Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 5 [7] June 2016: 30-33

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.533
Universal Impact Factor 0.9804

ORIGINAL ARTICLE **OPEN ACCESS**

Evaluation of Antimicrobial and Antioxidant activities of *Matricaria recutita, Ricinus communis* and *Zygophyllum coccineum* Extracts

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ABSTRACT
This work aimed to evaluate the antimicrobial and antioxidant activity of methanolic extract of some plant (Ricinus communis,Matricaria recutita and Zygophyllum coccineum) extracts used in herbal remedy and folk medicine in Saudi Arabia, Results indicated that, the total extract the studied plants showed activity against the tested microbes, the highest activity was observed by using Matricaria chamomilla at conc. of (10 and 20 mg/ml) against Bacillus subtilis, Staphylococcus aureus and E. coli. All extracts showed no activity against Candida albican. All extracts showed good antioxidant activity, the highest activity appeared for Zygophyllum coccineum followed by Matricaria recutita and finally Ricinus communis.
Keywords: Antimicrobial, antioxidant activity, Zygophyllum coccineum, Matricaria recutita, Ricinus communis.

Received 14.04.2016 Revised 11.05.2016 Accepted 12.06. 2016

INTRODUCTION

Matricaria recutita, once it has been called as *Marticaria chamomilla*, *Chamomilla recutita*, and *Chamomilum nobile* family Asteraceae and commonly it is known as German chamomile, Roman chamomile, English chamomile, Camomilla, and Flos Chamomile, Chamomile is widely used throughout the world. Its primary uses are as a sedative, anxiolytic and antispasmodic, and as a treatment for mild skin irritation and inflammation, Chamomile is one of the most widely used and well-documented medicinal plants in the world. It is included in the pharmacopoeia of 26 countries [1,2,3]. It mainly grows indigenously in Europe, NW. Asia, N. Africa, and cultivated in N. America and in many parts of the world [4].This herb has been used as herbal remedies for thousands of years. This herb has been believed by Anglo-Saxons as one of nine sacred herbs given to humans by the lord [5]. One of the most commonly consumed single ingredient herbal tea is chamomile, prepared with dried flowers from *Matricaria recutita* L. The composite flower is white in color with a yellowish orange center. Infusions and essential oils from fresh or dried flower heads have aromatic, flavoring and coloring properties, both are used in a number of commercial products including soaps, detergents, perfumes, lotions, ointments, hair products, baked goods, confections, alcoholic beverages and herbal teas. Chamomile flowers contain 0.24- to 2.0 percent volatile oil that is blue in color. Chamomile is also extensively consumed as a tea or tonic. It is used internally to treat anxiety, hysteria, nightmares, insomnia and other sleep problems, convulsions, and even delirium tremens [6].

The main constituents of *Matricaria recutita* L include the terpenoids α-bisabolol and its oxides and azulenes, including chamazulene [7].

Ricinus communis or castor plant has high traditional and medicinal value for maintain the disease free healthy life. Traditionally the plant is used as laxative, purgative, fertilizer and fungicide etc. whereas the plant possess beneficial effects such as anti-oxidant, antihistamic, Antinociceptive, antiasthmatic, antiulcer, immunemodulatory, Antidiabetic, hepatoprotective, Antifertility, anti inflammatory,

antimicrobial, central nervous system stimulant, lipolytic, wound healing, insecticidal and Larvicidal and many other medicinal properties. [8].

Phytochemical investigation of the aerial parts of *Zygophyllum coccineum* L. led to the isolation of nine ursane-type triterpene saponins, including the new one; zygophylloside S, together with a known flavonoid glycoside and a sterol glycoside. The isolated compounds were tested for antifungal activity against several important plant pathogens and for insecticidal activity against two important mosquito species. The isolated compounds showed 32-77 % fungal growth inhibition at a concentration of 30 µM against *Phomopsis viticola* [9]. Also it contains Zygophyllin (28% in leaves, 0.18% in stems and 0.26% in fruits). Quinovic acid (0.36% in leaves, 0.31% in fruits and 0.47% in stems). Flavonoids e.g, kaempfero1-3- rutinoside [10].Traditional Medicinal Uses of *Zygophyllum coccineum* include rheumatism, gout, cough, asthma, hypertension, flatulent colic, diuretic, the juice from fresh leaves and stems is known to be used as an abrasive cleanser and as remedy for the treatment of skin diseases [11].

MATERIALS AND METHODS

Plant Material:

Matricaria chamomilla and *Ricinus communis* seeds under investigation were collected from herbal markets in Al Kharj, Saudi Arabia, while *Zygophyllum coccineum* were collected from Al-Kharj area- Saudi Arabia, the collected plants were dried under shade for 7 days, after that and then grinded to fine powders.

The dried powder from each plant was extracted with 70% aqueous methanol by percolation in the solvent with occasional shaking for 48 hours; this process was repeated three times. The methanolic extract was combined and concentrated under vacuum to obtain a dry crude extract.

Anti-oxidant activity: *In vitro* anti-oxidant activity:

Scavenging Capacity on 1,1-Diphenyl-2-picrylhydrazyl (DPPH) Radical

The hydrogen atoms or electrons donation ability of fractionate/pure compounds will be measured from the bleaching of purple-colored methanol solution of DPPH. The effect on DPPH radical was estimated according to [12]. One milliliter of various concentrations (0.2–1.0mg/mL) of the fractionate /pure compound in methanol and water added to 1mL of DPPH radical solution in methanol (final concentration of DPPH as 0.2mM). After a 30min incubation period at room temperature the absorbance read against a blank at 517nm. Inhibition of free-radical DPPH in percent (I%) calculated according to:

$$I\% = [(A_{control} - A_{Sample})/A_{control}]X\ 100$$

Where, A control is the absorbance of the control reaction (containing all reagents except the test compound) and A Sample is the absorbance of the compound tested. Ascorbic acid used as control.

