Antioxidant Activity and Phytominerals Study of Some Asteraceae Species Growth in Western of Lraq

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Abstract

The antioxidant efficacy of aqueous extracts of twelve plants of the Asteraceae family, which is from natural flora, was investigated by the method of scavenging free radicals of the compound Diphenylpicrylhydrazyl (DPPH) namely *Aster subulatus, Calendula officinalis, Carduus pycnocephalus, Carthamus Oxantea, and Carthamus Oxantea. linearis, Launaea nudicaulis, Sonchus maritimus* and *Sonchus oleraceus*, this activity is compared to an inhibition ratio (IC50) half of the maximum inhibitor concentration of 50 of the standard ascorbic acid (vitamin C) antioxidant. the most effective of which was *Carhamus oxyacantha,* which reached 68.430% and *Centaurea pallescens* 66.432%, and the lowest effectiveness in, *Launaea nudicaulis* was 40.430% and *Koelpinia linearis* was 43.816%. The mineral elements were analyzed in the aerial part of plants : (K, Na, , Mg, Ca, and P) using Atomic absorption (Spectrophotometer apparatus 5000 (Atomic) - the results showed that plants contain very good ratios of elements as the best plant in terms of content was *Carduus pycnocephalus* and *Carthamus oxykontha.*

Keyword*: phytominerals, Asteraceae species; toxicity; biological changes.*

Introduction

Antioxidants are chemical compounds that can bind to free radicals without turning into a free root, provided that they are not harmful to the body and are subject to excretion, that is, the body can get rid of them, they work to provide the free electron that binds with the other free electron resulting from the oxidation process, thus reaching The state of stability .(1)and with this mechanism, the antioxidants maintain the cell and not change the chemical composition of the basic components of the cell, such as fats, proteins, genetics, etc. They are oxidized, and thus you can delay or prevent the emergence of oxidation significantly and with multiple mechanisms, some of which exist naturally in the body, that is, they are self-forming, and the body of the organism manufactures them in order to protect itself from the impact of oxidation of enzymes and vitamins, such as vitamin A, C, E Secondary metabolites in plants .(5)which are found in fruits, vegetables and herbs, examples of which are carotenoids. rotenoids, phenolic compounds and flavonoids that trap free radicals and are more effective than vitamins. Antioxidants are also added to foods to help prevent spoilage, Exposure to oxygen and sunlight are the main factors causing food oxidation. (6)The Asteraceae family is one of the largest families in vascular plants at all, and the majority of this family is either in the form of trees, shrubs or herbs, and it is one of the richest plant families in the world as it has about 1600-1700 genera and 24000 species, Monoecious, leaves alternate or opposite, flowers bisexual, the female radial of various shapes, and the corolla is either ligulate in the tubular flowers in the discus flowers, and the fruit Achenes. This family have an anti-oxidative potential .(2) and against pathogenic bacteria and infections .(3) and also for cancers, and wild plants possess a good content of mineral elements. (4)The aim of the research is study the antioxidant activity in some wild plants of Asteraceae family and know their content of the main nutrient minerals

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Materials and Methods

Plants collection

The plants were collected during flowering from separate areas in Anbar Governorate, from March to mid-August of 2018, after cleaning the plants, they were naturally dried in shade, taking into account the constant stirring, then they were milled using an electric grinder, and then packed with clean and sterile glass containers.

And sterilized [7]

Measurement of oxidative efficacy

the DPPH method, according to what was stated in. [8]250 mg of aqueous leaf extract (5 mg of crude extract / ml of water) was dissolved, and the volume was supplemented to 10 ml of methanol, to a final concentration of 0.5 mg / ml. Standard solutions were prepared by dissolving 250 mg of Ascorbic acid in 25 ml of distilled water, so that the final concentration was 10 mg / ml, and the latter was considered a storage solution of which four concentrations were prepared from which four concentrations were prepared from which four concentrations of 0.4, 0.3, 0.2, 0.1 (mg / ml) were considered as a control sample and placed in Tubes with plant solutions one by one. 3 ml of DPPH root was added to all tubes and shaken well in the Voretx apparatus. The tubes were placed in the dark for half an hour. After this period, the absorbance of the solutions was measured at a wavelength of 517 nm compared to the control sample DPPH.

