاس وهي كلوريد النحاس ، نترات النحاس و كبريتات النحاس على التوالي .

كما لوحظ أن لهذه السلالة مقدرة لإمتصاص النحاس اعلى من نوعي البكتريا (*Enterobacter aerogenes*) و (*Bacillus thurengensis*) والذين تم استخدامهما للمقارنة. و قد وجد أن هذه السلالة تحتاج الى تركيز أقل من المركبات الثلاثة المستخدمة السابقة الذكر للوصول الى 50% من الامتناس اذا ما قورنت بالنوعين الاخرين المستخدمين للمقارنة.

ولوحظ ايضا أن لهذه البكتريا مقاومة عالية للمضادات الحيوية والنباتات الطبية مقارنة مع البكتريا الاخرى . إذ تم دراسة تأثير ثمانية عشر نبات طبي على نمو هذه البكتريا وكان نبات الزعتر (*Thymus capitatus*) هو الوحيد الذي اظهر تأثيراً واضحاً على نمو هذه البكتريا وبالمقابل فقد اظهرت هذه النباتات تأثيراً على البكتريا الاخرى المستخدمة للمقارنة .

اظهرت الدراسة ايضا أن هناك فروقات واضحة في تركيز كل من النحاس والحديد وبعض بروتينات الدم مثل (Ceruloplasmin) و (Transferrin) في مصل الدم للمرضى المصابين بهذه البكتريا اذا ما قورنت بتركيزها في مصل الدم لكل من الاشخاص الاصحاء والمرضى المصابين بالحروق وبدون عدوى ايضاً.

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