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In Vitro Efficacy of *Acacia seyal* Delile *(*Altalh*)* Wood Extract against Four Bacteria Isolates

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Abstract

Acacia seyal known also as the tree (*Altalh*). the bark is used to treat dysentery and bacterial infections of the skin, such as leprosy , the wood is used to treat pain from rheumatism. *Acacia seyal* wood extracted using Bilola instrument which showed effective antibacterial activity against *Xanthomonas citri*, *Xanthomonas pmalvacearum*, *Escherichia coli*, and *Staphylococcus aureus*, the maximum inhibition zone observed 11.8mm, 12.6, 14.6mm, and 17.2mm, respectively.

Keywords: Bilola instrument, *Xanthomonas citri*, *Escherichia coli Staphylococcus aureus*, *Xanthomonas pmalvacearum*

الفعالية المختبرية لمستخلص خشب السنط السيال (الطلح) ضد أربع عزلات من البكتيريا

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المستخلص

السنط السيال المعروف ايضا بشجرة (الطلح) , يستخدم لحاءه في علاج الدسنتاربا والالتهابات الجلديه البكتريه مثل الجزام ,كما يستخدم خشبة في علاج الام الروماتيزم .تم استخلاص خشب السنط السيال بأستخدام جهاز بلولا الذي أظهرفعاليه مضادة للجراثيم ضد الزانثوموناس سيتري و الزانثوموناس بمالفاسيروم والاشريكيه القولونيه والمكورات العنقوديه الذهبيه وبلغت منطقة التثبيط القصوي 11.8مم , 12.6 مم, 14.6 مم, 17.2 مم علي التوالي .

الكلمات المفتاحية: جهاز بلولا , زانثوموناس سيتري , الاشريكيه القولونيه , المكورات العنقوديه الذهبيه, زانثوموناس بمالفاسيروم

Introduction:

Acacia seyal known also as the tree (*Altalh*). It is a woody thorny tree with a pale greenish or reddish bark. The bark is used to treat dysentery and bacterial infections of the skin, such as leprosy. It is also used as a stimulant. Incense from the wood is used to treat pain from rheumatism and to keep expectant mothers from contracting rhinitis and fevers. (Young *et al.,* 1996). The extracts of the wood of *Acacia seyal* showed in vitro anti-malarial (Muthaura *et al.,* 2015), anti-micro bacterial and cyclooxygenase inhibition (Eldeen and Van.2008), antibacterial (Eldeen and Van, 2007), and anticancer activities (Saeed *et al.,* 2015). It was revealed that the metabolites of leaves, seeds and flowers of *Acacia seyal* rich with of flavonoids and saponononins (Abdel-Farid *et al.,* 2014).

Martials and Method

Martials

Equipment's

Incubator, Oven, Autoclave, Microscope, Benzene burner, Petri Dishes, Slides, Flasks, Wire Loops, Needle, Forceps , beaker dropper, Sensitive balance and Bilola instrument for chemical extraction.

Chemicals and reagents

Nutrient Agar (NA), Peptone, Yeast Extract, Beef Extract, Agar, Distilled Water,

Acacia seyal woods

Samples collection

Acacia seyal woods were collected from the local market EL-Hasahesa, Gezira state, Sudan

Preparation of *Acacia seyal* Extracts

Five gram of *Acacia seyal* woods was weighted by Sensitive balance put in Bilola instrument extraction for chemical extraction and collected directly from the condenser.

Bilola instrument for chemical extraction

Bilola instrument for chemical extraction is a new instrument invent by Dr. Almahi(2021-4414).

The instrument consists of burner, burner unit and condenser. The instrument technique depends on burning or boiling the sample on the unit and condensed in a condenser directly as liquid or collected by solvents after condensed on the wall of the condenser due to the solubility.

Sources of the bacterial isolates

The human bacteria (*Staphylococcus aureus* and *Escherichia coli*) was brought supplied from Faculty of Medical Laboratories at University of Al-butana, Rufa`a, Gezira state, Sudan in December 2021.

The plant bacteria (*Xanthomonas citri* and *Xanthomonas pmalvacearum*) were brought supplied from Laboratories of Faculty of Agriculture, University of Gezira, Wad Medani, Gezira state - Sudan in November2022.

Human Bacteria Isolate

Soluble of bacteria in distilled water take one ml of each bacterial suspension was spread on nutrient agar medium. Filter disks (2cm in diameter) each saturated by extract were placed in the middle of each plate and incubated for 24hrs hours at 30^{o}C and followed for inhibition zones (Onions *et al.,* 1981)

Plant Bacteria Isolate

Several small pieces were taken from the sides of the affected tissue in the form of squares or sections measuring 1-2 cm so that they contain infected and healthy tissues. These sections were placed in a container containing ethanol provided that the papers are immersed. The sections are transferred used sterile forceps from the sterile solution paper until the excess disinfectant solution is removed on the surface, or they are washed in sterile water three times in row. The sterile sections are placed on a nutritious environment by 3-5 sections in each glass dishes, then the dishes are left for a period ranging from 24-48 hours until the bacteria colonies grow on the food environment and then these colonies are transferred to other environments to further study the characteristics of the pathogenic organism **(**Hari *et al*.,1998)

Results and Discussion

Results

The *Acacia Seyal* wood extract effect against the growth of four different bacterial isolates:

The *Acacia Seyal* wood extract possessed antimicrobial activities against *Staphylococcus aureus*, *Escherichia coli*, *Xanthomonas pmalvacearum* and *Xanthomonas citri* inhibition zone observed were 17.2, 14.6, 12.6 and 11.8 respectively (Table 1).

