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ABSTRACT

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I. INTRODUCTION

Adansonia digitata L. belongs to the Malvaceae family [1]. which consists of around 20 genera and 180 species. The tree species is widespread throughout tropical Africa's hot-dry regions [2; 3]. It extends from Northern Transvaal and Namibia to Ethiopia, Sudan, and the Southern Fingers of the Sahara. The baobab tree is found in Sudan in sandy soils, streams, grasslands, and in low savannahs. It is a deciduous tree massive, royal tree. It has thick, angular, wide spreading branches and a short, stout trunk, and often becomes deeply fluted [2].

Literature reviews on baobab published biochemical analyses revealed that the leaves, the seeds, and the pulp from baobab are rich in nutrients and it is used as food sources, especially for rural people [4; 5; 6]. *Adansonia digitata* is used in the medical and fishing fields. The fruit consists of large seeds embedded in a dry, acidic pulp and shell [7], the pulp is used in preparing cool drinks or sucked in rural areas. The fruit pulp has a very high vitamin C content; it contains sugars but no starch and is rich in pectin. However, the vitamin C content of the bulk fruit pulp varies from 1623 mg/kg-1 in one to 4991mg/kg-1 in another tree [8].

The baobab tree is a good source of vitamin C, iron calcium, and pectin. Its vitamin C content has been compared with oranges and found that it is about three times higher [8], reported that the fruit pulp may also serve as a calcium supplement because of its high calcium content; moreover, Leaves and seeds are identified as good sources of vitamins and minerals [9], reported that the knowledge of nutrition value of local dishes, soup ingredients, and local foodstuffs are necessary to encourage the increase in cultivation and consumption . According to [10] literature review revealed a great variation in reported values of nutrient contents of the baobab part which may be due to the quality of the sample, Papaya is used as food for African peoples and is used to improve the nutritional value of foods. This suggests that the ecological provenance of the baobab does not induce variability in the nutritional concentration of its parts [7].

II. MATERIALS AND METHOD

2.1. Collection of the samples

The plant material was collected from the Omdurman area, Khartoum state. This plant was identified in Herbarium (28.75cm . 41.25cm) by the Department of Biology, Faculty of Science, Benghazi University, Al Marj, Libya.

2.2. Preparation of the extracts

The seeds and pulp were air-dried at room temperature, and ground into a fine powder using an electric blender. The powder used was transferred into closed containers. Each powdered air-dried plant material was extracted with water and methanol. Five grams (5g) of each powdered sample was mixed in a conical flask with 100mL of deionized water or organic solvent, plugged, then shaken at 100 rpm for 24 hours, each of the extracts was filtered rapidly through the gauge and then by No. 1 Whatman filter paper. The filtrates were then concentrated in a rotary evaporator [11; 12].

2.3 Test organisms

Escherichia coli, *Staphylococcus aereus* and, *Klebsiella pneumoniae*. The bacterial strains obtained from Al Marj hospital.

2.4. Antibacterial Screening Method

To objectively evaluate the antimicrobial activity of the baobab (Adansonia digitata) extracts, the following microorganisms were tested: Gram-negative – *Escherichia coli* and *Klebsiella pneumonia*; Gram-positive - *Staphylococcus aureus*, were cultivated and stored in Nutrient Agar (NA) bacterial cultures incubated for 24 hours at 37° C. Muller-Hinton agar medium was used for bacterial growth. The agar diffusion method was used to accurately assess the antimicrobial activity of the extracts Equip the bacterial suspension by taking from 3-5 colonies of bacteria and putting in 3-4 ml Normal saline. Then, we took from the suspension 100 µl and put it in all agar plates with a sterile cotton swab containing bacterial cultures incubated for 24 hours at 37° C [13; 14]. Then, the extracts were applied directly on agar plates using the drop method (100 µL), [4; 5]. Next, the prepared extracts were poured into the well in the standard concentration (100 µL). The dishes were placed in incubation for 24 hours at a temperature of 37°C. The measurements of the inhibition zones of the dishes were taken. All tests performed in triplicate and clear zones greater than 7 mm were considered positive results because the Cork borer was 7 mm in diameter [15; 5].

III. RESULTS AND DISCUSSION

The best result was the extracts of the baobab pulp dissolved in methanol more than the extracts of baobab seeds dissolved in methanol. Perhaps the reason is that the active substances are found at higher rates in the pulp of the plant than in the seeds. Methanol extracts gave better results than distilled water extracts. *Staphylococcus aureus* bacteria were more affected than other bacteria (24.45 mm) at 100 µl compared with Klebsiella pneumonia and *Escherichia coli*. This may be due to the difference in the structure of the cell wall between positive and negative bacteria, where the effect of the extract is on the cell membrane. Raw organic analysis of bacterial cell wall. We observed that the greater the concentration the greater the diameter of the inhibition zone, where concentrations were used: 40µl & 80µl & 100 µl & 120 µl. Table (1,2,3,4)

