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Medicinal plants used in the Huasteca Potosina, México

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ABSTRACT

Ethnopharmacological importance: Medicinal plants have been a source of medicinal compounds since ancient times. This study documented the use of plant species in traditional medicine in the municipality of Aquismón, San Luis Potosí, México.

Materials and methods: Direct interviews were performed with inhabitants from Aquismón. The interviews were analyzed with two quantitative tools: (a) the informant consensus factor (ICF) that estimates the level of agreement about which medicinal plants may be used for each category and (b) the relative importance (RI) that determines the extent of potential utilization of each species.

Results: A total of 73 plant species with medicinal purposes, belonging to 37 families and used to treat 52 illnesses and 2 cultural filiations were reported by interviewees.

Nineteen mixtures with medicinal plants were reported by the interviewers. *Matricaria recutita* was the most used plant for combinations (five mixtures). The results of the ICF showed that diseases of the digestive and respiratory systems had the greatest agreement. The most versatile species according to their RI are *Ruta graveolens*, *Tagetes erecta*, *Ocimum basilicum* and *Erigeron karwinskianus.*

Conclusion: This study demonstrates that plant species play an important role in healing practices and magical–religious rituals among inhabitants from Huasteca Potosina. Further studies with medicinal flora, including mixtures, from Aquismón are required for the experimental validation of their traditional uses.

1. Introduction

Around 80% of general population in the world use plants to treat several illnesses (UICN et al., 1993). Medicinal plants are an important source of current drugs, about 25% of the drugs prescribed worldwide come from plants (Rates, 2001).

Mexico has a great knowledge in traditional medicine since ancient times. Colonial documents such as *Libellus de Medicinalibus Indorum Herbis,* written by Martín de la Cruz and Juan Badiano, and *Historia de las cosas de la Nueva España,* written by Bernardino de Sahagún, provide information about medicinal plants used for the Aztecs before the arrival of the Spaniards (Lozoya, 1984). In Mexico there are over 23,400 vascular plants (CONABIO, 2006) and 5000 species are used with medicinal purposes (Bye, 1993). More than 90% of the Mexicans use medicinal plants for the empirical treatment of several diseases and the most common medicinal plants used are *Allium sativum*, *Citrus limon*, *Gnaphalium sp.*, *Eucalyptus globulus*, *Mentha sp.*, *Matricaria recutita* and *Opuntia ficus indica* (Taddei-Bringas et al., 1999; Romero-Cerecero et al., 2004; Poss et al., 2005; Robles-Zepeda et al., 2011). In addition, over 40% of general physicians in Mexico have prescribed medicinal plants such as *Psyllium plantago*, *Valeriana officinalis, Aesculus hippocastanum* and *Ginkgo biloba* (Romero-Cerecero et al., 2004). People use herbal remedies due to their efficacy, tradition and their low cost. However, they often do not inform their physicians about their use of medicinal plants (Poss et al., 2005).

Quantitative tools used in ethnobotanical studies allow the selection of the most important plants to initiate pharmacological

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studies. Several ethnobotanical studies have been carried out in Mexico. However, only few of them have been done using quantitative tools and published in international scientific journals.

The municipality of Aquismón (San Luis Potosi, Mexico) is part of the region called Huasteca Potosina, located in the coastal plain of the Gulf of Mexico, and includes 26 from the 58 municipalities of the state of San Luis Potosí. The ethnic group Huasteco is a Maya group currently distributed in a strip extending to the north of Veracruz from the mountains of Otontepec, crossing by Tantoyuca and continuing along the northeastern of San Luis Potosi (Gallardo-Arias, 2004). Some surveys regarding the medicinal flora in the Huasteca Potosina have been carried out (Bye, 1979; Domínguez, Alcorn, 1985). However, these reports did not include quantitative tools. In this study, we describe the results of an ethnopharmacological survey about the medicinal use of several plant species used by inhabitants from Aquismón, San Luís Potosí, México.

2. Materials and methods

2.1. Study site

The municipality of Aquismón is located at 21°37′N latitude and 99°01′W longitude in the southeastern portion of the state of San Luis Potosi (Fig. 1). The autochthonous language is Teenek. Aquismón consists of 184 towns, of which 156 have less than 500 inhabitants, encompasses an area of 785.9 km^2 and has a total population of 45, 074 inhabitants, of whom 50% belong to the ethnic group, Teenek (Coordinación Estatal para el Desarrollo Municipal (CEDAM), 2006). However, indigenous people from Aquismón live under extreme poverty conditions.