The inhibition zone of the bacteria by *Acacia seyal* wood extract is shown in figure (1 to 5):

The inhibition zone test of *Acacia seyal* wood extract showed *Escherichia coli* bacteria in figure (1), *Staphylococcus aureus* bacteria in figure (2), *Xanthomonas citri* bacteria in figure (3) and *Xanthomonas pmalvacearum* bacteria in figure (4). While in figure (5) shows the relationship between bacteria and inhibition zone.

Table (1): Effect of *Acacia Seyal* Wood Extract on the Growth of Four Different Bacterial Isolates

Test Organisms	Zone of Inhibition (mean diameter (mm)
Staphylococcus aureus	17.2
Escherichia coli	14.6
Xanthomonas citri	11.8
Xanthomonas pmalvacearum	12.6

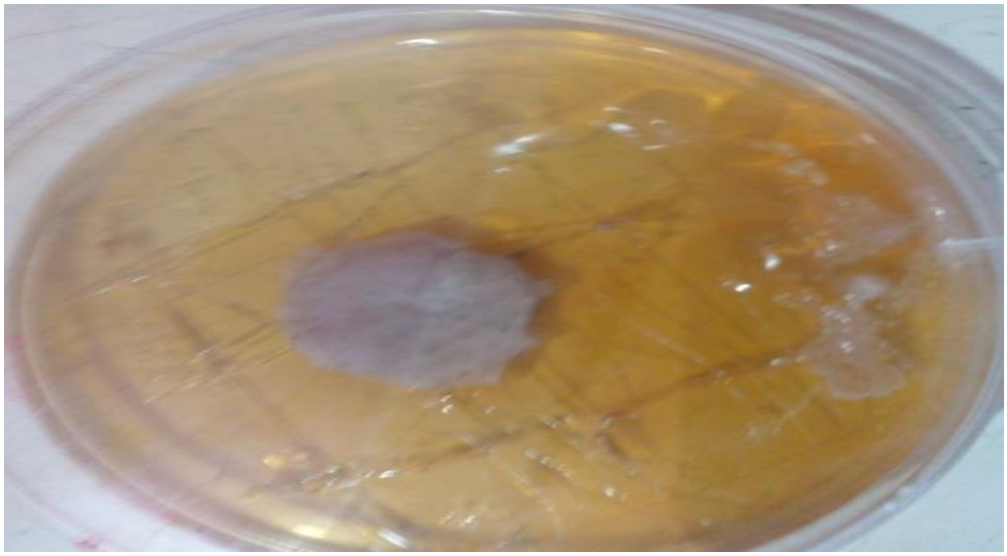

Fig (1) Showing Inhibition Zone diameters of *Acacia seyal* against Bacteria *Escherichia coli*

Fig (2) Showing Inhibition Zone diameters of *Acacia seyal* against Bacteria *Staphylococcus aureus*

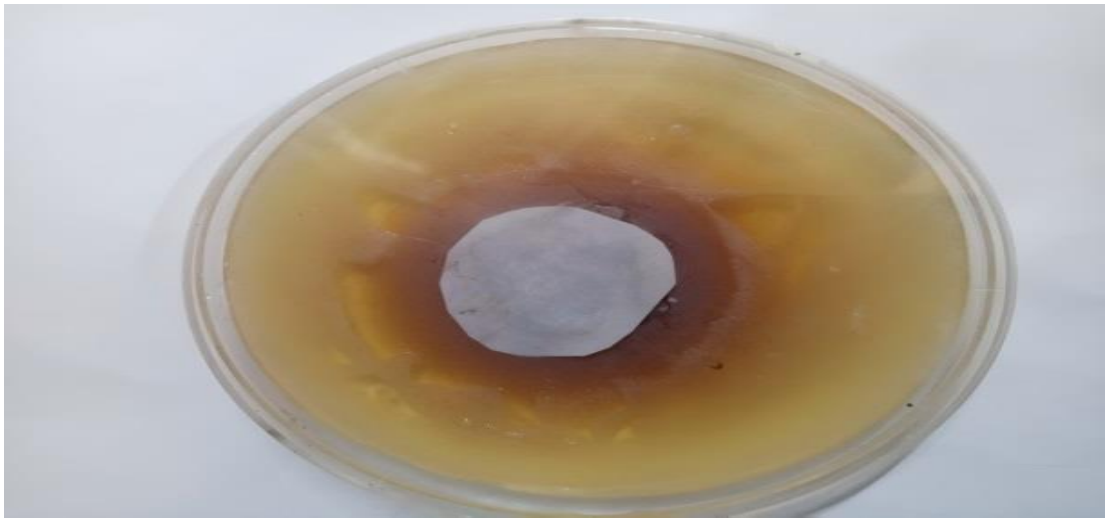

Fig (3) Showing Inhibition Zone diameters of *Acacia seyal* against Bacteria *Xanthomonas citri*