Determination of mineral elements

The concentrations of mineral nutrients (K, Na, Mn, Mg, Ca, and P) were measured using an atomic absorption device (Atomic -absorption Spectrophotometer 5000, by weighing 1g samples of the plant powder for the studied species and cooled down, dissolve the ashes in 5 ml of hydrochloric acid (20%), then filter the solution using filter paper, and complete the volume to (50) ml using distilled water. [9]

Results and discussion

Oxidative Activity:

The ability of the aqueous extracts of the studied plants to scavenge free radicals was tested using the compound diphenyl-1-picrylhydrazyl-2,2 DPPH, which was transformed into 1,1-diphenyl-2-picrylhydrazine in a reduced form DPPH –H, where it gave an antioxidant such as ascorbic acid. The hydrogen root of the DPPH reagent leading to a change in coloration. [10] the results of the antioxidant reaction of plants showed that the best DPPH was for *Carthamus oxyacantha* which reached 68.430%, followed by the value of *Centaurea pallensa* 66.432%. Comparing this effectiveness with the IC_{50} value of ascorbic acid which inhibits 50%, we find that these plants greatly surpassed it, which are among the plants of dry areas, and the lowest value of root scavenging was in *Launaea nudicaulis*, which amounted to 40.816%, and Table (1) shows the e percentage of antioxidant efficacy of plants compared to ascorbic acid.

Table (1): Antioxidant efficacy of the studied genera, compared with ascorbic acid (LSD 5%=2.649)

Taxa	Antioxidant %
Aster subulatus	44.430
Calendula officinalis	50.321
Carduus pycnocephalus	58.281
Carthamus oxyacantha	68.430
Centaurea bruguierana	63.654
Centaurea pallescens	66.432
Koelpinia linearis	43.430

Cont... **Table (1): Antioxidant efficacy of the studied genera, compared with ascorbic acid (LSD 5%=2.649)**

Launaea nudicaulis	40.816
Sonchus maritimus	49.439
Sonchus oleraceus	47.921
Vitamin C	49.396

The results obtained from the antioxidant reaction of the aqueous extracts of the studied plants showed high efficacy and great ability to displace free roots, and this is confirmed by the studies on both wild plants having a high ability to heal and increase the body's immunity, especially the species of the Asteraceae family .[13]These plants possess significant amounts of phenolic acids, as well as flavonoids, tannins and fatty acids, as such compounds are widely distributed in the plant kingdom, especially this family .[11]which are distinguished by their effective properties as antioxidants, as the plant components are the most displacement of the roots. This has been confirmed in many studies. [12] Moreover, the efficacy of plant extracts is relatively related to the content of the active chemical compounds they contain, and this was very clear for each of the plant regions which classified as xerophyte plant .

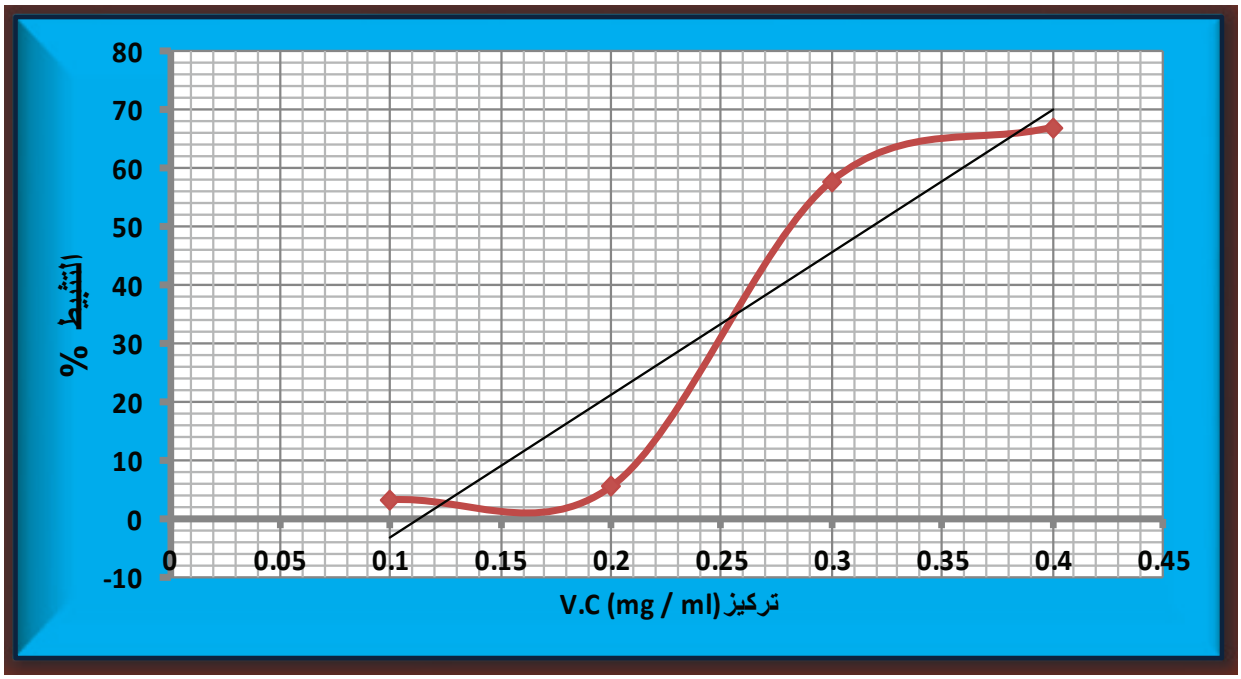

Figure (1): Standard curve for ascorbic acid to find the inhibitory concentration of the oxidative half-activity of the DPPH root.

