

## Studies on pharmaceutical ethnobotany in Arrabida Natural Park (Portugal)

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### Abstract

An ethnobotanical survey was carried out in Arrabida Natural Park, a Portuguese Protected Area in the Southwest of the Iberian Peninsula, with an area of 10 820 ha. Working with 72 local people, data on medicinal uses of 156 *taxa*, belonging to 56 botanical families, were obtained and presented, of which 214 uses corresponding to 81 *taxa* were previously unreported.

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### 1. Introduction

For a long time plants have represented a very important role for humanity (Morales, 1996). Nowadays, the popular use of plants as a way of treatment is still very important for human beings, and according to data from the World Health Organization (WHO), 80% of the total human population still treat their health problems with traditional remedies based mainly on phytotherapy (Morales, 1996).

This work was made in a Portuguese protected area (Arrabida Natural Park), created in 1976 due to its great biodiversity. This area is located at the Southwest of the Iberian Peninsula, at Península de Setúbal, in Portugal, and occupies an area of 10 × 820 ha (Fig. 1).

This work is part of a national project coordinated by the Nature Conservation Institute, whose main goal is “The inventory of the aromatic and/or medicinal plants in Portuguese Protected Areas Network”.

This study was made in order to fulfil the following objectives:

- to make ethnobotanical interviews, in order to obtain information about the medicinal plants used in the region, their uses, as well as their vernacular names, preparation, administration, condition (fresh or dried) and parts of the plant used;

- to characterise local people who still have this kind of information;
- to analyse the information and compare the results with other works.

### 2. Methodology

Information was obtained through ethnobotanical interviews (open-ended and not structured interviews, usually made as general conversations, in order not to coerce the informants) (Raja et al., 1997). To select the informants contacts with local people were made, starting in places like popular markets, houses for old people, coffee shops and restaurants. In all these places questions were made in order to know local people with a good knowledge about medicinal plants and their uses. Informants were selected among those people who showed to know a huge number of medicinal plants existing in the region. It is important to point that most of the informants were indicated by other local people as being those with the best knowledge about this subject.

Whenever possible, more than one interview session was carried out, in order to complete the information already obtained and to confirm the identification of some plants. In most cases, the second and last sessions involved a walk in the fields where the informants collected the plants, this being the procedure made in order to collect the plants together with the informants and to help them remember the plants used. During the interviews the investigators tried to

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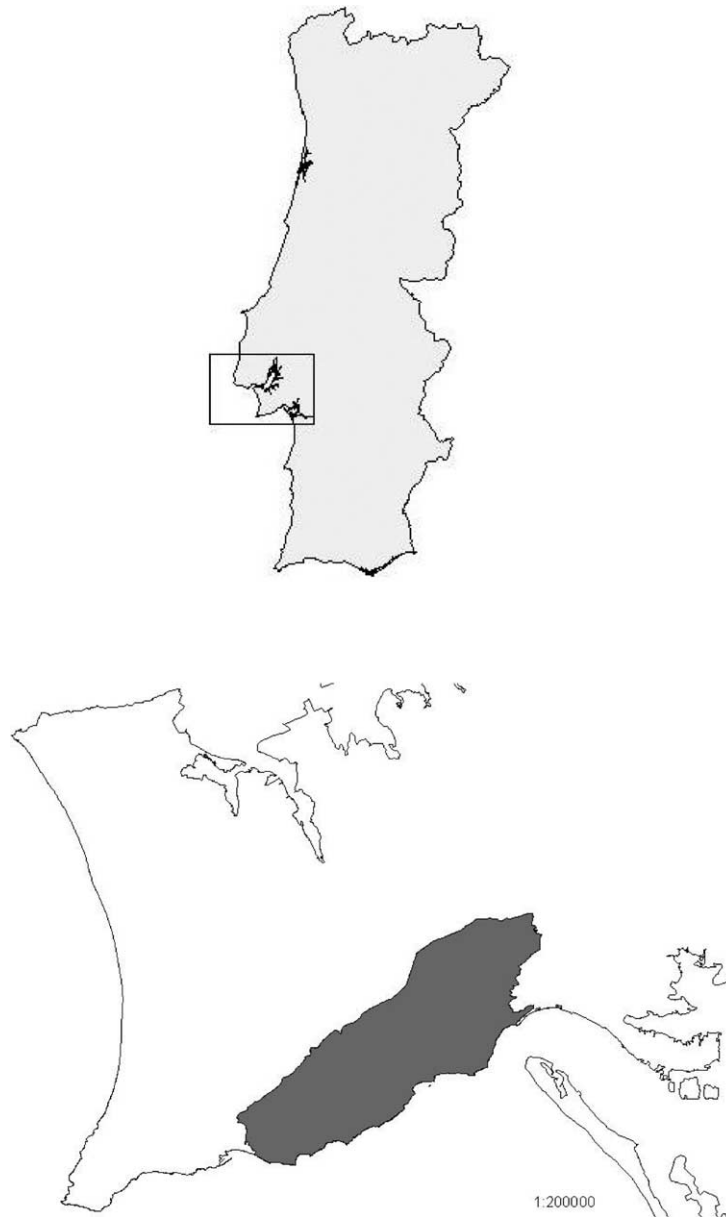


Fig. 1. Localization of the study area in Portugal and in Península de Setúbal.

get information about the vernacular names of the plants, their medicinal uses, preparation, administration, parts of the plant used and the condition of the plants (fresh or dried).

