Antioxidant activity of the species: *Ammoides atlantica* (Coss. Et Dur.) Wolf. of family Apiaceae

Zine El Abidine ABABSA¹, Safia IHOUAL², Wahiba KARA ALI², Souheila LOUAAR¹, Hocine LAOUER³, Salah AKKAL¹*, Kamel MEDJROUBI¹

¹Laboratoire de Phytochimie et Analyses physicochimiques et Biologiques, Département de Chimie, Faculté des Sciences exactes, Université de constantine 1 -Constantine, Route d’Ain el Bey, 25000 Constantine, Algérie

²Laboratoire de biotechnologie des molécules bioactives et de la physiopathologie cellulaire, Faculté des sciences de la nature et de la vie, Université constantine 1 -Constantine, Route d’Ain el Bey, 25000 Constantine, Algérie

³Laboratoire de Valorisation des Ressources Naturelles Biologiques, Département de Biologie, Université Ferhat Abbas de Sétif, Algérie.

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**Abstract:** The present work concerns the biological evaluation of the species *Ammoides atlantica* member of the family Apiaceae. After the extraction of the aerial parts of this plant, Antioxidant biological test of its méthanolic extract using DPPH: 2,2-diphenyl-1-picrylhydrazyl (Molecular formula C₁₈H₁₂N₅O₆) solution in MeOH (100µg/ml) was used in this assay (Takao and al., 1984) to assess the free radical scavenging (antioxidant) property of the extract. Quercetine, a well known natural oxidant was used as reference; its IC₅₀ gives 0,6549; the obtained value is very close to that of the reference (the Quercetine).

**Keywords:** *Ammoides atlantica*; Apiaceae; méthanol extract; Antioxidant; DPPH; Quercetine.

**Introduction**

The genus *Ammoides atlantica* is endemic in Algeria, it is widespread in the Mediterranean region, Biennial or perennial plant with thick stem fitted with a rosette of basal leaves. Slighty branched stems. Leaves Umbels 3-6 rays. Fruit 2-2.5 mm, it is found in lawns mountains above 1000 m (quezel and Santa., 1962).

In Algerian traditional medicine, the aerial parts of *Ammoides atlantica* are reported to have a wide range of biological activities such as antibacterial, antidiarrheic and diabetic activities (Laouer and al., 2003). In this study Antioxidant activity using méthanol extract of their aerial parts. These aerial parts are very rich of flavonoids, which are known by their anti oxidant activity. It is necessary to study further the different extracts: (CH₂Cl₂ extract, AcOEt extract and n-butanolic extract) in order to isolate and identify these metabolites, and to investigate the antioxidant activity for each flavonoid and understand the relationship between this activity and chemical structure of each compound.

**Materials and methods**

**Plant material**

The aerial parts of *Ammoides atlantica* were collected from Megress Mountain (Eastern Algeria) at 1500 m above sea level during June 2010, and identified by Dr. H. Laouer. A voucher specimen (B6308) has been deposited in the Museum Natural history of Nice (France).

**Preparation of extracts**

The air-dried powdered parts (700 g) of *Ammoides atlantica* were macerated three times in boiling methanolic solution (70%). The MeOH extract was concentrated to dryness.
Determination of Antioxidant activity

Qualitative assay

Test extract of *Ammoides atlantica* (5mg/ml) and Quercetine were dissolved in MeOH and applied on a TLC plate (Merck, Germany). After this plate was sprayed with DPPH solution using an atomizer and allowed to develop for 30 min. The white spots against a pink background indicated the antioxidant activity.

Quantitative assay

Stock solutions of the test extract of *Ammoides atlantica* were prepared to obtain different concentrations (0.198, 0.0495, 0.0297, 0.0198, 0.0099, 0.00495, 0.002475, 0.01188 mg/ml). Prepared solutions (30µl each) were mixed with DPPH (3ml) and allowed to stand 15 min for any reaction to occur. The UV absorbance of these solutions was recorded at 517 nm. The experiment was performed in triplicate and the average absorbance was noted for each concentration. The same procedure was followed for the Quercetine (used as reference). The percentage (I%) of inhibition of DPPH by the methanolic extract of *Ammoides atlantica* was calculated from the equation:

\[ I\% = \frac{AC - AE}{AC} \times 100 \]

where
- AC: Absorption in the absence of the inhibited control (negative control).
- AE: Absorption in the presence of the inhibited sample (extract).

Results and discussion

The methanolic extract of *Ammoides atlantica* exhibited a very important antioxidant in the DPPH assay with a maximal inhibition activity of 94.51%.

The results summarized in Table 1 showed that the percentage of inhibition of DPPH radical increase proportionally with the extract concentration, the obtained inhibition (I%) varied from 94.51% to 1.38%. These results were compared with those of the Quercetine (Table 2).

Table 1: Antioxidant activity of the methanolic extract of *Ammoides atlantica* at different concentrations (mg/ml).

<table>
<thead>
<tr>
<th>Concentrations of extract (Ammoides atlantica)</th>
<th>% of DPPH radical by Extract (Ammoides atlantica)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.198</td>
<td>94.51%</td>
</tr>
<tr>
<td>0.0495</td>
<td>94.18%</td>
</tr>
<tr>
<td>0.0297</td>
<td>93.85%</td>
</tr>
<tr>
<td>0.0198</td>
<td>89.94%</td>
</tr>
<tr>
<td>0.0099</td>
<td>71.63%</td>
</tr>
<tr>
<td>0.00495</td>
<td>69.13%</td>
</tr>
<tr>
<td>0.002475</td>
<td>45.76%</td>
</tr>
<tr>
<td>0.001188</td>
<td>1.38%</td>
</tr>
</tbody>
</table>

Table 2: Antioxidant activity of Quercetin at different concentrations (mg/ml).

<table>
<thead>
<tr>
<th>Concentrations (mg/ml)</th>
<th>% of DPPH radical by Quercetin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02</td>
<td>96.06%</td>
</tr>
<tr>
<td>0.01</td>
<td>95.91%</td>
</tr>
<tr>
<td>0.005</td>
<td>95.81%</td>
</tr>
<tr>
<td>0.0025</td>
<td>94.72%</td>
</tr>
<tr>
<td>0.0012</td>
<td>46.45%</td>
</tr>
</tbody>
</table>

Relationship between antioxidant activity and concentration of the extract of *Ammoides atlantica*

The correlation between antioxidant activity and concentrations of the extract of *Ammoides atlantica* is shown (Figure 1). The R² value was 0.244. The present study shows that highly positive relationship exists between the antioxidant activity and the increasing in concentrations of the extract. Previous work (Cai and al., 2004; Shan and al., 2005) showed that there were highly positive linear correlation between antioxidant capacity and total phenolic content of a large number of spices and herbs.
Antioxidant activity of Ammoides atlantica (Coss. Et Dur.) Wolf.

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Figure 1: The correlation between antioxidant activity and concentrations of the extract of Ammoides atlantica.

Conclusion

The present study addressed the phytochemical and biological investigation of Ammoides atlantica leading to the identification of eight flavonoids compounds. The positive antioxidant activity, suggests the potential presence of phenolic compounds in Ammoides atlantica.

References


