

Study the Biological Efficiency of an Isolated Terpenic Compound from the Ether Petroleum Extract and the Trace Elements of the Plant *Tribulusterrestris*

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Abstract

Many different compounds with a spread of biological properties and chemical structures are known from genus *Tribulusterrestris* together with steroid and terpinoid. In gift study we tend to indicate the preliminary phytochemical analysis for rock oil ether extract and isolated compound. The results unconcealed that there was no alkaloids, supermolecule, glycosides, saponins and tannic acid in petroleum ether however contain steroid and terpinoid. The isolated compound contained solely terpinoid compound. attention procedure was last this compounds. the FTIR qualitative analysis knowledge of isolated compound showed discovered absorptions signal. ultraviolet illumination spectrum showed most absorption at 220 nm due to $\pi \rightarrow \pi^*$ transition that is taken into account as characteristic feature of the unsaturated covalent bond. The concentration of the weather analyzed during this study decrease within the order $Fe > Ca > Cu > Zn > Cr$. important totally different among microorganism toward *T. terrestris* oil with $p < 0.05$ and LSD 15.4, highest MIC by *E. coli* about 50 mm in 100% concentration of *T. terrestris* oil compared with control.

Keywords: *Tribulusterrestris*, Petroleum ether Extract, Infrared, UV- visible spectroscopy and Antibacterial

Introduction

Puncture tracheophyte genus *Tribulusterrestris* a spermatophyte within the rosoid dicot family, native to heat temperate and tropical regions of the southern Europe and Southern Asia. This plant contain saponins, flavonoid, sterols fatty oils, terpenoids and metallic element salts. *T. terrestris* utilized in people medicines as a tonic, aphrodisiac, palliative, astringent, stomachic, antihypertensive drug, diuretic, lithotriptic, and urinary disinfectant. The edible fruit of the herb is extremely effective in most of the gut tract disorders. it's a significant constituent of Gokshuradi Guggul, a potent Ayurvedic medication wont to support correct functioning of the gut tract and to get rid of the urinary stones^[1]. *T. terrestris* has been used for hundreds of years in writing to treat impotence, genital diseases, and sexual infirmity. In Bulgaria, the plant is employed as a people medication for treating impotence. additionally to all or any these applications, the Ayurvedic accumulation of Republic of India attributes cardiogenic properties to the foundation and fruit. In ancient Chinese drugs, the fruits were used for treatment of eye hassle, edema, abdominal distension,

emission, morbid mucus, and sexual dysfunction. *T. terrestris* represented as a extremely valuable drug within the Shern-Nong accumulation (the oldest well-known pharmacologic add China) in restoring the depressed liver, for treatment of fullness within the chest, mastitis, flatulence, acute rubor, headache, and skin problem. In Unani drugs, *T. terrestris* is employed as drug, delicate laxative, and general tonic^[2,3]. *T. terrestris* could be a yearling plant cosmopolitan within the Mediterranean and also the heat elements of Europe, Asia, USA, continent and Australia^[4]. This plant is employed in ancient drugs in China, India, Iraq, Iran, etc. Studies show that *T. terrestris* contains steroids, saponins, flavonoids, alkaloids, unsaturated fatty acids, vitamins, tannins, resins, potassium, nitrate, aminoalkanoic acid and aminoalkanoic acid^[5]. This plant has several medical effects including; antimicrobial, medicinal drug, antioxidant and anti-toxic. The plant is additionally used for the treatment of vas diseases, cancers, metabolic process diseases and joint pain^[6]. the utilization of *T. terrestris* extract will increase body's ability to create muscle mass and strength and additionally improves circulation and gas transfer^[7]. future use of *T. terrestris* causes dilatation

of the vessels and improves coronary arteries while not facet effects [8].

