Bioactivity of Curcumin Extract Against of Some Pathogenic Strains

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Received on:13/3/2011
Accepted on:2/6/2011

Abstract

Dried powder was extracted with ethanol. Crude ethanolic extract of Curcmin was tested against number of microorganisms (gram positive bacteria (*Staphylococcus aureus*), and gram negative bacteria (*E. coli*, *Pseudomonas*, and *Klebsiella*)) . The antibacterial activity of the extract was evaluated against bacteria using disc diffusion method. Results were compared to commercial antibiotics, penicillin. The ethanolic extract showed a broad spectrum of antibacterial activity and the *Pseudomonas aeruginosa* was the most sensitive bacteria. Further studies on the isolation and characterization of the Curcumin and its antibacterial properties in progress.

Keywords: Antibacterial activities, Curcumin, soxhlet extraction, Staphylococcus aureus.

الفعاليات الحيوية للكركمين ضد بعض ضروب البكتريا المرضية

حمدان عبود عداي

الخلاصة

تم استخلاص ودراسة الفعالية الحيوية لمادة الكركمين وتمت عملية تشخيص مكونات الكركمين الثلاثة بوساطة كروتوغرافيا الطبقة الرقيقة TLC ودرست الفعالية المضادة للجراثيم لكل من الليكاندات ومعقداتها على أربعة أنواع من البكتريا (*Staphylococcus aureus, E. coli, Psedomonas, and Klebsiella pneumoniae*) الفعالية المضادة للبكتريا المستخلص تم تقييمها ضد البكتريا باستخدام طريقة الانتشار القرصي. قورنت النتائج مع المضادات التجارية مثل البنسلين. عرض المستخلص الايثانولي طيف واسع للفعالية المضادة للبكتريا. دراسات أكثر على فصل وميزة الكركمين وخواصها المضادة للبكتريا في طور التقدم.

Introduction

Products have been used extensively throughout history to treat medical problems. Numerous studies have been carried out to extract various natural products for screening antimicrobial activity (1-5). Medicinal plants are an important therapeutic aid for various ailments. Scientific experiments on the antimicrobial properties of plant components were first documented in the late 19th century (6). In India, from ancient times, different parts of medicinal plants have been used to cure specific ailments. Today there is widespread interest in drugs derived from plants. This interest

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https://doi.org/10.30684/etj.29.10.18
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primarily stems from the belief that green medicine is safe and dependable, compared with costly synthetic drugs that have adverse effects. Natural antimicrobials can be derived from plants, animal tissues, or microorganisms (7). The shortcomings of the drugs available today, propel the discovery of new pharmacotherapeutic agents in medicinal plants (8). To determine the potential and promote the use of herbal medicine, it is essential to intensify the study of medicinal plants that find place in folklore (9,10).

The use of herbs and medicinal plant as the first medicines is a universal phenomenon. Every culture on the earth, through written or oral tradition, has relied on the vast variety of natural chemistrie's found in plants for their therapeutic properties. All drugs from the plant are substances with a particular therapeutic action extracted from plants (11). The usage of herbal plants as traditional health remedies is the most popular for 80% of the world population in Asia, Latin America and Africa and is reported to have minimal side effect (12).

Materials and Methods

Plant extraction

Dried powder (50 g) of curcumin was extracted in soxhlet apparatus with 500 ml of 95% ethanol. The soxhelation process was carried out until the solvent was found to be colorless. The dark brown ethanolic extract was then filtered, concentrated using a rotary eaporator.

Thin layer chromatography (TLC)

The plant extract was spotted onto a silica gel TLC plate (Kieselogel 60 F254 0.2 mm, Merck).

Chloroform:Benzene:methanol (60:30:10) as mobile phase. Spots were visualized by iodine.

Antimicrobial activity assays

Different test microorganisms were used which are: *Escherichia coli, Pseudomonas aeruginosa, Klebsiella, and Staphylococcus aureus.*

All test microorganisms were collected from Biotechnology division, Department of applied science, University of Technology. The identity of all the strains was confirmed. The *ethanolic curcmin extract was* weighed and dissolved in dimethylsulfoxide (DMSO) to prepare extract stock solution of 100 mg/ml.

The antibacterial activity of the *ethanolic curcmin* extract was studied against selected types of bacteria, in brain hart broth agar media, which is used DMSO as a solvent and as a control for the disc sensitivity test (13,14). This method involves the exposure of the zone of inhibition toward the diffusion of micro-organism on agar plate. The plates were incubated for (24 h) at 37°C. The antimicrobial activity was recorded as any area of microbial growth inhibition that occurred in the diffusion area. The quantitative antibacterial activity

assay was performed by the nutrient broth for bacterial.

