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Traditional knowledge and uses of plant and fungi in the north-eastern Portugal: potential sources for pharmacological research and bioactive compounds

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1. Introduction

Despite many ethnobotanical studies all over the world, there was little ethnobotanical research in the Iberian Peninsula before the 1980s. In the last 20 years (and especially in the last decade) many surveys were carried out in various regions of Spain contributing to good scientific ethnobotanical knowledge of the Spanish part of the Iberian Peninsula. However, little or no scientific ethnobotanical research took place in Portugal before 2000 (Carvalho and Frazão-Moreira, 2006). There are some earlier publications about useful plants that do not follow ethnobotanical methodologies and most of them lack the plants' scientific names.

Recent ethnobotanical research in the North-eastern Portugal region (Carvalho, 2005) enhanced that medicinal and food uses have always been relevant reasons for popular plant management and are among the most persistent ones even when people are progressively losing their close relationship with nature.

Traditional knowledge on plant and fungi resources and the prevailing of plant use practices are very important to local agro-forestry approaches. It is possible to take a new insight into old resources and knowledge and to obtain useful data to promote small and medium undertaking in the area which can allow people fixation on a very depressed region, with serious social and economic constrains.

2. Objectives

To record and document traditional knowledge, local uses and practices about plant and fungi, in the Natural Park of Montesinho (PNM), a protected area in the north-eastern Portuguese region. To identify potential sources of phytochemical/pharmaceutical compounds (on the basis of research team expertise and experience) with interest for pharmacological research and local phytotherapy and gastronomy.

3. Methods

Data have been collected during ethnobotanical fieldwork conducted since 2000, using consented non-structured and semi-structured interviews, group discussions and participant observation. Data were entered into a database and analyzed according to qualitative and quantitative methods.

4. Results

An ethnobotanical catalogue related to 364 vascular taxa, 55% wild species, has been set. Twenty five fungi species and lichen were also mentioned. About 848 practical uses organized in ten main categories and corresponding to 626 popular names were reported. A high consensus index (0.93) was registered. Medicinal plants (166 spp.) and food plants (120 spp.) had the highest number of citations and were those with the highest number of described applications (Carvalho 2005). It has been empirically recognized for centuries that plant essential oils and extracts interfere with microorganisms in various ways. More than 500 studies attest the

antimicrobial effects of essential oils inhibiting growth of even antibiotic resistant strains from bacteria, yeast and filamentous fungi (Dal Sasso et al 2006). Several species and/or their medicinal and food uses mentioned in the PNM have never been reported before. Namely, there is a high number of species (42 vascular plants) used as spices, as herbal teas and for food preservation processes. About 30% of the reported species are potential sources of essential oils and phenolic components with antimicrobial and bactericidal effects. Macrofungi traditionally used in local gastronomy are, mainly, mycorrhizal fungi associated to some ecologically and economically important forestry and agro-forestry species. The protective effect of mycorrhizal macrofungi against phytopathogenic fungi is well known. Numerous studies have reported that several ectomycorrhizal fungi, along with the recognized beneficial effect on plants growth and nutrition, seem to exert a protective effect against root pathogens (Martins et al 1997), and thus can be used as biocontrol agents. A considerable amount of inventoried species are still being gathered and used in several rural communities from the PNM. However, ethnobotanical knowledge is mainly found in people from 60 to 80 years old and varies between genders. There is a non negligible risk of information loss, due to a decrease of the acquaintance transmission and associated traditional practices. This could limit the cultural, social and scientific potential value of this knowledge for the future generations.

5. Conclusion

The ethnobotanical use of local botanical and mycological species from Montesinho Natural Park suggests that many of those applications are related to the bioactivity of the secondary metabolites produced. The chemical composition in volatile compounds of botanical and mycological wild flora from Montesinho Natural Park is almost unknown. The potential of approaches in the area of nutraceuticals and ethnopharmacology has not been explored systematically. These assumptions confer increased interest in the clarification of the chemical basis of the traditional uses of plants and fungi. The production of bioactive compounds using local material can be used as an important income for local economy and a contribution to rural development.

Keywords: traditional knowledge, wild food and remedies, edible plants, ethnopharmacology

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Traditional Knowledge and Uses of Plant and Fungi in the North-eastern Portugal: Potential Sources for Pharmacological Research

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Objectives:

- ✓ To record and document traditional knowledge (TK), local uses and practices about plant and fungi, inside a north-eastern Portuguese region (PNM).
- ✓ To identify potential sources of phytochemical compounds particularly interesting to local phytotherapy and pharmacological research.

Methods:

- ✓ Ethnobotanical fieldwork conducted since 2000.
- ✓ Consented non-structured and semi-structured interviews, group discussions and participant observation.
- ✓ Data set in a computerized database and analyzed according to qualitative and quantitative methods.

Results:

- ✓ An ethnobotanical catalogue related to 364 vascular *taxa*, 55% wild, and 25 fungi species (Carvalho 2005).
- ✓ 848 practical uses organized in ten main categories and corresponding to 626 popular names. Consensus index 0.93.
- ✓ Medicinal plants (166 spp.) and food plants (120 spp.) had the highest number of citations and are those with the highest number of described applications. Some uses have never been reported before.
- ✓ 42 vascular plants used as spices, as herbal teas and for food preservation processes. About 30% are potential sources of essential oils and phenolic components and can have antimicrobial and bactericidal effects.
- ✓ Very popular macrofungi in local gastronomy are mainly mycorrhizal fungi associated to some ecologically and economically important agro-forestry species, such as oak, chestnut and pine trees.
- ✓ Several ectomycorrhizal fungi, along with the recognized beneficial effect on plants growth and nutrition, seem to exert a protective effect against root pathogens (Martins et al 1997), and thus can be used as bio control agents.
- ✓ A considerable amount of inventoried useful species are still being gathered and used in several rural communities from the PNM. However, ethnobotanical knowledge is mainly found in people from 60 to 80 years old and varies between genders. There is a non negligible risk of information loss.

References:

- Carvalho, A. M. 2005. *Etnobotánica del Parque Natural de Montesinho. Plantas, Tradición y Saber Popular en un Territorio del Nordeste de Portugal*, Ph.D. dissertation, published in CD-Rom. Madrid: Universidad Autónoma de Madrid.
- Martins et al, 1997. "Influence of mycorrhization on physiological parameters of micropropagated *Castanea sativa* Mill. Plants". *Mycorrhiza* 7: 161-165.



Conclusions:

- ✓ The ethnobotanical use of botanical and mycological species suggests a high relationship between local uses and chemical composition in volatile compounds (e.g. bioactivity of the secondary metabolites produced) of the wild flora from the PNM. However, these species have not been explored systematically as nutraceuticals or as species with ethnopharmacological potential.
- ✓ These assumptions increase the interest in current research on the chemical basis of traditional uses of plants and fungi. The production of bioactive compounds using local material can be used as an important income for local economy and a contribution to rural development.
- ✓ TK and old resources can provide useful data to promote small and medium undertaking in the area and contribute to people fixation on a very depressed region, with serious social and economic constraints.
- ✓ Moreover, the ecological and economic value of these biological resources, the communities' benefits and equitable distribution of the profits should be a matter of concern for future research or applied projects.

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