Trybstan is one in every of the *T. terrestris* compounds that will increase concupiscence and counteract of cold-natured physiological state and biological time disorders. *T. terrestris* extract will increase sexual efficiency in men by increasing level of free androgenic hormone and control the number of sex hormone, progesterone and pregnenolone [9]. Further, the employment of the plant in ancient drugs in Asian country and China is to treat sexual pathology and increase concupiscence by increasing the amount of androgenic hormone and gonadotrophic hormone. *T. terrestris* had no impact on the organs like the prostate, seminal vesicles, womb and duct that are sensitive to system [10]. On the opposite hand, using *T. terrestris* with alternative herbs as well as ginseng, soy and berries improves erectile and sexual behavior. Finally, chemical derived from *T. terrestris* had a big impact in reducing liquid body substance aldohexose levels that might introduce the plant as a potent healthful plant for the treatment of polygenic disorder [11].

Materials and Method

Plant Material: Puncture vine *T. terrestris* it classified from the local markets d in Plant Taxonomy lab \ College of Science Basrah University, the dried fruits cleaned and blended by using (Electrical Mill blender). The powder of fruits kept until required.

chemical and Materials : All chemicals were of purity analytical grades :hydrochloric acid (analar), n-hexane, ethyl acetate and petroleum ether from (BDH); acetone, 95% ethanol from Baghdad factory for drugs and cosmetics (Whatmann 540) filter paper.

Petroleum ether Extract: 20.000 gm of *T. terrestris* powder was added to a thimble and then placed in a Soxhlet extractor. Heat was applied to a round bottom flask which contain petroleum ether solvent was placed at the base of the Soxhlet extractor. The extract was concentrated using a rotary evaporator (Puchi Rotavapor-Re) then dried at room temperature (12), the weight of brown oil was 3.967 gm.

Isolation methods with Column Chromatography

Petroleum ether extract (2.000gm) was subjected to column chromatography on silica gel (73–240 mesh – Merck) packed and eluted with mixture of n-Hexane:

ethyl acetate(7:3).

Thin Layer Chromatography

(TLC) were carried out on the petroleum ether extract and isolated compound using n-Hexane: ethyl acetate(7:3)

Preliminary Qualitative Tests

Preliminary tests were carried out on the petroleum ether extract and isolated compound

Infrared and UV- visible spectroscopy

IR spectra using PyE-UNICAM-30300S Infra red spectrophotometer and Uv-visible spectra on JASCO UV. *T. terrestris* was weighted and digested in (5:1) mixture of nitric acid and perchloric acid (10 ml). After digestion few drops of concentrated HCl added. The solution was diluted with distilled deionized water. The dilute filtrate solution was used for analysis of minerals by atomic absorption spectrophotometer [13].

Antibacterial to isolated compound

It has been getting negative and positive Gram bacteria from the Department of Life Sciences / College of Science / University of Basra

Determination of minimum inhibition concentration of *T. terrestris* oil

1ml inoculum of bacteria was added to 100 ml of nutrient broth and then incubated at 30°C for 24h and then dilution of bacterial solution with Physiological Normal saline compared with the standard test tube McFarland for 108 cells / ml of stuck bacterial and inoculated into nutrient agar, supplemented with different concentrations of the compound chemical (100%, 75%, 50%, 25%, 12.5%), using L-shap to work hole by puller diameter 6 mm, and then incubated dishes in the incubator for 37°. Then measured the diameter of the inhibition and compared with the control [14].

Result and Discussion

Herbal medication was practiced in several components of the planet, thanks to its low value and affordability. Qualitative phytochemical analysis of various components of the plants and distinguishing its compounds helps practitioners in treating diseases. It conjointly helps researchers in synthesizing new chemical substances. Puncture vascular plant *T. terrestris*

