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Extraction, Characterization and Evaluation of the Plant Extract of Tamarix as an Antibiotic to Treat Types of Burns Bacteria

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***Abstract*---**Background: Tamarixaphylla (L.) is included in our common and large species, the genus Tamarix L. belongs to the Tamaricaceae family. Tamarix species are employed in traditional medicine as astringent, aperitif, stimulus of perspiration and diuretic.leaves are considered as a source for curing different infectious diseases. (Marwat et al 2003, Panhwar et al 2007), The good antimicrobial activities of medicinal plants are due to the presence of secondary metabolites., Aim of study To find out the antimicrobial activity of the aqueous and alcoholic extracts of tamex in the bacterial species S. epidermidis, s. mutanss, s. aureas, E. coli and burns infections, Material and methods: Chemical detection of active compounds were investigated The presence of active compounds and used agar diffusion method is used to test the effectiveness of the

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extracts as antibacterial, Results and discussion: The presence of these compounds in extracts of the Tamex plant, which are compounds that have an effective effect in inhibiting the growth of various microorganisms, is important because most of the therapeutic effects are attributed to them. The anti-microbiological activity of aqueous and alcoholic Tamex plant extracts in bacterial species (S. epidermidis, s. mutanss, s. aureas, E. coli), that the highest inhibition diameter of 18 mm for alcoholic extract in bacteria s. aureas and the lowest diameter of inhibition of 12 mm for aqueous extract in bacteria E. coli As for the diameter of inhibition for bacteria S. epidermidis. conclusion :The presence of effective groups of the aqueous and alcoholic extracts of Tamex plant, which has a significant inhibitory effect on the different types of bacteria, The alcoholic extract of the plant is more effective than the aqueous extract on bacteria s. aureasIt is a bacterium that causes burns infections.

***Keywords*---**antibiotic, antimicrobial activities, plant extract, tamarix.

Introduction

Tamarixaphylla (L.) is included in our common and large species, the genus Tamarix L. belongs to the Tamaricaceae family. This tree is mostly planted on roadside (Lefahal et al 2010). They are relatively long-lived plants that can tolerate a wide range of environmental conditions and resist a biotic stresses such as high temperature, salt, and drought stresses (Abdallah Emad et al 2013). Tamarixaphylla (L.) Is used as medicinal plant, Tamarixspecies are employed in traditional medicine as astringent, aperitif, stimulus of perspiration and diuretic. leaves, stem and twigs are preferred for different diseases with no side effects by local practitioners in the country. Thus, leaves are considered as a source for curing different infectious diseases(Ahmad et al 2009 ، Panhwar et al 2007, Patri et al 2017) , The good antimicrobial activities of medicinal plants are due to the presence of secondary metabolites. is found to be rich in polyphenolic compounds such as flavonoids, phenolic acids, tannins and coumarins , Several researches proved antioxidantand antimicrobial activities of some Tamarix species such as T. ramosissima (Achakzai et al. 2009), phenolics possess a considerable antimicrobial capacity against a large number of pathogenic strains this capacity may inhibition of growth of bacteria could be due to the permeability and thedestruction of the microbial membrane, inhibiting synthesis ofnucleic acids and bacteria inhibiting energy metabolism(Ansari et al 2014 ، Al-Shamma et al 2006). The aim of study To find out the antimicrobial activity of the aqueous and alcoholic extracts of tamex in the bacterial species *S. epidermidis, s. mutanss, s. aureas, E. coli* and burns infections.