A total of 72 people (mean age: 63 years old; 59% women, 41% men) were interviewed. Informants were not scientifically literate and were born or lived in the region most of their lives.

Voucher herbarium specimens were prepared and deposited in the Herbarium of the Arrabida Natural Park. The notes taken during the interviews are also kept at the same place.

Plants were identified using the following literature: Coutinho (1939), Franco (1971, 1984, 1994, 1998), Valdés et al. (1987) and Castroviejo et al. (1986, 1990, 1993, 1993a, 1997, 1997a).

To establish the originality of this research, the results obtained were compared with an extensive corpus of studies: Bonet et al. (1999), Costa (1977, 1977a), Feijão (1986), Font-Quer (1983), Gründ (1983), Jiménez and López (1985), Juscafresa (1975), Mulet (1991), Pizarro (1988), Poletti (1988, 1988a, 1988b), Raja et al. (1997), Rodrigues (2001), Schauenberg and Paris (1977), Selga (1998), Thomson (1981) and Vasconcellos (1949).

### 3. Results

Information about medicinal plants was gathered on 156 *taxa*. These plants belong to a total of 56 botanical families. The predominant botanical families are: *Lamiaceae*,

Table 1  
Plants with folk medicinal uses reported by at least three informants and having new uses (signalled with ♣)

Scientific name	Local Portuguese names	Popular use	Preparation	Administration	Condition	Parts used	Frequency of citation
Agavaceae							
<i>Agave americana</i> L. ♣	Piteira, piteira-brava	Antirheumatic  For colds, for hoarseness, antitussive, for coqueluche, for influenza	Alcohol maceration Syrup	External  Oral	Fresh  Fresh	Leaf, fruit Leaf, fruit	6
Anacardiaceae							
<i>Pistacia lentiscus</i> L. ♣	Aroeira	Antirheumatic  Antiseptic  Antiodontalgic, buccal antiseptic  Gastric analgesic	Alcohol maceration Infusion  Infusion  Infusion	External  External  Gargle  Oral	Fresh or dried Fresh or dried   	Seeds root Stem  Leaf, bark	4
Apiaceae (Umbelliferae)							
<i>Foeniculum vulgare</i> subsp. <i>piperitum</i> (Ucria) Coutinho ♣	Funcho	For heart-burn, gastric analgesic, for blood circulation, antiarrhoeic, hepatic protector, for gall-bladder ailments For toracic pain	Infusion	Oral	Fresh or dried	Stem	6
<i>Petroselinum crispum</i> (Miller) A.W. Hill ♣	Salsa	Abortive, anti-anaemic, hypoglycemiant	Infusion	Oral	Fresh	Root	3
Asteraceae (Compositae)							
<i>Achillea ageratum</i> L.	Erva-de-são-joão, macela-de-são-joão, marcela-de-são-joão, marcela-real, marcetão, margacinha	Antipyretic, hypoglycemiant, for urinary system ailments  Intestinal anti-inflammatory, appetizing	Infusion  Infusion	Oral  Oral	Dried  Fresh or Dried	Flower head  Flower head	4
<i>Chamaemelum nobile</i> var. <i>discoideum</i> (Boiss.) P. Silva ♣	Macela, macelas, marcela, marcelinha, margacinha	Appetizing, for sea-sickness, hepatic protector, for gall-bladder ailments, gastric analgesic, for intoxication, digestive, antiemetic, for paludism, antihypertensive, emetic, for ictericia, renal antispasmodic, for bladder ailments, for intermittent fever Antipyretic  Intestinal anti-inflammatory	Infusion  Infusion  Infusion	Oral  Oral  External	Fresh or dried  Fresh or dried  Fresh or dried	Flower head  Aerial part Flower head	17
<i>Lactuca sativa</i> L.	Alface	Sedative	Infusion	Oral	Fresh or dried	Leaf	4
<i>Matricaria recutita</i> L. ♣	Camomila, margaça, margacinha, matricária	Appetizing, antipyretic, emetic	Infusion	Oral	Dried	Flower head	3
<i>Pulicaria odora</i> (L.) Reichenb. ♣	Erva-montã, erva-montão, erva-montana, monirão,	For abdominal pain  Anti-infeccious  Vulnerary	Infusion  Poultice  Infusion	Oral  External  External	Dried  Fresh or Dried Fresh	Leaf floral top Leaf  Leaf Floral top	5
<i>Santolina rosmarinifolia</i> L.	Marcela, marcelão, marcela-real, roquete-macho	Antipyretic  Hepatic protector, antihypertensive, intestinal anti-inflammatory, appetizing	Water maceration Infusion	Oral  Oral	Dried  Fresh or dried	Flower head Flower head	7

Table 1 (Continued)

