



RESEARCH ARTICLE

Antioxidant evaluation of methanolic extract of *Tamarix aphylla* and *Euphorbia helioscopia*¹Muhammad Hassan, ¹Sultan Mehmood, ¹Nisar Khan, ¹Aziz Khan, ^{2*}Rahmat Ali Khan, ³Samiullah Khan¹Department of Botany, University of Science and Technology Bannu-28100, Pakistan²Department of Biotechnology, University of Science and Technology Bannu-28100, Pakistan³Department of Microbiology, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad 45320, Pakistan**Manuscript Info****Manuscript History:**

Received: 25 July 2014

Final Accepted: 26 August 2014

Published Online: September 2014

Key words:*Tamarix aphylla*, *Euphorbia helioscopia*; antioxidant***Corresponding Author****Muhammad Hassan****Abstract**

Tamarix aphylla and *Euphorbia helioscopia* are native to the Mediterranean, has become a major invasive plant growing in temperate, sub-tropical as well as high altitude areas. In Pakistan, *Tamarix aphylla* and *Euphorbia helioscopia* has spread extremely rapidly, now it can be found in almost every ecological region of Khyber Pakhtunkhwa Province traditionally used for various human ailments. The objective of this study was to evaluate *Tamarix aphylla* and *Euphorbia helioscopia* methanol extracts for antioxidant activities. Dried plant were grinded and its methanolic extracts (TAME) were prepared. These methanolic extracts were evaluated for biological assays according to standard protocol in-vitro. The results obtained in this study indicate that TAME and EHME possess significant antioxidant activities which might be due to the presence of bioactive compounds. Further studies are required to scan, isolate and purify the major bioactive compounds and to verify both ex-vivo and in-vivo assays.

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Introduction

Medicinal plants have been playing a pivotal role in improving human life. From the very beginning they have served human to maintain their health and helped human in every field of life like cosmetics, beverages, dyes, oils and medicines. Medicinal plants are known to have biologically active compounds like flavonoids, saponins, steroids, ascorbic acid, and phenolic compounds. Phenolic and flavonoids compounds give the plant antioxidant and anti-inflammatory properties Bruneton, (1995). Treatment by using plants is known as phytotherapy. In western world it is also called "Alternative medicines" and has been used in pharmaceutical industries for a long time. Living cells contains antioxidant metabolites and neutralizing enzymes which stops the oxidation and ultimately protect damage to the biologically important compounds like lipids, protein and DNA etc. from the ancient times medicinal plants have been used for the treatment of many diseases because they contain biologically active compounds. Extracts from different parts of the plants are used from ancient times for the management of different biological conditions because of their less adverse effects, efficacy, low cost and easily availability. Prostaglandin synthesis is inhibited by phytochemicals "flavonoids" which are present in plants (Godaet al., 1985). Liu, (2003) showed that different phytochemicals obtained from different plant have different pharmacological activities like the treatment of chronic diseases, lipid per oxidation and cancer. Synthesis of birth control pill (with estrogen and progesterone) and hormones i.e. corticosteroids were reported by Crabbe, (1979). Curcumin a dietary antioxidant, which is obtained from *Curcuma longa* L (turmeric) is used as a therapeutic agent, and is shown to have strong anti-inflammatory, antioxidant and anticancer properties (Kawamoriet al., 1999; Antuneset al., 2000; Khan et al., 2001). The present project was arranged to evaluate antioxidant and antimicrobial activity of *Tamarix aphylla* and *Euphorbia helioscopia* leaves extract.

2. MATERIALS AND METHODS:

2.1. Plant Collection:

Tamarix aphylla and *Euphorbia helioscopia* leaves were collected from District Bannu during the February 2012. Collected plant samples were dried under shadow at a room temperature for 45 days and ground it into the fine powder.

2.2. Plant Extract Preparation:

200 g powder from each of the samples were taken and placed in the 70% commercial grade methanol (CH₃OH) and stirred well, then after passing of 72 hours the extracts were filtered by using qualitative whatman filter paper. In vise bath the filtrate was placed at 40 C° and thus the entire methanol was evaporated, so the crude extracts of the plant were obtained and stored it in the refrigerator at 4 C° for the purpose of future in-vitro studies.

2.3. DPPH radical scavenging activity

Procedure of Gymphi *et al.* (1999) was used for determination of DPPH scavenging capacity of various fractions. 2.4 mg DPPH were dissolved in 100 ml methanol to prepare stock solution. The stock solution was further diluted with methanol until attaining an absorbance less than 1.00 using the spectrophotometer at 517 nm. 3 ml solution was mixed with 100 µl sample solution (1-100 µg/ml) and measured absorbance at 517 nm. % inhibition was calculated as;

Scavenging effect (%) = [(OD of control-OD of sample) / (OD of control)] ×100
While IC₅₀ value was obtained by using graph prism pad software.

2.4. Statistical Analysis:

To determine various parameters of the plant extract treatment effects, one-way analysis of variance was carried by computer software SPSS 13.0. Level of significance among the various treatments was determined by LSD at 0.05% and 0.01% level of probability.