Material and Methods

Instruments

Table 1
Employed instruments countries of origin

No.	Apparatus	Country
1	Electrical balance Denver	Germany
2	Grinder	China
3	Water distiller Gfi	Korea
4	Electric shaker	Korea
5	Autoclave labiech	Korea
6	Biological hood fin tech	Korea
7	Spray dryer	Switzerland

Bacterial used

Table 2
Bacteria used with scrotum types for each type

No.	Bacteria	Scrotypes	Reference
1	*E. coli*	ATCC10536	IbnSina Research Center
2	*s. aureas*	ATCC6538	IbnSina Research Center
3	*s. epidermidis*	Clinical isolate	University of Baghdad Department of Biotechnology
4	*s. mutans*	Clinical isolate	University of Baghdad Institute of Genetic Engineering

Methods

Plant classification

The samples were sent to the herbal collection site / College of Science / Department of Biology / University of Baghdad for classification purposes and were shown is tamaixarceuthoides.

Preparation of extracts

- Preparing the alcoholic extract: We weighed 100 g. of powdered leaves of the dry and crush tamarix plant and put it in a round flask and add 70% ethanol in a quantity of 1 liter in a ratio of 1:10 and put it in an incubator shaker for a week (using the soaking method) at room temperature, then filtered with gauze and filter paper. Dry the ethanolic extract using a spray dryer, collect the product and store in bottles, the final product weight is 12 g.
- Aqueous extract preparation: We weighed 100 g. of powdered leaves of the dry and crush tamarix plant and put it in a round flask 1L size and add 500ml distilled water then put it in an incubator shaker for 6 h. (Using the

soaking method) at room temperature, then filtered with gauze and filter paper. Dry the ethanolic extract using a spray dryer, collect the product and store in bottles, the final product weight is 15 g.(Al-Shamma et al 2006)

Chemical detection of active compounds

The presence of active compounds has been investigated using chemical detection methods as follow:

- Detection of Tannins Test: Add 1 ml of water lead acetate (1%) to 1 ml of extract when a white deposit is found, the result is positive indicating the Tannins. (Jawad et al 1998)
- Detection of carbohydrates With Molsch's reagent, mix 1 ml of the form with 5 drops of Alpha Naphthol Alcoholic in tube. Add 2.5 mL of sulfuric acid and a blue ring to indicate the presence of carbohydrates. (Sheel et al 2014)
- Detection of glycosides Test: Detection of the glycosides by the fehling reagent, and the emergence of red deposit indicate the presence of the glycosides (Jawad et al 1998).
- Phenols test: Dissolve (0.1 g) of the extract in (1) ml of distilled water and add (1-2) a drop of FeCl3 solution. When the blue or green color appears, the result is positive and indicates on the presence of phenols (Sheel et al 2014).
- Resins test: Add 1 ml lead acetate (1%) to 1 ml of the extract. When white precipitation is found, the result is positive and indicates the presence of resins. (Sheel et al 2014)
- Detection of Flavonoids test: Detection of Flavonoids by addition of (1) ml of the Alcoholic potassium hydroxide reagent (5) N to (1) ml of the extract , and when a yellow deposit appears, the result is positive and indicates the presence of flavonoids.(Ukoha et al 2011)
- Detection of Saponin test: Add 1 ml of Mercury Water Chloride Reagent (5%) to (1) ml of the extract. When white precipitation is found, the result is positive and indicates the presence of soap.(Jagetia et al 2004)
- Alkaloid test: Detection of alkaloids using the wagners reagent by adding several drops of reagent to (1) ml of the extract and When an acorn appears, the result is positive and indicates the presence of Alkaloids. (Pandey et al 2013)
- Protein detection: Detection of proteins using a papurite detection consisting of (80%) copper sulphate dissolved in distilled water and (1) ml of (10%) of the reagent. When the violet color indicates the presence of proteins. (Jagetia et al 2004)
- Coumarins test: Detect coumarins by placing a quantity of the sample in a test tube, then cover the tube with a filter paper moistened with diluted sodium hydroxide solution, then heat the tube on boiling water bath for a few minutes and then expose the filter paper to the source of ultraviolet radiation, The coloring of the paper in bright green yellow indicates the presence of coumarin(Sheel et al 2014) .
- Terpens test and steroids Test: Dissolve (1) gm from the model to a little chloroforms and adds a drop of acetic anhydride and a drop of concentrated sulfuric acid. When the brown color appears to indicate the containment of

the soil model, the dark blue Fidel color contains the steroids. (Ukoha et al 2011).

