

Antibacterial Activity and Phytochemical Screening of Iraqi *Taraxcum Officinale L*

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Abstract

Objective: The objective of this research is to identify the microscopic Characteristics in plant extraction by detecting effective component and examine of antibacterial vitality.

Procedure: *Taraxacum officinale* leaf was gathering of Baghdad city . After the prepare the leaf and the preparation and scrub and then dried we extracted by the SOXHLET device where we use 90% ethanol. This pharmacological study includes microscopy and a chemical screening using reagent .Through the diffusion method an antibacterial evaluation of the leaf extract was detected. in this treatise was used diverse bacteria *Pseudomonas aeruginosa*, *Klebsiela pneumonia*, *Staphylococcus aureus*, *E. coli* , *Enterococcus faecalis* and *Streptococcus spp.*.

Outcomes: An outcome indicates the presence in the top and down surface of the leaf type of stomata is the stomatal actinocytic while non-glandular trichome is found only above the top surface of the leaf. As the outcome of microscopic screening of the forms of fiber that the indicators for the top area of the leaf was 18%, while the down region was 31% for the leaf. The Initial outcome of chemical plant screening for plant leaf was revealed existence at Tannins, Saponins, Terpenoids and Alkaloids component .The outcome of effectiveness against bacteria in the search was offered showed diverse activity against all bacterial species within search.

Keywords: *Taraxacum officinale* , stomata , phytochemical screening

Introduction

Dandelion is Perennial herbaceous plant belongs to the family Asteraceae (Compositae) Also called *T. officinale*, green areas and on the sides of the road, Banks, beaches and areas with moist soil. This plant has been used in herbal medical fields. It was also mentioned specifically in Asia, Europe and North America .For the roots of the plant is very useful for the treatment of problems of the gastrointestinal tract support liver function and digestion while plant leaves are used as diuretic and digestive stimulants ¹ . Medicinal plants contain a range of active compounds of great importance and therapeutic properties as most studies indicate the increasing activities of antimicrobial plants by detecting areas targeted by antibiotics by plant extracts against drug-resistant microbial pathogens ² .The curative

Characteristics of plant extracts can be introduced into traditional or folk medicine by interacting with certain species and producing antioxidant activities ³ . Dandelion plant has a protective effect against brain damage caused by lead ⁴. The root of the dandelion plant (*Taraxacum officinale*) contains some substances that have antioxidant property these substances are inulins, lactones, triterpenes, sterols, flavonoids, and phenolic acids ⁵. Through studies in China and America found dandelion plant containing antiperspirants through its inhibition of NO production and cyclooxygenase-2 (COX-2) acts as anti-inflammatory and antinociceptive ⁶ . In recent years it has increase important to find naturally occurring antioxidants for food safety for the purpose of promoting health and preventing various infections and their high degree of safety in human use and consumer acceptability. ⁷



Figure (1) *Taraxacum officinale* plant

Material and Method

Collection of Plant Material

A leaf of dandelion plant was aggregated of region saydiya in Iraq. After obtaining the leaf of the plant was washed with distilled water and scoured with strainer paper to remove powder and suspended parts and then dried at a temperature up to 25-30 °C for one week and persistent stirring to block the formation of molds. It was then weighed, ground, placed in tight vials and stocked for use in the extraction process. The plant sample was identified

and authenticated by the national herbarium of the Ministry of Agriculture of Iraq.

Extraction

The plant samples (leaves of plant) were washed and dried under shade conditions for 10 days. After drying the leaves were powdered in a mechanical grinder. 300 g of leaf powder was packed in the thimble of Soxhlet apparatus and extracted with 900 ml of aqueous ethanol (ethanol-water 80:20 v/v) for 12 hr. Extract was filtered and concentrated under vacuum using rotary evaporator to get a dry residue. 12 g of residue was used in screening the different active compounds.⁸

Preliminary Phytochemical Investigation

Preliminary investigations for the chemical constituents were done using 5% ethanolic potassium hydroxide (KOH) for detection of flavonoids, Mayer's and Dragendorff's reagents for detection of alkaloids and foam test for saponins, 1% lead acetate test, ferric chloride (FeCl₃) and alkaline test for tannin.⁸

$$\text{Stomatal index} = \frac{\text{No: of Stomata}}{\text{No: of Stomata} + \text{No: of epidermal cells}} \times 100$$

Macroscopic Examination

Fresh specimens of plant were used to study the morphological characters of the plant such as the shape of leaves, stems and margins.