3. Results:

DPPH free radical scavenging assay

DPPH (1, 1-diphenyl 1-2-picryl-hydrazyl) a free radical possess the ability to still electron from antioxidant, therefore it is widely used for estimation of in vitro antioxidant scavenging activities of medicinal plants. The Figure 1 and 2 shows the scavenging activity of *Tamarix aphylla* (TAME) and *Euphorbia helioscopia* methanolic extract (EHME) for free radicals of DPPH. *Euphorbia helioscopia* methanolic extract (EHME) showed comparatively highest activity as compare to *Tamarix aphylla* (TAME) which are due to plant bioactive metabolites present in them.

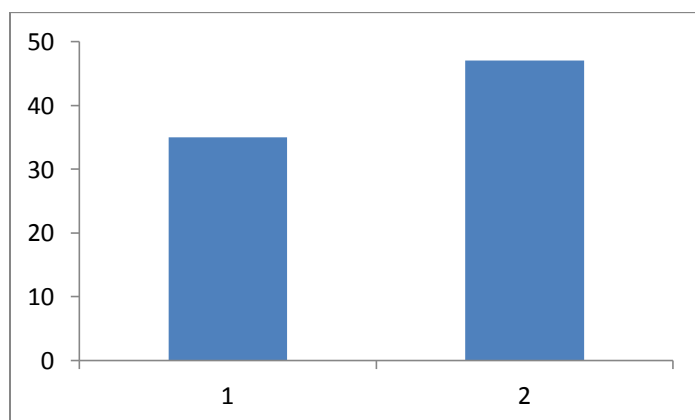


Figure 1: Antioxidant activity of *Tamarix aphylla* at 1 (7.5 µg/ml) and 2 (7.5 µg/ml)

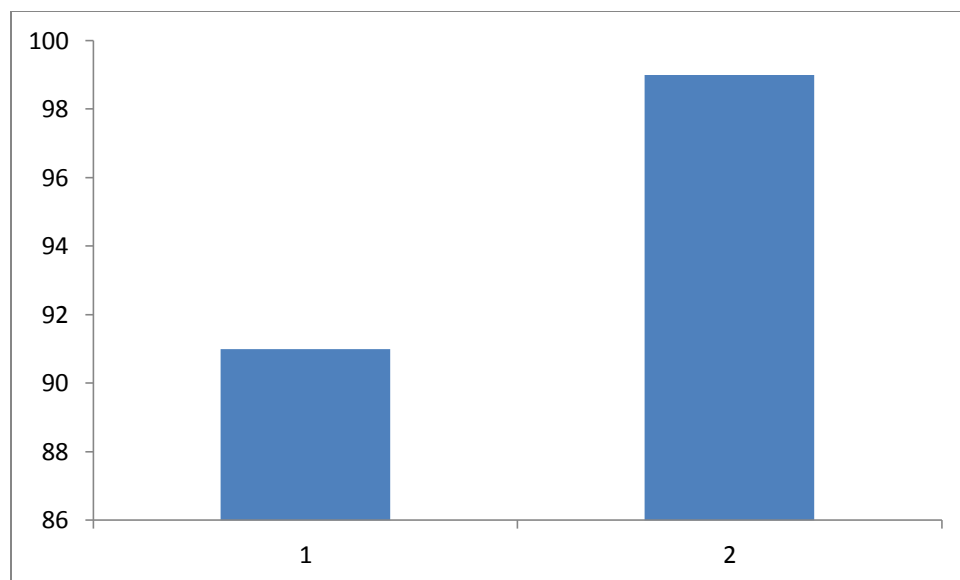


Figure 2: Antioxidant activity of *Euphorbia helioscopia* at 1 (7.5 µg/ml) and 2 (7.5 µg/ml)

4. Discussion

For the treatment of different human ailments medicinal plants play its basic role due to the presence of bioactive compounds in them, such as the treatment of inflammation, oxidative stress, heart diseases and cancer throughout the world since long. Different parts of the medicinal plants are used mostly for the treatment of various diseases because of their fewer side effects as compare to the synthetic drugs. Local herbal system is commonly used world widely. In the same way Pakistan is also a rich country in medicinal plants which are locally used in folk medicines for the treatments of various diseases like infections, cardiovascular diseases, diseases of digestive system and skin diseases etc by local healers. Antioxidant activity of medicinal plants is also very important. The results obtained from *Tamarix aphylla* (TAME) and *Euphorbia helioscopia* methanolic extract (EHME) scavenged the free radicals up to a significant level. TAME as compare to the other medicinal plants methanolic extracts, such as significant results were found by Kordaliet al, (2008), reported that essential oils and phenolic compounds. Javid, (2009), also found that water extract of *Withania somnifera* and *Datura alba* have some bioactive compounds which inhibit significantly effect. Our result showed that the free radicals scavenging are directly proportional to the concentration of the extract used. Kanegusuket al, (2001) reported organic fraction of *Rubus imperialis* (C.) showed more cytotoxicity zaidiet al, (2006) studied that methanolic fraction of *Arceuthobium moxycedri* exhibited 100% effects at high dose which are in friendship to our result. The result of present study evaluated the folk use of this medicinal plant and suggests that methanolic extract possess some bioactive constituents having anticancer activities that can be the central point of new drugs having anticancer and shielding role against different pathogens.

5. CONCLUSIONS

This research report concludes that *Tamarix aphylla* (TAME) and *Euphorbia helioscopia* methanolic extract (EHME) showed significant antioxidant effect which turns our intention for purification of its bioactive metabolites.

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