Anti-bacterial activity

Agar diffusion method is used to test the effectiveness of the extracts, where the bacterial species was activated in a medium (Nutrient broth) 250 ml of the medium was prepared according to the manufacturer's instructions and sterilized with autoclave at 121 ° C for 24 h. left to cool and inoculate with 1 ml of the activated bacterial cell suspension , it was then incubated in the incubator at 37 C for 24 h. , after which 250 ml of medium (Muller Hinton agar) was prepared and left to cool and inoculate with 1 ml of the activated bacterial cell suspension, pour 20 ml of the medium into each 9 cm glass dish, let the dishes cool and make 3 pits for each layer with a diameter of 8 mm per hole using the drill and add 50 µl of the extract into the pits using :: lending the antibiotic gentamicin. As a control agent, it was then incubated in the incubator at 37 C for 24 h.(Gong et al 2012 , Eloff et al 1998).

Result and Discussion

Chemical detection of the main components of the Tamex plant in alcoholic and aqueous extracts Table (3) shows the results of chemical detection using the reagents mentioned above. This division relies mainly on the naturally occurring metabolic components in the cells and tissues of plants, which are called primary secretions. These compounds are found in plants as secondary metabolites. It has an effective role as an anti-microorganism, between the table that both extracts contain the same active groups as the Tamex plant extract contains tannins, carbohydrates, glycosides, phenols, flavonoids, soap,resins, alkaloid and coumarin .

Table 3
Chemical components of the extract of alcoholand water for Tamex

Active chemical compounds	Sage plant extract	
	Water	Alcoholic
Tannins	+	+
Carbohydrate	+	+
Glycoside	+	+
Phenols	+	+
Resins	+	+
Flavonoids	+	+
Soap	-	-
Alkaloids	+	+
Proteins	-	-
Coumarins	-	-
Terpens	-	-

The presence of these compounds in extracts of the Tamex plant, which are compounds that have an effective effect in inhibiting the growth of various

microorganisms, is important because most of the therapeutic effects are attributed to them. (Al-Budairi et al 2012)

Table (4) shows the anti-microbiological activity of aqueous and alcoholic Tamex plant extracts in bacterial species (S. epidermidis , s. mutanss, s. aureas , E. coli), that the highest inhibition diameter of 18 mm for alcoholic extract in bacteria s. aureas and the lowest diameter of inhibition of 12 mm for aqueous extract in bacteria E. coli As for the diameter of inhibition for bacteria S. epidermidis was It has a large and convergent effect and this is in agreement with many studies. It is evident from the table that the alcoholic extract of the leaf plant has the highest effectiveness on bacteria, compared to gentamicin (Surinut et al 2003).

Table 4
Shows the anti-microbiological activity of aqueous and alcoholic Tamex plant extracts in bacterial species

Bacteria	Inhibition zone diameter (mm)		
	Aqueous Ex.	Alcoholic Ex.	Positive control (µg/ml), gentamicin
E. coli	12	15	17
s. aureas	15	18	17
s. epidermidis	13	15	17
s. mutans	15	13	17

Conclusion

- The presence of effective groups of the aqueous and alcoholic extracts of Tamex plant, which has a significant inhibitory effect on the different types of bacteria
- The alcoholic extract of the plant is more effective than the aqueous extract on bacteria*s. aureas*It is a bacterium that causes burns infections.

Recommendations

- Conducting wide studies on the use of the alcoholic and aqueous extract of the plant, due to its effectiveness against many microbes.
- Conducting experiments using other types of solvents, noting the extent to which they are limited to the active groups
- Manufacture of extracts as an ointment to treat many diseases

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