2.2. Data collection

Direct interviews with general population from San Isidro Tampaxal, Xolmon, La laja, Chamal, Eureka, Familia, Barrio La Sagrada and Nuevo Tampaxal, towns of Aquismón, were performed from July to November 2011. A total of 162 inhabitants, 90 men and 72 women, in an age group between 15 and 82 years, were interviewed individually. Before beginning the interviews, their consent was obtained to reveal the information. Interviews were conducted through a semi-structured questionnaire. The questions were about the common and local name of the plant used, medicinal use of plant species, preparation, and the plant parts used. Specimens were identified and deposited at Centro de Investigación de la reserva de la biosfera de Mapimi. The botanical correct names were corroborated at Missouri Botanical Garden, Tropicos (2010) and International Plant Names Index (2008).

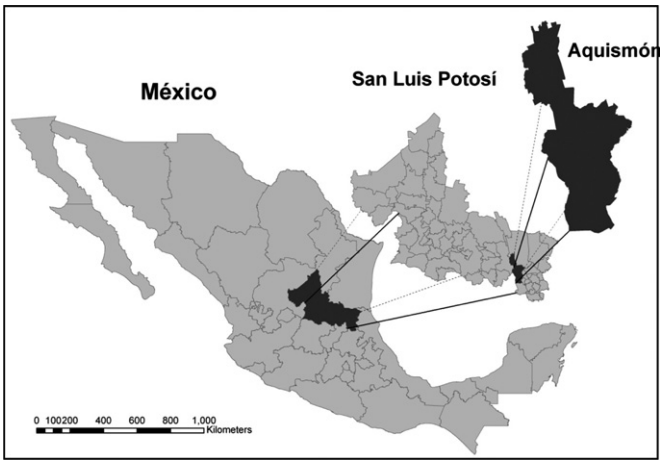

Fig. 1. Map of the study area, municipality of Aquismón, San Luís Potosí, México.

2.3. Data analysis

The diseases treated with medicinal flora from Aquismón were grouped into 13 categories based on the classification used by the International Classification of Diseases used by the World Health Organization (ICD—International statistical classification of diseases and related health problems (World Health Organization), 2007). The relative importance (RI) of the species cited was calculated (adapted from Bennett and Prance, 2000) according to the following formula:

$$RI = NCS + NP,\ NCS = \frac{NCSS}{NSCSV},\ NP = NPS/NPSV$$

NCS is the number of body systems, which is obtained dividing NCSS, the number of body systems treated by a given species, by *NSCSV*, the total number of body systems treated by the most versatile species. *NP* is the number of pharmacological properties, which is obtained by dividing *NPS*, the number of properties attributed to a species, by *NPSV*, the total number of properties attributed to the most versatile species. The result can have a maximum value of 2, indicating the most versatile species.

The informant consensus factor (*ICF*), adapted by Heinrich et al. (1998), estimates the level of agreement between interviewees about which plants to use for each category, and was calculated as follows:

$$ICF = \frac{nur - nt}{nur - 1}$$

where *nur* is the number of citations of the medicinal plant in each category and *nt* is the number of citations of the uses given to the plant in each category. The result of this factor ranges from 0 to 1, where a value close to 1 indicates a well-defined selection criterion in the community and/or if that information is exchanged between informants, whereas a low value indicates that plant species are chosen randomly, or that informants do not exchange information about their use.

3. Results

3.1. Use of medicinal flora

A total of 73 plant species with medicinal purposes, belonging to 36 families were reported by interviewees. The medicinal plants were reported to treat 52 illnesses and 2 cultural filiations (Table 1). The most common families are: Asteraceae (13 plants), Lamiaceae (seven plants), Poaceae (four plants), Myrtaceae (four plants) and Rutaceae (four plants) (Table 1). Only four medicinal plants lack a name in Teenek: *Tila Mexicana, Rhamnus purshiana, Rosmarinus officinalis* and *Achillea millefolium* (Table 1). None of the medicinal flora mentioned by the informants are endangered species. The most commonly mentioned species were *Chenopodium ambrosioides* (n=93), *Matricaria recutita* (n=89), *Mentha citrata* (n=80), *Persea americana* (n=71) and *Psidium guajava* (n=70) (Table 1).The most frequently used parts are leaves (53 plants), whole plant (eight plants), flowers (four plants), roots (four plants), shell (two plants), fruits (one plant), seeds (one plant) and bulb (one plant) (Table 1). The results indicated that 90% of plant species are reported to cure more than one ailment and most of the folk remedies are administrated in the form of infusions (Table 1). Medicinal plants are commonly used for the treatment of stomachache (n=32), fever (n=31), body