Microscopic Examination

Powdered Microscopy

Dried leaves were finely powdered and used for anatomical study and observed the plant tissue component. A tiny magnitude of the dust was put on a slide to clarify by few drops of chloral hydrate and wrapped for covering slide for tested under microscope. Different cell components were observed and taken the figures by microscopical camera.

Leaf Microscopy

For determination the type of stomata and type of trichomes used two surfaces of leaves. The lower and upper epidermal layer of fresh leaf were clarified by

chloral hydrate and heating for many times and observed under a microscope. Determination of the components of leaves (stomata, trichomes and stomatal index) were carried out under microscope. The stomatal index was carried out by using the following equation.

Antimicrobial examination

Efficiency is gauged through the essential disc sawing way⁹. All pure culture from bacteria was possessed to the lab of microbiology, Basic Science College of Dentistry of Mustansiriyah University. *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *E. coli*, *Enterococcus faecalis* and *Streptococcus* spp. It was cultivated in a culture medium where each was mixed with a concentration of *Taraxacum officinale* extract. Inhibition zone was determined through fisher-lilly zone. The concentration of streptomycin was¹⁰. The measurement was made-up in three copies.

Outcomes and debate

Macroscopical and Plant Morphological

Dandelion cultivate of Of single and uncomplicated roots , It grow more than approximately 10 stem 7–36 cm long, however occasionally up to 66 cm long. a outcome of the morphological study were referred to the leafs are 3–40 cm long and 2–8 cm broad. The leaf border is usually Lobular and often ruptured or serrated with severe teeth ¹⁰ .

Microscopical Examination

Outcome was reference to actinocytic type of stomata was presented on top and down exterior of the leafs, whilst the non-glandular unicellular trichomes offered on top exterior of the leafs. Also the microscopic Outcome was reference to streak form fibers.

Phytochemical Screening

Outcomes from leaves extract were presented and referred to the extract was contain the Tannins, Saponins, Terpenoids and Alkaloids compounds ^(11,12).

Antimicrobial Activity

The plant anatomical results were reference to

Anomocytic stomata type in the leaves . Unicellular unbranched covering of trichomes, fibers and starch present in the leaves of the *Taraxcum officinale* plant (figure 3,4,5,6) . The phytochemical profile results of active constitues were referenced to many active compounds were presented such as tannin ,saponins , Tannins , Saponins ,Terpenoids and Alkaloids which isolated and purified Table (2) . The pathogenic bacteria which used for investigated the bioactivity of leaves extract of *Taraxcum officinale* were E coli , *pseudomonas aeruginosa*, *Streptococcus spp.* , *Staphylococcus epidermidis*, *Enterococcus faecalis*, *Klebsiella pneumoniae* and *Staphylococcus aureus* . The different concentrations of cardioactive glycosides extract from leaves (1000,500,250,125,63.5µg /ml) were found active for all microorganisms strain in concentration 1000 µg /ml while inactive in 63.5 µg /ml concentration exception *Enterococcus faecalis* effected in this concentration . The largest inhibition zone found in *Enterococcus faecalis* in all concentrations while the smallest inhibition zone found in *Staphylococcus epidermidis* bacteria . In obtained results shown that *Taraxcum officinale* extract effect for all types of bacteria that mean this extract has good potency against all tested bacteria seen in table (1) and figure (2).

Table (1) Antibacterial activity of ethanolic extract of leaves of *Taraxcum officinale*

Pathogenic bacteria	inhibition zones (mm) , concentration (µg/ml)					
	1000	500	250	125	63.5	DMSO
E coli	20	12	8	11	-----	-----
<i>pseudomonas aeruginosa</i>	18	10	6	7	-----	-----
<i>Staphylococcus aureus</i>	23	12	12	4	-----	-----
<i>Streptococcus spp.</i>	19	-----	6	4	-----	-----
<i>Staphylococcus epidermidis</i>	13	9	7	-----	-----	-----
<i>Enterococcus faecalis</i>	27	20	16	7	4	-----
<i>Klebsiella pneumoniae</i>	11	7	-----	5	-----	-----

