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Antioxidant and antibacterial activities of essential oil extracted from *Ranunculus arvensis* L.

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ABSTRACT

The most common use of Ranunculus species in traditional medicines are anti-rheumatism, intermittent fever and rubefacient. The objective of this research was to formulate and evaluate anti-bacterial activity against different bacterial strains, and his essential oil from Ranunculus arvensis L. Antioxidant activity of this essential oil was determined by DPPH radical scavenging. An antibacterial activity analysis was carried out using paper disk diffusion the essential oil of Ranunculus arvensis L displayed antibacterial activity against the tested bacteria in the disk diffusion method. The data obtained in previous studies indicate that the Ranunculus arvensis L have a significant antioxidant and antibacterial activities. Only few pharmacological activities have been studied of these species. Most of studies up till now have concentrated their attention on the antibacterial, antifungal, Anti-inflammatory and analgesic of different extracts. There is a lack of comprehensive isolation studies issued or comprehensive investigation of their pharmacological actions. Thus, we believe that the isolation of new active component from these species would be of huge scientific value.

Keywords: Ranunculacea, Ranunculus arvensis, Antioxidant, DPPH, Antibacterial activity

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INTRODUCTION

Algeria presents with the nature of their soils and its climate a grat variety of vegetation.

Phytochemical studies carried out on various Ranunculus species. The genus Ranunculus belongs to the family Ranunculaceae, which comprises 50 genera and 2000 species**[1],**revealed that they produce compounds belonging to different secondary metabolite groups, including triterpenesaponins**[2]**, alkaloids **[3]**, flavonoids **.[4]**, fatty acids and organic acids **[5].**Although several plants belonging to this genushave been shown to possess important biological properties such as antioxidant, antibacterial, antiviral **[6,7]**,antimicrobial **[8],** anti-inflammatory, antiprotozoal **[9]**, xanthine oxidaseinhibitory, andnematocidal activities **[10].**

The present study aims to evaluate the antioxidant andantibacterial activities of essential oil prepared from *Ranunculus arvensis* L.

The essential oils of the ranunculus arvensis L, has been the subject of many studies in medicinal and agricultural**[11].**

The essential oils extracted by steam water distillation (the extractor working continuously, hydrodistillation)
The EO is separated from the aqueous phase by diethyl ether, dried over an anhydrous Na_2SO_4 and stored in dark bottle.

MATERIALS AND METHODS

plant material
Ranunculus arvensis was collected in april 2006 from Constantine (east of Algeria)

And identified by Prkaabache (university of setif Algeria).

preparation of extracts
DPPH – radical scavenging activity assay
The capacity of the essential oil to scavenge the DPPH (2,2- diphenyl – 1- picrylhydraryl) radical.

Extracts (0,25 mg) were dissolved in 4 ml of methanol (0,0625mg). Then it was mixed with (0,5ml) of methanolic solution of DPPH (1mM) and allowed to stand at room temperature for 30mn. The optical density of the mixture was measured at 517 nm.

DPPH – RSC values were expressed as a percentage ofDPPH radical discolouration. The ascorbic acid was used as a positive control (1mg/ml).**[12](Table1).**

Table 1: DPPH scavenging activity of ascorbic acid

Concentration of ascorbic acid 1ml=3µg	% of increase DPPH Scavenging (ascorbic acid)
1ml	63.51
2ml	64.86
3ml	66.21
4ml	67.56
5ml	68.91

Antibacterial activity test
Microorganism strains
All of the bacteria clinical strains; *Escherichia coli, klebsellapneumoni, Staphylococcus aureus, Bacillus substilus Bacillus amyloalcaficies, Enterobacter sp., Seratia sp., Proteus mirabilis and Proteus vulgaris* were obtained from Bacteriology Laboratory Constantine Hospital University (C.H.U)**[1].**

Antimicrobial assay
The antibacterial activity of the essential oils was tested by the paper disk diffusion technique.

The extracts were dissolved in DMSO and then 20µl of this extracts were absorbed onto sterile 6- mm diameter filter paper disks **[13].**

The bacterial strains were inoculated on Mueller – Hinton broth and incubed for 24h at 37± 0,1C°.

Antibacterial activity was evaluated by measuring the zone of inhibition (in mm) against the test organisms;All experiments were done under sterile conditions in duplicate and repeated three times. DMSO was used as a negative control**[14].**

RESULTS AND DISCUSSION

The antioxidant activity of the essential oils prepared from the above – mentioned *Ranunculus arvensis* are reported in **(table 2)** and **(fig1).**

Table 2: DPPH scavenging activity of essential oil of *Ranunculus arvensis*L

Concentrations of essential oil 1ml=3µg	% of increase DPPH Scavenging of essential oil
2	40,6749556
3	48,8454707
4	55,8614565
5	62,6998224
6	70,1598579

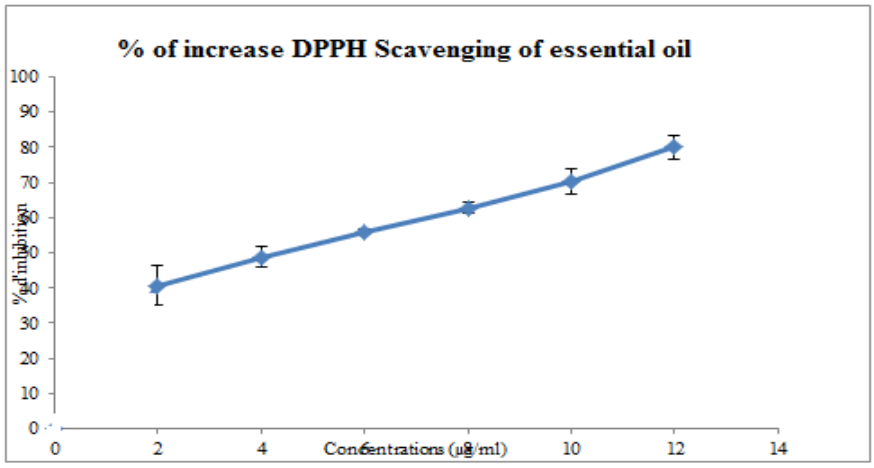

Fig.1:DPPH scavenging activity of essential oil of *Ranunculus arvensis* L

They may very well be the main components that contribute to the antioxidant activity observed in the present study. The antibacterial activity levels of the extracts of this plants evaluated by the disk diffusion are reported in **(table 3).**

Table 3: Effect of Antibacterial activity of *Ranunculus arvensis L*

Microorganism	Antibacterial activity (Zone of inhibition) in mm
Escherichia coli	18
Staphylococcus aureus	21
Enterobactersp	14
Proteusvulgaris	15

In the disk diffusion assay the maximal inhibition zones ranged between (15-21mm), which indicate that the extracts of *Ranunculus arvensis* showed significant activity against the tested bacterial species.

CONCLUSION

In conclusion, the data obtained in previous studies indicate the Ranunculus species possess antioxidant and antibacterial properties.

The findings in our study also demonstrate that the *Ranunculus arvensis* have a significant antioxidant and antibacterial activities.

Further investigations are necessary to identify the compounds responsible for the activity of phytochemical screening extracts.

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