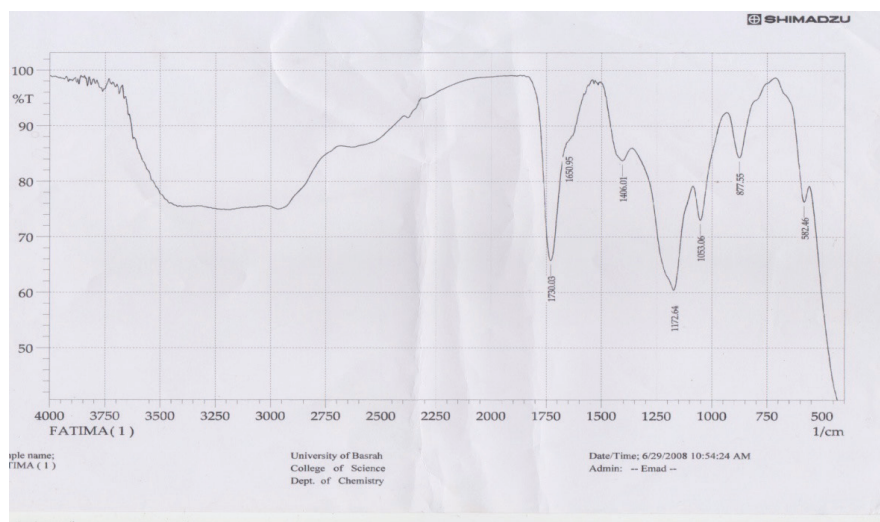
L. could be a healthful plant wide used as a drug provider in pharmaceutical business [15]. Table (1) indicate the preliminary phytochemical analysis for fossil oil etherextract and isolated compound. The results discovered that there was no alkaloids, sugar , glycosides, saponins and phenol inpetroleum ether however contain ,steroid and terpinoid. The isolated compound contained solely terpinoid compound. tender loving care procedure was endure this compounds and also the results were shown in table (2) as refer[16].

Table (1): Preliminary qualitative test forpetroleum ether extract and isolated compound

Phytochemical	Petroleum ether extract	Isolated compound
Glycoside	-	-
Phenols	-	-
Flavonoids	-	-
Tannins	-	-
Saponins	-	-
Alkaloids	-	-
Terpenoids	+	+
Sterols	+	-
Carbohydrate	-	-

Table (2): TLC for preliminary qualitative test forpetroleum ether extract

Test sample	P-ansaldehyde& Phosphoric acid	Ninhydrin	Folin reagent	Drangdroff	40% H2SO4	H2SO4 2ml+ Chloroform	visible
Petrulem ether extract	0,68 0.41 0.32 0.26	-	-	-	0.68 0.32	0.68 0.41 0.32 0.26	0.68 0.41 0.26
Isolated compound	0.68	-	-	-	0.68	0.68	0.68



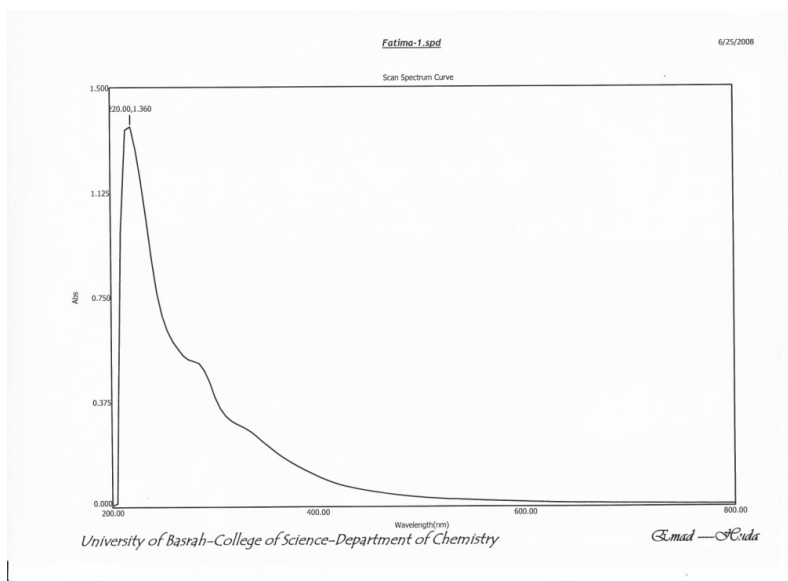
Figure(1) the FTIR spectroscopic of isolated compounds