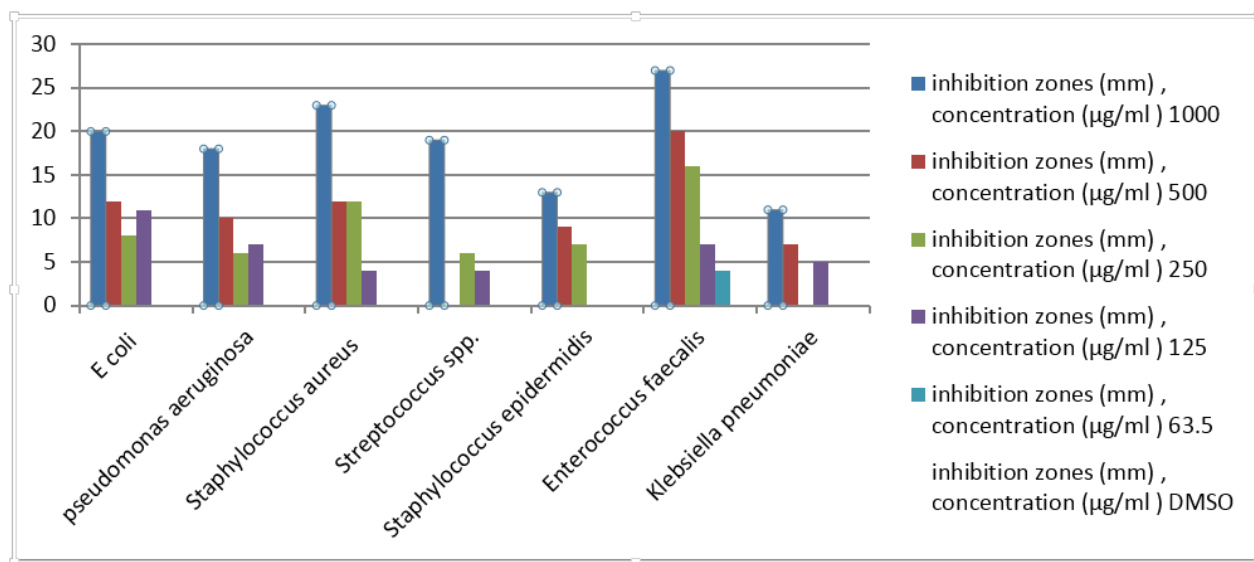


Figure 2: Antibacterial activity of Taraxcum officinale.

Table (2) Phytochemical screening of Taraxcum officinale.

Test	Roots	Leaves
Tannins	-	+
Saponins	-	+
Terpenoids	+	++
Flavonoids	-	-
Alkaloids	-	+

Microscopical Examination

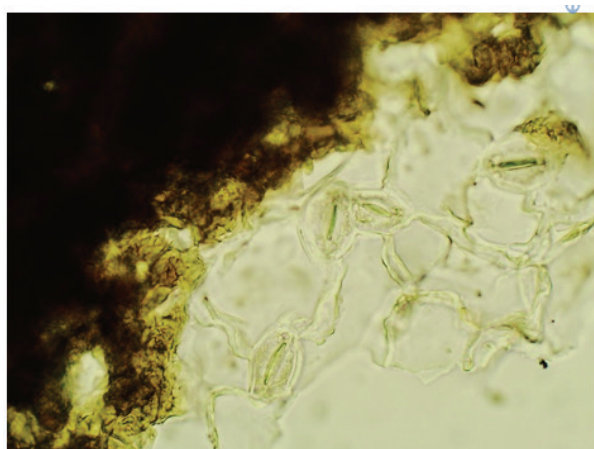


Figure (3): Anomocytic stomata Figure (4): Starch

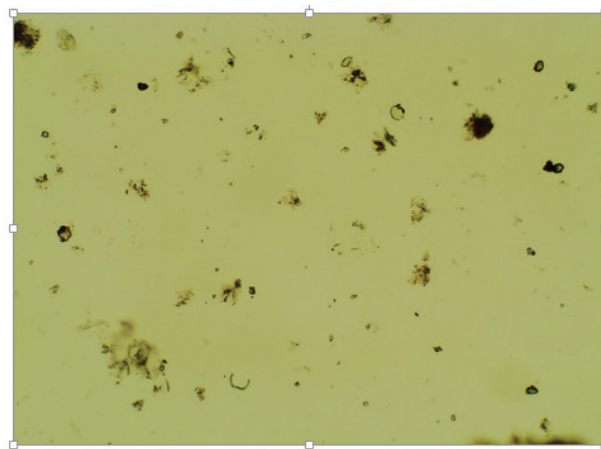


Figure (5): Annual xylem vessels Figure (6): Fiber

Conclusion

According to the both results Pharmacognostical, phytochemical and antimicrobial study the expended of cultivation of this plant in Iraq is very necessary to

improve quality and quantity and investigation the activity in animal study.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Mustansiriyah University and all experiments were carried out in accordance with approved guidelines.

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