Minimum inhibitory concentration (MIC) evaluation

The MIC was evaluated on plant extract that showed antimicrobial activity. This test was performed at four concentrations of the extract employing the same agar well diffusion method.

Results and Discussion

Thin layer chromatography

The R_f value of the tested extract were 0.7, 0.6 and 0.5 and that mean there are three compounds in the extractant and according to the literatures (18) the compounds are curcumin, demethoxycurcumin and bisdemethoxycurcumin.

Antimicrobial activity of ethanolic extract of Curcumin

The antibacterial activities of the plant extract were evaluated by measuring the inhibition zone observed around the tested materials. In agar diffusion assay, the ethanolic extract of the plant showed considerable activity against all tested bacteria (figure 1).

Conclusions

The ethanolic extract of *curcumin* showed good antibacterial activity against Gram positive and Gram negative bacteria.

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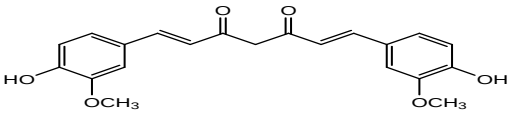
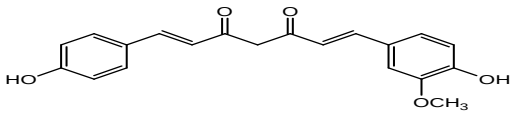


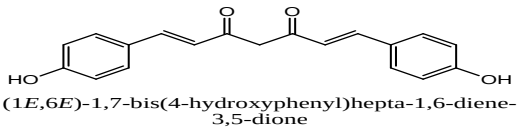
(1*E*,6*E*)-1,7-bis(4-hydroxy-3-methoxyphenyl)hepta-1,6-diene-3,5-dione

Curcumin



(1*E*,6*E*)-1-(4-hydroxy-3-methoxyphenyl)-7-(4-hydroxyphenyl)hepta-1,6-diene-3,5-dione