Scientific name	Local Portuguese names	Popular use	Preparation	Administration	Condition	Parts used	Frequency of citation
		For sea-sickness	Infusion	Oral	Dried	Flower head	
<b>Boraginaceae</b>							
<i>Borago officinalis</i> L. ♣	Borragem, erva-da-borragem	Menstrual analgesic, antipyretic, for measles, blood circulation, urinary system	Infusion	Oral	Fresh or dried	Flower	5
		Antipneumonic, for colds	Infusion	Oral	Dried	Flower	
<i>Lithodora prostrata</i> subsp. <i>lusitanica</i> (Samp.) Valdés ♣	Erva-das-sete-sangrias, erva-de-sete-sangrias, sargacinha	For bladder ailments, blood circulation, for chilblain, for colds, antitussive, for sea-sickness, gastric analgesic, antipyretic, hepatic protector, digestive, for influenza, antipneumonic, dismenorrheic, Intestinal anti-inflammatory, blood depurative, for intoxication, antidermotic, sedative, antirheumatic, renal antispasmodic, blood circulation	Infusion	Oral	Fresh or dried	Aerial part	20
<b>Caryophyllaceae</b>							
<i>Paronychia argentea</i> Lam. ♣	Erva-prata, pastinha	Gastric analgesic, bladder and prostate ailments, for abdominal ailments, stomach ulcers	Infusion	Oral	Dried	Aerial part	5
<b>Cistaceae</b>	Esteva						
<i>Cistus ladanifer</i> L. ♣		Bronchodilator, for colds	Infusion	Oral	Fresh or dried	Flower	6
		Feet antiperspirant	Direct application	External	Fresh	Leaf	
		Antiseptic	Infusion	External	Fresh	Flower, young shoot	
		For chilblain	Vapor	External	Fresh	Leaf	
		For toracic pain	Indirect poultice	External	Fresh	Leaf	
<i>Tuberaria lignosa</i> (sweet) Samp. ♣	Erva-alcar, erva-alcária, erva-aucária, erva-casqueira	Anti-inflammatory, anti-infectious, for swelling, vulnerary, for wounds, for varicose veins	Infusion	External	Dried	Aerial part	12
		For hoarseness	Gargle	Oral	Fresh or dried	Whole plant	
		For burns	Indirect poultice	External	Fresh or dried	Whole plant	
		Heart-burn, gastric analgesic, Intestinal anti-inflammatory, for influenza	Infusion	Oral	Dried	Flower, leaf	
		Antihæmorrhoidal	Vapor	External	Dried	Aerial part	
<b>Clusiaceae (Guttiferae)</b>							
<i>Hypericum androsaemum</i> L. ♣	Hipericão-do-gerês	Sedative, hepatic protector, antihypertensive, for good disposition	Infusion	Oral	Dried	Aerial part	3
<i>Hypericum elodes</i> L.	Calafite, calafito, galafito	Antiallopecic, antiseptic, antieczematous, for swelling, antipodalgic	Infusion	External	Fresh or dried	Aerial part	15
		Vulnerary	Poultice	External	Fresh or dried	Aerial part	
		Anti-inflammatory, stomach and intestinal anti-inflammatory, renal antispasmodic, intestinal antispasmodic, gastric analgesic, antiulcerose	Infusion	Oral	Dried	Aerial part	
<i>Hypericum humifusum</i> L.	Hipericão, hipericão-anão, hipericão-menor, hipericão-pequeno	Diuretic, gastric analgesic, digestive, hepatic protector, for gall-bladder and bladder ailments, urinary system	Infusion	Oral	Dried	Aerial part	7