The content of mineral elements

shows Table (2,3,4,5) the content of the studied plants of mineral nutrients. The results showed a high percentage of potassium, sodium and manganese, which work to protect the body from osteoporosis and paralysis, and works to increase fertility, and is useful in treating muscle spasm and that its severe deficiency leads To stop the heart muscle in the state of diastole, as it is useful in cases of mental deficiency and has importance in regulating blood pressure and heartbeat and activating all excretory systems in the body such as the kidneys and colon by exchanging ions with potassium, as well as its importance in excreting CO2 from the body and without it to accumulate CO_2 in The blood has become acidic, thus preventing the occurrence of cancer diseases, and

this element has an important role in the representation and transport of sugars inside the plant. [16] and the table shows the presence of phosphorus, as its presence in the plant occurs naturally as a result of its absorption from the soil and is important in Water balance within cells, and it is important for neuromuscular stimulation as it is excreted from the body through the kidneys .[14]Calcium has a benefit in preventing osteoporosis and joint pain, and it also has an important role in the blood clotting process as its ions are naturally present in the blood, factor (4) that is involved in the formation of the enzyme that helps convert prothrombin in to thrombin, and the presence of this The element explains the indications for using the plant as a tonic and tonic for the heart muscle [15] And the presence of magnesium, calcium and phosphorous in wild plants, which gives them a role in treatments for morbidity and bone formation, and is useful for muscle contraction, hypertonia, reducing and treating nausea, and gastrointestinal disorders, and this explains the importance of the plant in the treatment of general weakness of the body and anemia to produce Hemoclopin, which increases the body's resistance, supports the immune system, as well as increases energy production, which the body needs greatly, especially in women and children .[6]As for manganese, their percentage was weakness, anemia, and skin pimples as well as being an antioxidant and that these elements have a role in increasing the oxidative activity of plants [4].

Table (2) the values of the mineral elements phosphorous and manganese in the studied genera of Asteraceae family

Taxa	Mineral	
	Mn ppm	P Ppm
Aster subulatus	120	811
Calendula officinalis	152	789
Carduus pycnocephalus	183	810
Carthamus oxyacantha	163	503
Centaurea bruguierana	132	409
Centaurea pallescens	124	854
Koelpinia linearis	165	822
Launaea nudicaulis	201	799
Sonchus maritimus	254	793
Sonchus oleraceus	176	699
Picris babylonica	169	496
Xanthium brasilicum	231	643

Table (3) the values of the metallic element magnesium in the studied genera of the Asteraceae family

Taxa	Mg %
Aster subulatus	0.123
Calendula officinalis	0.105
Carduus pycnocephalus	0.176
Carthamus oxyacantha	0.104
Centaurea bruguierana	0.120
Centaurea pallescens	0.122
Koelpinia linearis	0.110
Launaea nudicaulis	0.151
Sonchus maritimus	0.114
Sonchus oleraceus	0.190
Picris babylonica	0.164
Xanthium brasilicum	0.120

Table (4) the values of the mineral element calcium in the studied genera of the Asteraceae family

Taxa	Ca %
Aster subulatus	0.101
Calendula officinalis	0.126
Carduus pycnocephalus	0.120
Carthamus oxyacantha	0.142
Centaurea bruguierana	0.128
Centaurea pallescens	0.103
Koelpinia linearis	0.111
Launaea nudicaulis	0.113
Sonchus maritimus	0.176
Sonchus oleraceus	0.123
Picris babylonica	0.187
Xanthium brasilicum	0.199

Table (5) the values of the mineral elements Sodium and Potassium in the studied genera of the Asteraceae family

Taxa	Na %	K%
Aster subulatus	0.231	0.230
Calendula officinalis	0.298	0.211
Carduus pycnocephalus	0.276	0.201
Carthamus oxyacantha	0.234	0.311
Centaurea bruguierana	0.322	0.318
Centaurea pallescens	0.344	0.198
Koelpinia linearis	0.234	0.230
Launaea nudicaulis	0.210	0.212
Sonchus maritimus	0.209	0.240
Sonchus oleraceus	0.291	0.332
Picris babylonica	0.245	0.309
Xanthium brasilicum	0.345	0.321

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Conflict of Interest: None

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