Fig (4) Showing Inhibition Zone diameters of *Acacia seyal against Bacteria Xanthomonas pmalvacearum*

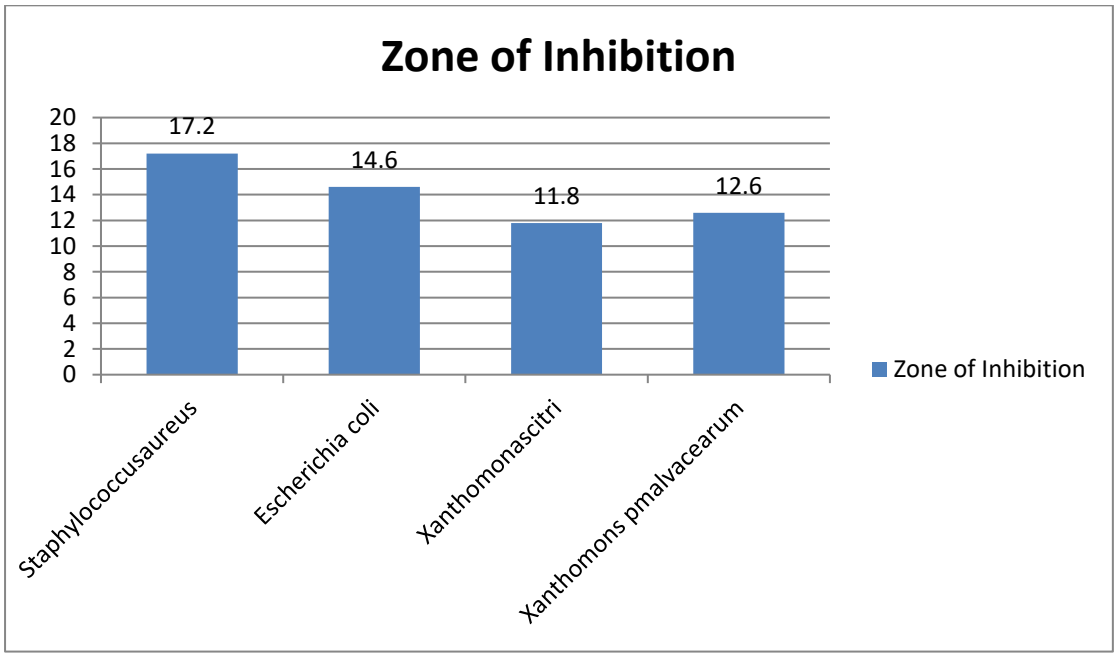

Fig (5) Effect of *Acacia seyal* wood Extract on the Growth of Four Different Bacterial Isolates

DISCUSSION:

This study was conducted four bacterial isolates to find out the effect of *Acacia seyal* wood extract extracted using the Bilola instrument aganist four bacterial isolates which are *Staphylococcus aureus, Escherichia coli, Xanthomonas citri* and *Xanthomonas pmalvacearum.* The maximum inhibition zone observed were *Xanthomonas citri* 11.8mm, *Xanthomonas pmalvacearum*12.6mm, *Escherichia coli* 14.6mm and *Staphylococcus aureus* 17.2mm see (Table 1). In contrast, these findings were semi compared to a study by Hatil and Moneer (2006) the maximum zone of inhibition was observed against *Escherichia coli* 30mm and minimum was against *Staphylococcus aureus* 23mm. This result was in accordance with that obtained by Hatil and Banga (2014) who found that *Acacia seyal* sensitivity of five clinical bacterial isolates (*Staphylococcus aureus, Escherichia coli, Klebsilla sp., Pseudomonas aeruginosa and Proteus sp*) the Minimum Inhibitory Concentration of ranged from <5 to >20 mg/ml. While Abdirahman *et al.,* (2020) found that *Acacia seyal* extract has anti-bacterial, antioxidant activities and Cyto-toxicity. René *et al.,* (2020) reported *Acacia seyal* extracts (leaves, root bark and trunk) was to have antimicrobial properties. Elamin *et al.,* (2022) reported that *Acacia seyal* of stem extract has efficacy in medicinal field as anti-diabetic, antimicrobial, and anti-inflammatory.

Conclusions and Recommendations:

Conclusions:

The *Acacia seyal* extract in this study has anti-bacterial properties was inhibition growth of four different bacterial isolates like *Staphylococcus aureus, Escherichia coli, Xanthomonas citri* and *Xanthomonas pmalvacearum*.

Recommendations:

The study recommended studying the effect of *Acacia seyal* extract on fungi.

Recommended to study the effect of *Acacia seyal* seeds on bacteria .

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