Table 1: Effect of Different Concentrations of Methanol Extract of Baobab pulp on Growth of Bacteria

Bacteria	40µl	80µl	100µl	120µl
Escherichia coli	18.36	21.72	22.66	24.37
Staphylococcus aureus	19.51	21.45	24.45	25.25
Klebsiella pneumonia[e]	19.24	21.53	23.45	25.28

Diameter of the well 7 mm - average diameter of the inhibition zones in mm - at least 6 replicates

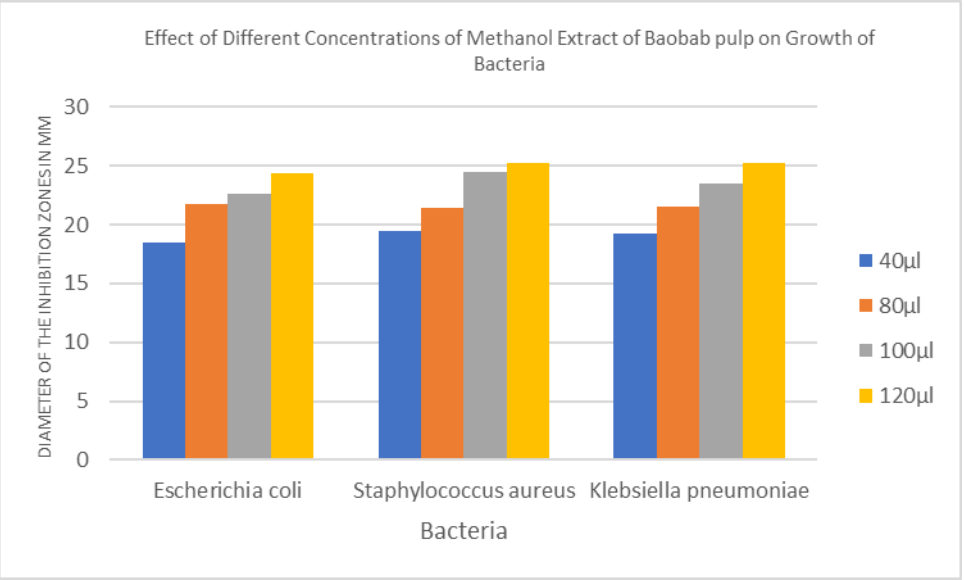


Table 2: Effect of Different Concentrations of Distilled Water Extract of Baobab pulp on Growth of Bacteria

Bacteria	40µl	80µl	100µl	120µl
Escherichia coli	16.4	17.38	18.27	25.39
Staphylococcus aureus	18.44	19.59	24.42	25.55
Klebsiella pneumoniae	14.51	16.2	21.20	22.65

Diameter of the well 7 mm - average diameter of the inhibition zones in mm - at least 6 replicates

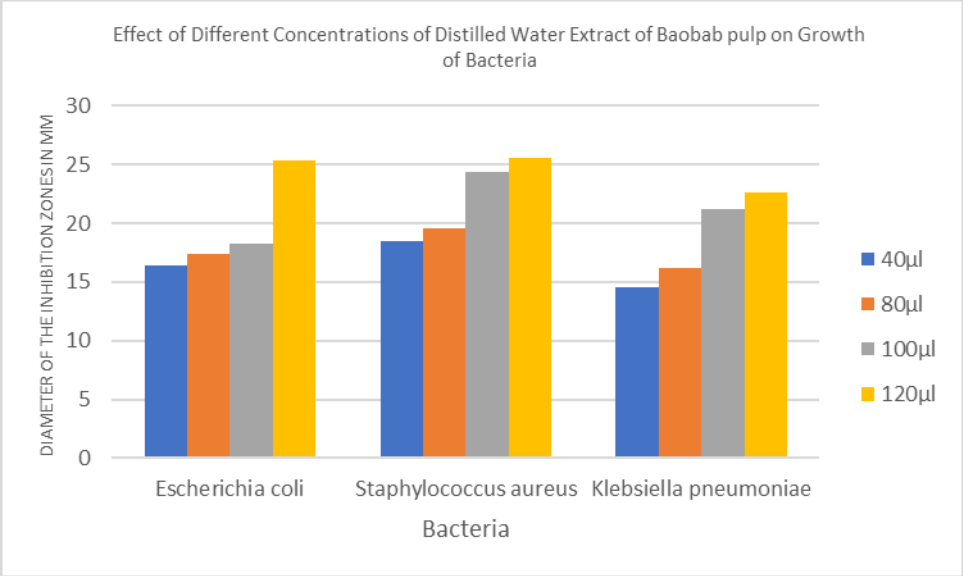


Table 3: Effect of Different Concentrations of Methanol Extract of Baobab Seed on Bacterial Growth