<i>Hypericum perforatum</i> L.	Erva-de-são-joão, hipericão, hipericão-milfurado, hipericão-do-gerês, pirição	For migraine, renal antispasmodic, hepatic protector, for bladder and gall-bladder ailments, for sea-sickness, Intestinal anti-inflammatory, sedative Antiseptic	Infusion Infusion	Oral External	Dried Dried	Aerial part Aerial part	6
Crassulaceae							
<i>Umbilicus rupestris</i> (Salisb.) Dandy ♣	Canudos, concelos, conchelos, erva-das-sete-chagas	For chap Callicide Antitussive	Ointment Poultice Infusion	External External Oral	Dried Dried Dried	Leaf Leaf Leaf	3
Cucurbitaceae							
<i>Ecballium elaterium</i> (L.) A. Richard ♣	Pepino-de-são-gregório, pepinos-de-são-gregório	For fistulas Vulnerary Nasal decongestive Intestinal antispasmodic for children	Direct application Alcohol maceration Vapor Ointment	External External External External	Fresh Fresh Fresh Fresh	Fruit Fruit Fruit Fruit	3
Cupressaceae	Zimbro						
<i>Juniperus turbinata</i> (Guss.) Nyman ♣		Antiseptic For headaches, for migraine Antirheumatic Gastric analgesic	Infusion Direct ingestion Alcohol maceration Spirits maceration	External Oral External Oral	Fresh Fresh Dried Dried	Fruit Fruit Fruit, root Fruit	5
Equisetaceae							
<i>Equisetum arvense</i> L. ♣	Cavalinha, erva-cavalinha, erva-pinheira, erva-pinheirinha	Bladder ailments, gastric analgesic, diuretic, Kidney or gall-bladder stone, renal antispasmodic, for urinary system, for sea-sickness	Infusion	Oral	Fresh or dried	Aerial part	14
<i>Equisetum telmateia</i> Ehrh.	Cavalinha, erva-cavalinha, erva-pinheira, erva-pinheirinha	Digestive, bladder ailments, Intestinal anti-inflammatory, anti-infectious, gastric analgesic, for prostate ailments For urinary system	Infusion Infusion	Oral External	Dried Dried	Aerial part Aerial part	4
Ericaceae							
<i>Arbutus unedo</i> L. ♣	Medronheiro	Cardiotonic, for abdominal pain, renal antispasmodic, bladder ailments Abortive, antihypercholesterolaemic Blood depurative	Decoction Decoction Syrup	Oral Oral Oral	Dried Dried Fresh	Root Root epidermis Root	7
Fabaceae (Leguminosae)							
<i>Pterospartum tridentatum</i> (L.) Willk. ♣	Carqueja	Hypoglycemic, antihypertensive, antihypercholesterolaemic, digestive, for colds, antitussive, blood circulation, hepatic protector, gastric analgesic, Intestinal anti-inflammatory, for gout, for uric acid, sedative, renal antispasmodic For gall-bladder ailments, antihypertensive, for heart-burn For bladder ailments, intestinal antispasmodic Cicatrizant	Infusion Infusion Infusion Infusion	Oral Oral Oral Oral	Dried Dried Dried Dried	Flower Flower, leaf Aerial part Flower	22
<i>Trifolium angustifolium</i> L.	Rabinho-de-raposa, rabo-de-gato, rabo-de-ovelha, rabo-de-zorra, rabo-do-gato	Antidiarrhoeic	Infusion	Oral	Fresh or dried	Aerial part	3

Table 1 (Continued)

Scientific name	Local Portuguese names	Popular use	Preparation	Administration	Condition	Parts used	Frequency of citation
<b>Fagaceae</b>							
<i>Quercus faginea</i> subsp. <i>broteroi</i> (Coutinho) Camus	Carvalho	Cardiotonic, antihypercholesterolaemic	Infusion	Oral	Dried	Bark	3
		Antirheumatic For toracic pain	Infusion Indirect poultice	External External	Dried Dried	Bark Bark	
<b>Gentianaceae</b>							
<i>Centaurium erythraea</i> subsp. <i>grandiflorum</i> (Biv.) Melderis ♣	Fel-da-terra	For bladder ailments, hypoglycemiant, kidney stone, antipyretic, anti-infectious, Intestinal anti-inflammatory, for migraine, sedative Appetizing	Infusion	Oral	Dried	Aerial part	18
			Wine maceration	Oral	Dried	Aerial part	
<b>Geraniaceae</b>							
<i>Geranium purpureum</i> Vill. ♣	Chá-de-são-roberto, erva-de-são-roberto, erva-norberta, erva-são-roberto, são-roberto	Antiulcerose, vulnerary, anti-cancerous, intestinal antispasmodic, digestive, gastric analgesic, hepatic protector, for sea-sickness, for gall-bladder ailments, for gastritis, for influenza, intestinal anti-inflammatory, renal antispasmodic	Infusion	Oral	Dried	Aerial part	31
<b>Juglandaceae</b>							
<i>Juglans regia</i> L. ♣	Nogueira	Hypoglycemiant, for abdominal pain	Infusion	Oral	Fresh or dried	Leaf	5
		Antiseptic, antirheumatic	Alcohol maceration	External	Fresh or dried	Leaf	
		Antipodalgic, antiseptic Uterus anti-inflammatory	Infusion Infusion	External External	Fresh Fresh	Leaf Leaf, epicarp	
<b>Lamiaceae (Labiatae)</b>							
<i>Lavandula luisieri</i> (Rozeira) Rivas-Martínez	Lavandula, rosmarinho	For heart-burn, for sea-sickness, blood circulation, sedative Antidermatotic, nasal descongester	Infusion Infusion	Oral External	Fresh or dried Fresh or dried	Flower head Aerial part	6
<i>Melissa officinalis</i> L. ♣	Cidreira, erva-cidreira erva-limoeira	Sedative, digestive, analgesic, intestinal anti-inflammatory, hepatic protector, for sea-sickness, gastric analgesic, for renal and gall-bladder ailments Blood circulation, intestinal analgesic	Infusion Infusion	Oral Oral	Fresh or dried Fresh or dried	Leaf Leaf, young shoot, root	22
<i>Mentha pulegium</i> L. ♣	Poejo, poejos	Antihypercholesterolaemic, gastric analgesic, sea-sickness, for headache, for colds, intestinal analgesic, hepatic protector Antitussive, for colds	Infusion Syrup	Oral Oral	Fresh or dried Fresh or dried	Aerial part Aerial part	23
<i>Mentha viridis</i> L. ♣	Hortelã	For sea-sickness, gastric analgesic, Intestinal anti-inflammatory, antihelmintic for children, antihypercholesterolaemic, antitussive	Infusion	Oral	Dried	Aerial part	8
<i>Mentha x piperita</i> L. ( <i>M. aquatica</i> x <i>M. spicata</i> ) ♣	Hortelã-pimenta	Antibronchitic, antiasmatic, for colds, analgesic, gastric analgesic, for influenza, Intestinal anti-inflammatory, antihelmintic for children, gastric analgesic	Infusion	Oral	Fresh or Dried	Leaf	7