Table (3): Infrared absorption peaks and their related function groups for isolated compounds

Bond frequency (cm-1)	Band	Mod of vibration	Functional groups
1173.64 cm-1	C-H	Ro.	CH ₂
1406.01cm-1	C-H	Str.	-CHof CH3group
1730.03cm ⁻¹	C=O	Str.	Ester

Str.(stretching), Ro.(rocking)

Fig(1) and table(3) the FTIR spectroscopic data of isolated compound showed observed absorptions signal at 1730.03cm⁻¹ and 1650.95 cm-1 for (C=O stretching),1406.01cm-1 (C-H in CH3) and, 1173.64 cm-1 C-H scissor for CH₂,1053.06 cm-1 C-H rocking for CH₂ and 877.55.

**Figure(2) UV spectrum to isolated compound****Table(4) UV spectrum to isolated compound**

Type spectrum	maximum absorption	transition
UV spectrum	220 nm	$\pi\pi^*$

UV spectrum showed maximum absorption at 220 nm due to $\pi\pi^*$ transition which is considered as characteristic feature of the unsaturated double bond Figure(2) and table (4). The medicinal plants serve as a good source of vital mineral elements which can be consumed both for dietary and medicinal purposes. However has been collected mineral contents (Ca, Zn, Fe, Cu, Cr,) of *T. terrestris*^[17], Table (5) The concentration of the elements analyzed in this study decrease in the order Fe>Ca>Cu>Zn>Cr.

Table (5) shows the elements and the amount of elements found in plant *Tribulus terrestris*

Quantity of elements measured mg/g	Elements
19.23	Calcium
3.10	Chrome
8.20	Copper
20.12	Iron
4.33	Zinc

Determination of minimum inhibition concentration of Tribulus terrestris oil

Significant different among bacterial toward *T. terrestris* oil with $p < 0.05$ and LSD 15.4 as shown. Gram negative bacteria showed high significant difference in inhibition to *T. terrestris* oil, due to differences between gram positive and gram negative bacteria include the thickness of the cell membrane, that is just about twenty to thirty nanometers thick in gram positive and eight to twelve nanometers thick in Gram negative; the number of supermolecule within the cell walls; and also the conjugated protein content, that is low in gram positive bacterium and high in gram negative. All bacterium contain a layer of peptidoglycan in their cell membrane, however the distinction between gram positive and gram negative bacterium is that Gram negative contains a skinny layer of peptidoglycan placed between 2 supermolecule layers this is often what

provides Gram negative bacteria a sensitive to matter result compared gram positive bacteria^[18].

From the results in table (6) highest MIC by *E. coli* about 50 mm in 100% concentration of *T. terrestris* oil compared with control. *Staphylococcus aureus* and *Bacillus cereus* were showed simple difference in MIC compared with control and showed differential and specific MIC of chemical compound impact of the growth of bacteria used to study and this shows that the impactiveness of biological or poisonous substance plant adversely have an effect on the physiology of microorganism because it contains terpenoids vehicles have substance to the expansion of bacteria effect through its impact on the method of the article organic phenomenon and so its impact on the composition of proteins contribute to the formation of necessary enzymes within the metabolism^[19].

Table (6): Minimum inhibitory concentrations (MICs) of *T. terrestris* oil on gram negative and positive bacteria (diameter of inhibition measured with millimeter)

concentrations of Tribulusterrestris oil %	Control	Bacillus cereus	Escherichia coli	Staphylococcus aureus
100	0	15	50	20
75	0	11.4	37.5	16.2
50	0	0.7	20.3	10
25	0	0	11.1	0
12.5	0	0	0	0

Ethical Clearance. Authors Contribution ; All authors have made substantial, direct and intellectual contribution to the work and approved it for publication.

Ethics Statement ; This article contains studies with human participants performed by the authors, the approval of collecting sample from the parents of the persons of the donors.

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Conflicts of Interest ; The authors declare there is no conflict of interest

Data availability ; All datasets generated analyzed during this study are included in the manuscript

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