Demethoxycurcumin



(1*E*,6*E*)-1,7-bis(4-hydroxyphenyl)hepta-1,6-diene-3,5-dione

Bisdemethoxycurcumin

Scheme 1

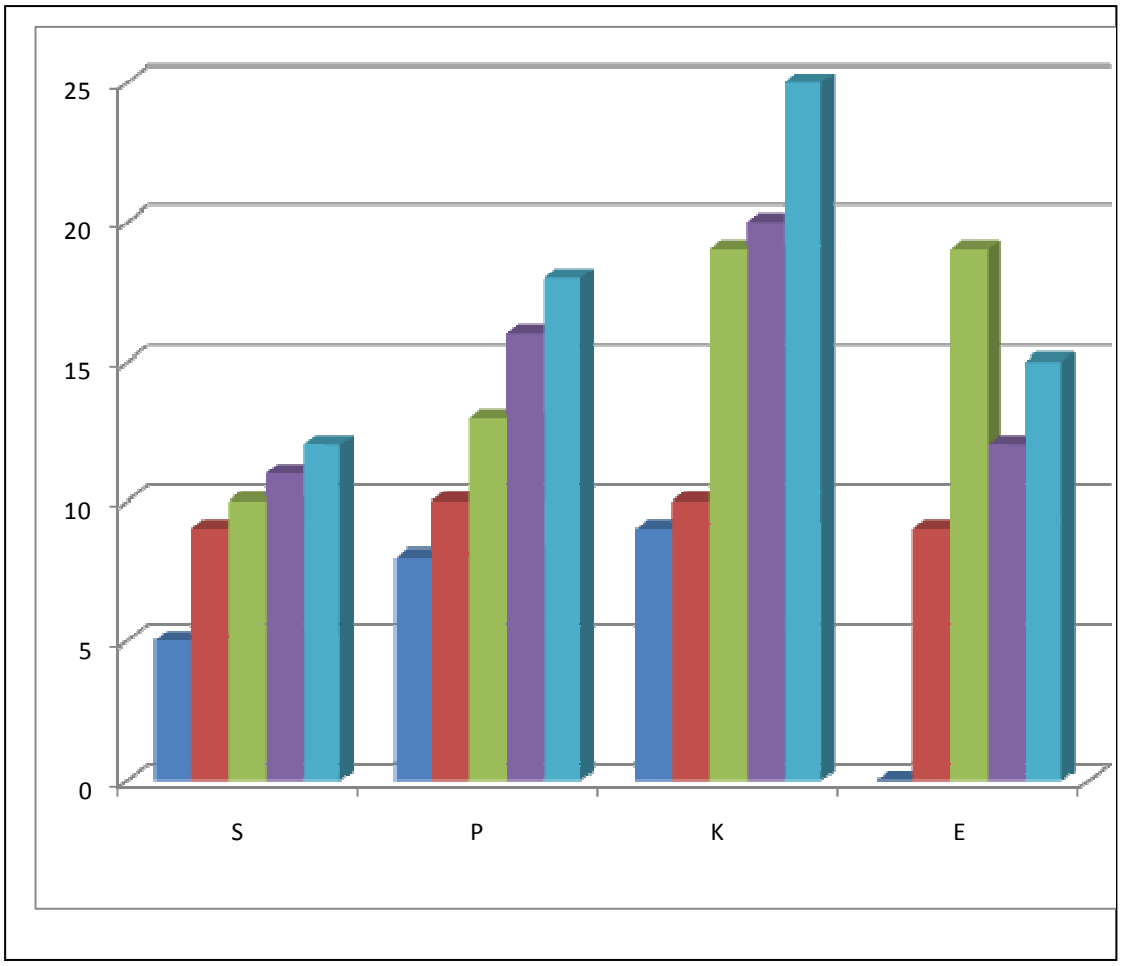
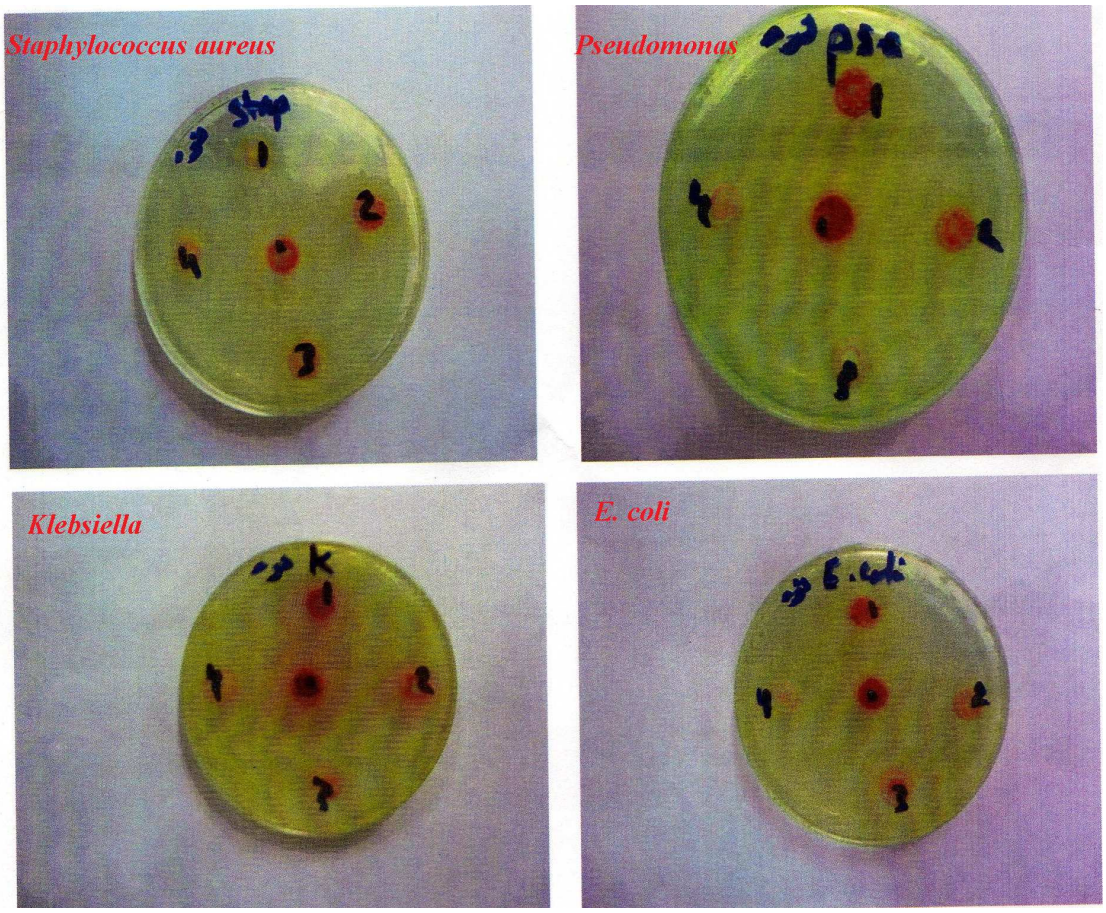


Figure 1: The antibacterial activity of Curcumin ethanolic extract.

S	*Staphylococcus*
p	*Pseudomonas aeruginosa*
K	*Klebsiella*
E	*Echerichia*

Inhibition Zone (mm)



Concentrations in (µg/mL.)