FOLK MEDICINE OF TRÁS-OS-MONTES (PORTUGAL). TRADITIONAL USES AND BIOACTIVE COMPOUNDS OF SIX COMMON MEDICINAL SPECIES

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Ethnobotanical surveys conducted in north-eastern Portugal reported plant knowledge and uses of several wild species in folk medicine, based on field studies using participant observation, unstructured and structured interviews, including freelisting and free pile-sorting. Taking advantage of a multidisciplinary team, besides botanical inventories and sociocultural and anthropological studies, we set out applied phytochemical research on locally used medicinal plants (more frequently cited, i.e. frequency of citation > 50%) that have special cultural significance. Considering the use reports and informants' selected sites, as well as, local consumers' criteria and the optimal growth stage of each species, samples were collected for analysis with informants' permission and cooperation.

Epidemiological and experimental studies have consistently shown an inverse association between consumption of greens and fruits and the risk for chronic diseases. These physiological functions may be partly attributed to the abundance of antioxidants such as vitamin C, vitamin E, β-carotene and phenolics.

This study reports the first approach to the antioxidant potential evaluation of six species (Glechoma hederaceae, Foeniculum vulgare, Malva sylvestris, Oregano virens, Rosa canina, Thymus mastichina), often used in folk medicine, accessed by biochemical assays used as models for the lipid peroxidation damage in biomembranes. Bioactive compounds such as phenolics, flavonoids, vitamin C and vitamin E were also determined. Significantly negative linear correlations were observed between the bioactive compounds and antioxidant activity EC50 values. Experimental phytochemical research points to pharmacological effects that confirm the importance of the empirical use of these species and their contribution to a good health condition.
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1. Introduction/Introducción

Ethnobotanical surveys conducted in north-eastern Portugal along several years (2000-2009) reported plant knowledge and use of almost 150 wild species used in folk medicine. This poster documents traditional knowledge and reports the first approach to the antioxidant potential evaluation of six of these species with particular cultural significance, Glechoma hederacea (1), Foeniculum vulgare (2), Malva sylvestris (3), Oregano virens (4), Rosa canina (5), Thymus masticha (6), accessed by biochemical assays used as models for the lipid peroxidation damage in biomembranes. Bioactive compounds such as phenolics, flavonoids, vitamin C and vitamin E were also determined.

2. Methodology/Metodología

• Ethnobotanical surveys: field studies, participant observation, unstructured and structured interviews, free-listing and free pile-sorting.
• Sampling: Considering the use reports and informants’ selected sites, as well as, local consumers’ criteria and the optimal growth stage of each species, samples of different plant parts (leaves, shoots, flowers and fruits) were collected with informants’ permission and cooperation.
• Phytochemical analysis: Phenolics, flavonoids and ascorbic acid by spectrophotometrical techniques.
• Chemical assays: DPPH radical scavenging capacity and reducing power.
• Biochemical assays: inhibition of β-carotene bleaching and inhibition of lipid peroxidation in brain tissue (TBARS assay).
• Ethnobotanical observation-participant, entrevistas abiertas y estructuradas, encuestas en el campo y categorización libre.
• Análisis fitoquímicos por espectrofotometría.
• Evaluación de propiedades antioxidantes: poder reductor e inhibición del radical libre DPPH; ensayo TBARS

3. Results/Resultados

Several wild species were simultaneously mentioned for medicinal and food purposes. Besides their medicinal interest, these species had always a significant use in local cuisine, specifically to preserve food, such as olives, sausages and pickles.

Throughout historical periods of starvation, they were the tastiest ingredient of very poor, insufficient and monotonous daily meals.

Since they are important ingredients of the folk pharmacopoeia and traditional cuisine some of them have been semi-domesticated and are still cultivated in homegardens and present in every homesteads.

4. Conclusion/Conclusión

• Experimental phytochemical research points to pharmacological effects that confirm the importance of the empirical use of these species and their contribution to a good health condition.
• The radical scavenging activity and lipid peroxidation inhibition capacity support their use in folk medicine against several chronic diseases known to be related to the production of ROS and oxidative stress.

5. Acknowledgements/Agradecimientos

We are grateful to all the people of Trás-os-Montes communities for participating and sharing with us all their knowledge, enthusiasm and patience. We also thank Elisabete Martins who collaborated in data collection.

Table 1. Ethnobotanical information about the six species studied, Surveyed area: Bragança, Vinhais and Miranda do Douro, three municipalities of the North-eastern Portugal. Frequency of citation > 50%

<table>
<thead>
<tr>
<th>Species</th>
<th>Local name</th>
<th>Part of plant used &amp; preparation</th>
<th>Medicinal use or property</th>
<th>Edible use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gléjoma hederacea</td>
<td>L.</td>
<td>Flores, hojas, raíces, infusión</td>
<td>Diurético, antitumorales, antiinflamatorios, antinflamatorios</td>
<td>Condimentos, también para uso culinario</td>
</tr>
<tr>
<td>Foeniculum vulgare</td>
<td>L.</td>
<td>Inflorescences/infusion</td>
<td>Anticongestivos, carminativos, antirrespiratorios</td>
<td>Para poder e preparar otros alimentos</td>
</tr>
<tr>
<td>Malva sylvestris</td>
<td>L.</td>
<td>Flores, hojas, raíces, infusión</td>
<td>Depurativos, antiespasmódicos, antinflamatorios</td>
<td>Para poder e preparar otros alimentos</td>
</tr>
<tr>
<td>Oregano virens</td>
<td>L.</td>
<td>Inflorescences/infusion</td>
<td>Anticongestivos, carminativos, antirrespiratorios</td>
<td>Para poder e preparar otros alimentos</td>
</tr>
<tr>
<td>Rosa canina</td>
<td>L.</td>
<td>Inflorescences/infusion</td>
<td>Anticongestivos, carminativos, antirrespiratorios</td>
<td>Para poder e preparar otros alimentos</td>
</tr>
<tr>
<td>Thymus masticha</td>
<td>L.</td>
<td>Inflorescences/infusion</td>
<td>Anticongestivos, carminativos, antirrespiratorios</td>
<td>Para poder e preparar otros alimentos</td>
</tr>
</tbody>
</table>

Figura 1 – A: Bioactive compounds; B: Antioxidant activity EC50 values

• Phenolics and particularly flavonoids, were the main antioxidant compounds found in the samples. O. vulgare presented the highest values.
• Origanum vulgare gave the best results in all the antioxidant activity assays (EC50) values ≤ 0.45 mg/ml), which is in agreement with the highest content in phenolics found in this species.
• The very low EC50 value (0.01 mg/ml) obtained for TBARS inhibition in brain homogenates is very promising, considering that brain is highly sensitive to oxidative damage.

Research Projects and funding/Proyectos y financiación:

Figuras 1 a 6

• Phenolics
• Flavonoids
• Ascorbic acid

DPPH scavenging activity

Reducing Power

Inhibición de TBARS en el tejido cerebral

Medicina tradicional

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