<i>Micromeria graeca</i> (L.) Reichenb.	Isofre, isope	Fr bladder ailments, for colds, antipyretic, for sea-sickness, for influenza	Infusion	Oral	Dried	Leaf, small stems	8
		Antitussive	Syrup	Oral	Dried	Leaf, small stems	
<i>Origanum virens</i> Hoffmanns. & Link ♣	Oregãos	Antihypercholesterolaemic, intestinal antispasmodic for children, for abdominal pain, intestinal anti-inflammatory	Infusion	Oral	Dried	Aerial part	7
<i>Phlomis lychnitis</i> L. ♣	Salvinha	Digestive, gastric analgesic, intestinal anti-inflammatory, analgesic, renal antispasmodic	Infusion	Oral	Fresh or dried	Aerial part	8
<i>Phlomis purpurea</i> L.	Candeeiros, candiola, erva-dos-candeeiros, marioila, marioilas, mariola, mariolas, salva, selva-da-serra	Cardiotonic, antidiarrhoeic, for abdominal pain, digestive, gastric analgesic, intestinal anti-inflammatory, antihelmintic, emetic, for sea-sickness, for colds' prevention, renal antispasmodic, for bladder ailments, hepatic protector, for stomach ulcers, for gastritis	Infusion	Oral	Fresh or dried	Aerial part	24
		Intestinal antispasmodic	Olive oil decoction	External	Fresh or dried	Leaf	
		Gastric analgesic	Direct ingestion	Oral	Fresh	Leaf	
<i>Rosmarinus officinalis</i> L. ♣	alecrim	Digestive, diuretic, for headaches, blood circulation, cardiotonic, antihypertensive, sedative, hepatic protector, for sea-sickness, blood depurative	Infusion	Oral	Fresh or dried	Aerial part	26
		Ocular antiseptic	Direct application	external	Fresh	Aerial part	
		Nasal descongervative, antidermatosis, antipodalgic, for scurf, vaginal antiseptic, for furuncles, antiseptic, anti-infectious	Infusion	External	Fresh or dried	Aerial part	
Lauraceae							
<i>Persea americana</i> Miller	Pereira-abacate	Antihypercholesterolaemic, hypoglycemicant, gastric analgesic, hepatic protector, intestinal anti-inflammatory	Infusion	Oral	Fresh	Leaf	4
Liliaceae							
<i>Allium cepa</i> L.	Cebola	For furuncles	Olive oil decoction	External	Dried	Bulb tunic	6
		Buccopharyngic antiseptic and anti-inflammatory, for hoarseness, bronchodilator, antitussive	Infusion	Oral	Dried	Bulb tunic	
<i>Aloe arborescens</i> Miller	Aloé, cacto-alóé	Analgesic, for varicose veins, vulnerary	Direct application	External	Fresh	Leaf	8
		Vulnerary, for burns	Poultice	External	Fresh	Leaf	
		Hepatic protector	Infusion	Oral	Dried	Leaf, stem	
		Vulnerary, anti-cancerous	Syrup	Oral	Fresh	Leaf	
<i>Asphodelus lusitanicus</i> Coutinho	Abrótea	Antidermatosis	Direct application	External	Fresh	Root	6
<i>Urginea maritima</i> (L.) Baker	Cebola-albarrã, cebola-brava	Antiasmatic, antitussive, antibronchitic	Fume	Inhalation	Fresh	Bulb	4
		For chilblain	Ointment	External	Fresh	Bulb	
		Antidermatosis	Olive oil decoction	External	Fresh	Bulb	
Malvaceae							
<i>Lavatera cretica</i> L. ♣	Malva, malvas, malva-brava, malva-mansa	Buccal antiseptic, gastric analgesic, hepatic protector, buccopharyngic antiseptic, antidontalgic	Infusion	Oral	Fresh or dried	Aerial part	22

Table 1 (Continued)