Antimicrobial activity:

Antimicrobial activity of the methanolic extract of the studied plant extracts (5, 10 and 20 mg/ml) were done on various microbes such as *Candida albican, E. coli, Staphylococcus aurous, Streptococcus pyogenes, Bacillus subtilis, Pseudomonas aeruginosa* and *Klebsiella pneumonia* using agar-well diffusion method as mentioned by [13], with minor modifications.

Test organisms

The microorganisms used for the experiments were obtained from the Regional Center for Mycology and Biotechnology (RCMB), Al-Azhar University, Cairo, Egypt.

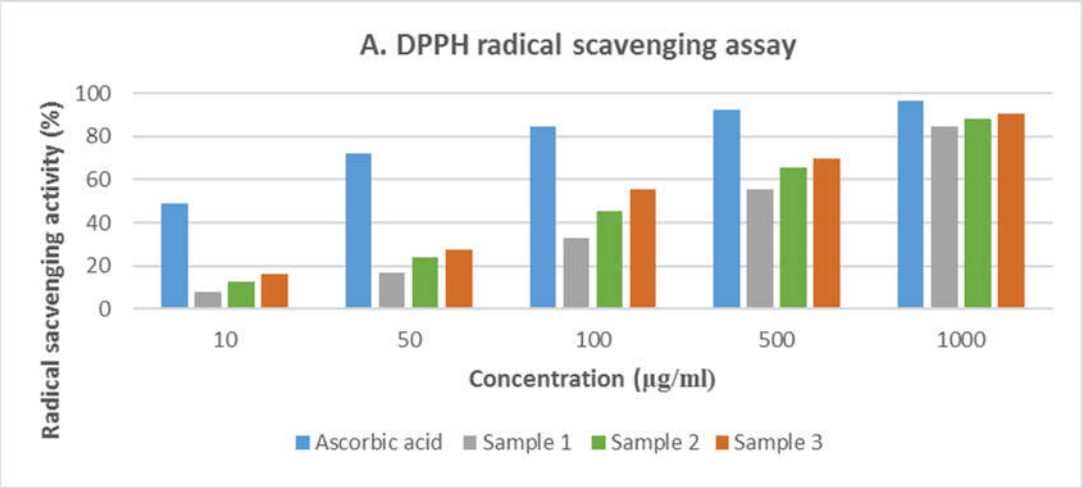
RESULTS AND DISCUSSION

We can summaries our results from which of these plants showed good activities (antioxidant and antimicrobial) specially most these plants have many uses in herbal remedies.

Antioxidant Activity:

There were differences in the antioxidant potentials of different samples ($P \geq 0.05$) which represents the variation in percentage of oxidant scavenging capacity as performed by DPPH free radical scavenging assay (Figure-1). It was found the antioxidant activity was greater in sample 3 (*Zygophyllum coccineum*) 90.76 > 2 (*Matricaria recutita)* 88.32 > 1(*Ricinus communis)* 84.69, while all sample activities was lower than ascorbic acid (96.51 %) [14].

R. commmunis seed extracts produced the antioxidant activity by using lipid peroxidation by ferric thiocyanate method and free radical scavenging effect on 2,2-diphenyl-1picrylhydrazyl radical (DPPH) and hydroxyl radical generated from hydrogen peroxide. The high antioxidant activity of the seed of *R. communis* at low concentration shows that it could be very useful for the treatment of disease resulting from oxidative stress. The responsible chemical constituents of *R. communis* which produce antioxidant activity are Meth hylricinoleate, Ricinoleic acid, 12 octadecadienoic acid and methyl ester [15].



Antimicrobial Activity:

The total methanolic extract of the studied plants was investigated for their antimicrobial activity against clinically important microbes. Results indicated that, the total extract the studied plants showed activity against the tested microbes, the highest activity was observed by using *Matricaria chamomilla* at conc. of (10 and 20 mg/ml) against *Bacillus subtilis, Staphylococcus aureus, E. coli* and moderate activity against *Candida albican, Ricinus communis and Zygophyllum coccineum* showed moderate activity against tested organisms. The essential oil from and *M. chamomile* were active against 3 strains of S. aureus and the Candida strains and can be used in the treatment of acute otitis externa [16].Chamomile's essential oil components, -bisabolol had the strongest activity against Gram-positive and Gram-negative bacteria. Chamazulene also had strong antimicrobial activity, spiroethers had weak activity against Gram-positive bacteria but were inactive against Gram-negative bacteria [17].

Ricinus communis showed antimicrobial activities at high concentrations. *Ricinus communis* was good against dermatophytic and pathogenic bacterial strains *Streptococcus progenies*, *Staphylococcus aureus* as well as *Klebsiella pneumonia*, *Escherichia coli* [18].

Other al extracts showed no activity against *Candida albican*. The current work has shown that the studied plants are a potential source of antimicrobial agents.

RECOMMENDATION

The studied plants showed promising antimicrobial and antioxidant activities, in which further researches needed to determine which components responsible for this activity.

ACKNOWLEDGMENT

Authors wishes to express their thanks to Abdullah Al Dosary, Prince Sattam Bin Abdulaziz University, Al-Kharj, KSA, for his helping during this work.

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CITATION OF THIS ARTICLE

Abd El Raheim M. Donia, Aftab Alam, Younis S. Nour and Asmaa M. Radwan. Evaluation of Antimicrobial and Antioxidant activities of *Matricaria recutita, Ricinus communis* and *Zygophyllum coccineum* extracts. Bull. Env. Pharmacol. Life Sci., Vol 5 [7] June 2016: 30-33