Bacteria	40µl	80µl	100µl	120µl
Escherichia coli	11.41	12.21	13.33	14.46
Staphylococcus aureus	11.61	17.55	18.35	22.35
Klebsiella pneumoniae	11.53	12.1	14.41	15.54

Diameter of the well 7 mm - average diameter of the inhibition zones in mm - at least 6 replicates

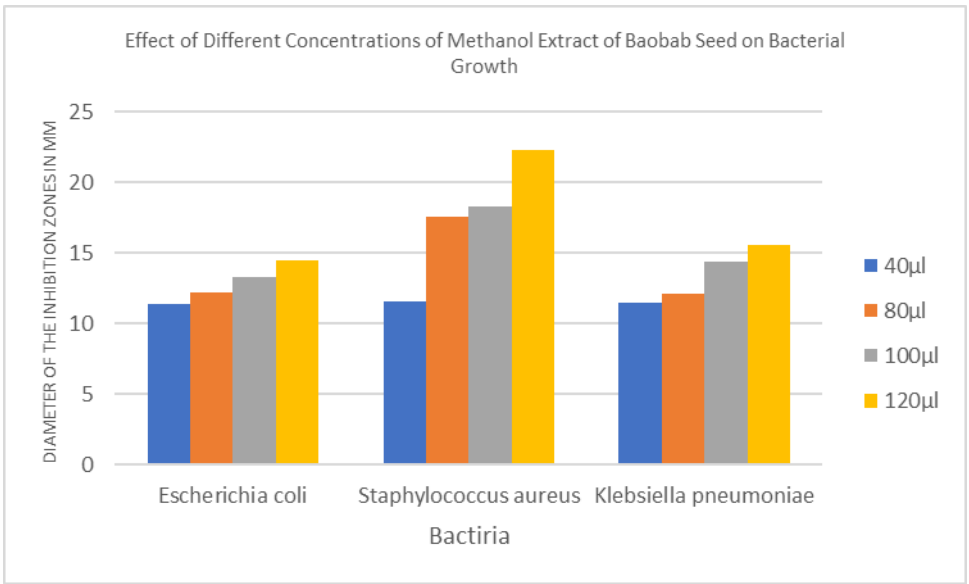
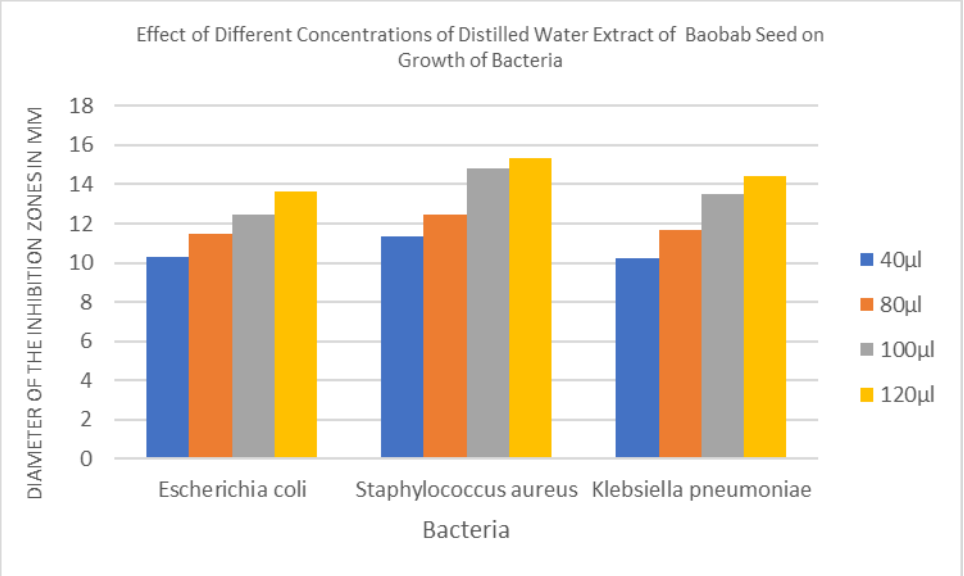


Table 4: Effect of Different Concentrations of Distilled Water Extract of Baobab Seed on Growth of Bacteria

Bacteria	40µl	80µl	100µl	120µl
Escherichia coli	10.32	11.50	12.44	13.65
Staphylococcus aureus	11.33	12.46	14.85	15.33
Klebsiella pneumoniae	10.22	11.66	13.50	14.45

Diameter of the well 7 mm - average diameter of the inhibition zones in mm - at least 6 replicates



IV. CONCLUSIONS

In conclusion, the antibacterial activity of baobab methanol extracts was found to be high for Gram-positive and Gram-negative strains. So, we can conclude that the activity varies according to the plant's species and the type of solvents used for extraction. Different solvents with different polarities may result in the extraction of different types of biologically active compounds from plants. These bioactive compounds may go and bind to the microbes' cell walls, leading to the inhibition of their growth.

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