Scientific name	Local Portuguese names	Popular use	Preparation	Administration	Condition	Parts used	Frequency of citation
		Antiseptic, antipyretic, intestinal anti-inflammatory, vulnerary, anti-inflammatory, anti-infectious, genital antiseptic, bladder anti-inflammatory, for urinary system, swelling antiseptic	Infusion	External	Fresh or dried	Aerial part	
<i>Malva neglecta</i> Wallr. ♣	Malvas	Antiseptic, ocular antiseptic, antihæmorrhoidal, genital antiseptic	Infusion	External	Fresh	Leaf	4
<i>Malva sylvestris</i> L.	Malva, malvas, malva-brava	For obstipation, antihypertensive	Infusion	Oral	Fresh or dried	Leaf, young shoot	10
		Antihæmorrhoidal	Vapor	External	Fresh or dried	Leaf	
		Antiseptic, intestinal anti-inflammatory, anti-inflammatory, anti-infectious, vaginal antiseptic, antidermotic, for urinary system	Infusion	External	Fresh or dried	Leaf	
		Buccopharyngic anti-inflammatory	Gargle	Oral	Fresh or dried	Aerial part	
		Antiodontalgic	To wash one's mouth	Oral	Fresh or dried	Aerial part	
Myrtaceae							
<i>Eucalyptus globulus</i> Labill. ♣	Eucalipto	Analgesic, antiseptic, antirheumatic	Infusion	External	Fresh or dried	Leaf, stem	9
		Intestinal anti-inflammatory, renal antispasmodic, for bladder ailments, antihypertensive	Infusion	Oral	Fresh or dried	Leaf, stem	
		Nasal descongervative, antiasmatic, bronchodilator	Vapor	Inhalation	Fresh or dried	Leaf, stem	
Oleaceae							
<i>Fraxinus angustifolia</i> Vahl ♣	Freixo	Gastric analgesic, diuretic, for bladder and prostate ailments, hypouricemic, uric acid Antihypercholesterolaemic	Infusion	Oral	Dried	Stem, leaf	8
		Antirheumatic	Infusion	Oral	Dried	Flower	
			Infusion	Oral	Dried	Leaf, seed	
<i>Olea europaea</i> L. ♣	Oliveira	Antihypertensive, hepatic protector, antihypercholesterolaemic, sedative, hypoglycemic, antiulcerose, anti-anaemic, cardiotonic	Infusion	Oral	Fresh or dried	Leaf, stem	24
Papaveraceae							
<i>Chelidonium majus</i> L.	Erva-das-verrugas, erva-dos-calos, quelidónio	Vulnerary, for warts, callicide	Direct application	External	Fresh	Sap	3
Pinaceae							
<i>Pinus pinaster</i> Aiton ♣	Pinheiro-bravo, pinheiro-ranoso	Hypoglycemic, for colds	Infusion	Oral	Dried	Young shoot	6
		For wounds on the hands and feet, for burns	Direct application	External	Fresh	Resin	
		Muscular analgesic	Alcohol maceration	External	Fresh	Resin	
		Antiasmatic	Vapor	Inhalation	Fresh	Cone	
		Buccal antiseptic	Infusion	To wash one's mouth	Fresh	Young shoot	
		Antitussive	Syrup			Young cone and shoot	
Plantaginaceae							
<i>Plantago coronopus</i> L. ♣	Diabelha, erva-abelha, erva-diabelha	Buccopharyngic analgesic, tonsillitis	Infusion	Oral	Fresh or dried	Aerial part	8



		Antiseptic	Infusion	External	Dried	Aerial part	
		Buccopharyngic anti-inflammatory	Infusion	Gargle	Fresh or dried	Aerial part	
<i>Plantago major</i> L. ♣	Erva-das-sete-linhas, erva-de-sete-linhas, tançagem-maior, tanchagem	Vulnerary	Infusion	External	Fresh or dried	Leaf	3
		For burns	Direct application	External	Fresh	Leaf	
Poaceae (Gramineae)							
<i>Cymbopogon citratus</i> (DC.) Stapf ♣	Chá-príncipe, erva-príncipe, príncipe	Gastric analgesic, for digestive system, for gall-bladder ailments, Intestinal anti-inflammatory, for sea-sickness, renal antispasmodic, for bladder ailments	Infusion	Oral	Fresh or dried	Leaf	12
<i>Zea mays</i> L.	Milho	Intestinal anti-inflammatory, for bladder ailments, renal antispasmodic, for urinary system anti-inflammatory, diuretic	Infusion	Oral	Dried	Styles, stigmata, young leaf	17
Polygonaceae							
<i>Rumex crispus</i> L. ♣	Catacuz, catacuzes, patacuz	Antidiarrhoeic	Infusion	Oral	Dried	Seed	4
Rosaceae							
<i>Agrimonia eupatoria</i> L. ♣	Agrimónia, eupatória	Gastric analgesic, hepatic protector, for gall-bladder ailments, for gastritis, antiulcerose, renal anti-inflammatory, intestinal anti-inflammatory, for stomach ulcers	Infusion	Oral	Dried	Aerial part	7
<i>Cydonia oblonga</i> Miller ♣	Marmeleiro	Arterial sclerosis, antihypercholesterolaemic, hypoglycemic, diuretic, for obstipation, hypouricemic	Infusion	Oral	Dried	Leaf	11
		Cardiotonic	Infusion	Oral	Dried	Flower	
		Antieczematous	Infusion	External	Dried	Leaf	
<i>Eriobotrya japonica</i> (Thunb.) Lindley ♣	Nespereira	Antihypercholesterolaemic, hypoglycemic, antidiarrhoeic, antihypertensive	Infusion	Oral	Fresh or dried	Leaf	10
<i>Prunus avium</i> L. ♣	Cereja, cerejeira	Intestinal anti-inflammatory, antidiarrhoeic, diuretic, for bladder ailments, analgesic	Infusion	Oral	Fresh or dried	Peduncle	7
<i>Rubus ulmifolius</i> Schott ♣	Silva, silvas	Antidiarrhoeic, for enteritis, for furuncles, buccopharyngic antiseptic, intestinal anti-inflammatory, renal antispasmodic, analgesic, for stomach ulcers	Infusion	Oral	Fresh or Dried	Young shoot	19
		Antiodontalgic	Infusion	To wash one's mouth	Fresh or Dried	Root	
		Buccal antiseptic	Infusion	To wash one's mouth	Fresh or Dried	Young shoot	
		Antitussive	Syrup	Oral	Fresh or Dried	Young shoot, leaf	
Rutaceae							
<i>Citrus aurantium</i> L.	Laranjeira-azedo	Sedative, antihypertensive	Infusion	Oral	Fresh or dried	Flower, leaf	4
<i>Citrus limon</i> (L.) Burm. Fil. ♣	Limão, limoeiro	For colds, hypoglycemic, for abdominal pain, gastric analgesic, blood depurative, for sea-sickness, sedative, antitussive	Infusion	Oral	Fresh	Leaf, epicarp, fruit	10
<i>Citrus sinensis</i> (L.) Osbeck ♣	Laranjeira	Sedative, cardiotonic, blood depurative, for sea-sickness, antihypertensive, analgesic	Infusion	Oral	Fresh or dried	Flor, leaf, epicarp	13
<i>Ruta chalepensis</i> subsp. <i>bracteosa</i> (DC.) Coutinho	Arruda, rudias, ruta	Antihypercholesterolaemic, antidiarrhoeic, intestinal anti-inflammatory	Infusion	Oral	Dried	Aerial part	4

Table 1 (Continued)

Scientific name	Local Portuguese names	Popular use	Preparation	Administration	Condition	Parts used	Frequency of citation
		Analgesic	Infusion	External	Fresh	Aerial part	
Solanaceae							
<i>Datura stramonium</i> L. ♣	Figueira-do-inferno	Analgesic	Direct application	External	Fresh	Fruits	3
		For swellings on feet and legs	Infusion	External	Fresh or dried	Leaf	
		Antiasmatic	Fume	Inhalation	Dried	Leaf	
Tiliaceae							
<i>Tilia cordata</i> Mill. ♣	Tília	Antihypertensive, sedative, cardiotonic, for headaches, antipyretic, hepatic protector	Infusion	Oral	Dried	Leaf, flower	17
		Buccopharyngic analgesic	Infusion	Gargle	Dried	Leaf, flower	
Urticaceae							
<i>Parietaria judaica</i> L.	Alfavaca-de-cobra, erva-dos-muros	Intestinal antiseptic, anti-infectious, anti-inflammatory	Vapor	External	Fresh or dried	Aerial part	19
		Antiseptic, intestinal anti-inflammatory, genital antiseptic, antihæmorrhoidal	Infusion	External	Fresh or dried	Aerial part	
		Capillary reinforcing, analgesic, hypouricemic, for obstipation	Infusion	Oral	Fresh or dried	Aerial part	
<i>Urtica membranacea</i> Poir	Urtiga, urtigas, urtiga-brava	Blood circulation, antihypercholesterolaemic, antihypertensive, hypoglycemic, for gout and uric acid	Infusion	Oral	Fresh or dried	Whole plant	11
		Antihæmorrhoidal, antiseptic	Infusion	External	Fresh or dried	Root	
Verbenaceae							
<i>Lippia citriodora</i> (ort.) H.B.K.	Bela-luísá, doce-lima, lúcia-lima	Sedative, gastric analgesic, intestinal anti-inflammatory, for sea-sickness	Infusion	Oral	Fresh or dried	Leaf	11

*Asteraceae*, *Rosaceae*, *Poaceae*, *Fabaceae*, *Liliaceae* and *Clusiaceae*.

The parts of the plant most used for medicinal purposes are, in decreasing order: leaves, flowers (including the flowering heads and floral summits), the whole plant, the complete aerial parts, the root, fruits and stems.

Internal uses (used in 171 of the cases) predominate over external (used in 105 cases).

Infusion (almost always in water) is the main method of preparation, either for oral or for external administration. For topical use, the most important methods are the direct application, the poultices, the alcohol maceration and the indirect poultice (which is a poultice not put directly over the skin).

Most reported medicinal activities were related to the treatment of digestive (31%), cardiovascular (12.03%), urological (11.13%), bronchopulmonary (10.98%), dermatological (8.12%) pathologies; these together represent almost three quarters of the total uses. There are also a large number of plants with analgesic and antipyretic (6.32%), and antiseptic (4.51%) properties. Other pathologies treated with plants are: neurological (3.16%), gynaecological (2.41%), inflammations (2.11%), stomatological (1.95%), and rheumatism (1.65%). Some plants were referred to as being used to treat a large number of diseases, being used “for everything” (1.35%). Some plants are considered abortive, used to treat cancerous diseases, have antihelminthic activity or are antiulcerose (0.60%). A few plants were referred only by a low number of informants, as being useful to treat prostate (0.45%), ophthalmic (0.15%) pathologies, are used against obesity (0.15%) or to treat measles (0.15%).

The complete catalogue of the ethnoflora of the studied area is given in Novais (2002). The most notable findings are presented below. Table 1 indicates the plants with uses cited by at least three independent informants and which also present new or uncommon uses (signalled with the symbol ♣), following the reliability criterion of Le Grand and Wondergem (1987 in Bonet et al., 1999) and Johns et al. (1990 in Bonet et al., 1999); it is composed by 73 taxa. In this table, plants are grouped by families in alphabetical order.

## 4. Discussion and conclusions

### 4.1. Predominant families and species

Only a few botanical families (*Asteraceae*, *Lamiaceae*, *Fabaceae*, *Apiaceae* and *Rosaceae*) mentioned by the informants comprise between one-third and one-half of the total number of plants cited. This agrees with other ethnobotanical studies carried out with this same method in the Mediterranean area (Raja et al., 1997). This fact can be explained by the representativity of these families in the Mediterranean flora and because they include some common plants. According to Johns et al. (1990 in Bonet et al., 1999), the more common a plant (family or species) is in an area, the greater

is the probability of its popular use. An example of this is the fact that among the most cited plants we find five *Lamiaceae* (*Mentha pulegium* L., *Rosmarinus officinalis* L., *Melissa officinalis* L. and *Phlomis purpurea* L.) and one *Asteraceae* (*Chamaemelum nobile* var. *discoideum* (Boiss.) P. Silva).

Some species are notable for the number of people who cited them, for the number of different uses, or for both aspects. *Geranium purpureum* Vill. was cited by 31 informants, who attributed them 14 different uses, involving all of the aerial parts of the plant. Other species cited by more than 20 informants are, in decreasing order: *Rosmarinus officinalis* L. (9 uses), *Oleae europaea* L. (8 uses), *Phlomis purpurea* L. (17 uses), *Mentha pulegium* L. (9 uses), *Lavatera cretica* L. (15 uses), *Melissa officinalis* (11 uses), *Pterospartum tridentatum* (20 uses) and *Lithodora prostrata* subsp. *lusitanica* (Samp.) Valdés (24 uses).

Some plants, such as *Asphodelus lusitanicus* Coutinho, were referred to by a large number of informants (8) and all of them referred it as being useful to treat only a very specific pathology (a dermatological pathology).

### 4.2. Drug preparation methods

Water infusion is the predominant method of drug preparation, which corroborates Bonet et al. (1999). It is also important to point out that in most cases it is very difficult to separate the procedures of decoction and infusion, as pointed out by Mulet (1991) and Bonet et al. (1999). Although some informants have stated that decoction was mostly used for big stems and roots and the procedure of infusion was predominantly used for flowers, flower heads, floral summits, leaves and young shoots.

Besides this, we can see that water is the vehicle for almost all oral and external preparations.

The preparation most cited is the tisane, in Portuguese called “chá”. The second most cited preparation is the infusion used to wash some parts of the body. Other ways of preparation are direct application, poultices (applied directly on the skin—direct poultice; or applied over a piece of tissue—indirect poultice). Alcohol maceration is also used in a large number of pathologies, such as rheumatics, or to massage a painful part of the body.

### 4.3. Drug activities

The predominance of remedies for digestive ailments agrees with the data obtained for other regions, either in Portugal (Rodrigues, 2001), or in Spain (Bonet et al., 1999). It is considered that the therapeutic categories most referred to (digestive, cardiovascular, urological and bronchopulmonary) are those that affect most of the present population. It is also interesting to notice that there were also references to some treatments for diseases which have appeared very recently (e.g., cholesterol), so, probably the search for remedies in nature occurs as an anthropic response to new diseases.

Some decades ago, probably the informants would not mention that some plants were used to treat these kinds of ailments, so, it would be important to make a comparative study between ethnobotanical surveys made in the same region but at different times.

Although it wasn't the objective of this research, during the interviews we found a remarkable high number of magical or religious practices linked to the medicinal uses of plants. Some numbers (specially 3, 7 or 9) play an important role in the use of parts of the plant or the duration of the treatment; this confirms the results obtained by Bonet et al. (1999). It is also important to refer that some local Portuguese names allude to their claimed properties, such as "erva-das-verrugas" (warts herb) or "erva-dos-calos" (callus herb)—*Chelidonium majus* L., used to treat warts and callous.

#### 4.4. Data on quantitative ethnobotany

A quantitative analysis of the data obtained during the interviews is of great importance, because it allows us to make macro-scale comparisons. These comparisons are relevant, because cultural and biological biodiversity is seriously threatened in many regions of the world (Begossi, 1996). It is important to make sure that comparisons are only made with other studies using the same methodology.

A precise idea of the importance of the medicinal plants in a region can be gained with the ethnobotanicity index, postulated by Portéres (1970, in Bonet et al., 1999). This index is determined by a *ratio* between the useful plants and the total flora, expressed in percentage. For our study area it was possible to determine this index, because it is a well-studied area and a reasonably complete flora of the area is already done. The only problem is that the flora studies are done in the complete calcareous area, while the present study included only the area of the Arrabida natural park (approximately one-half of the complete calcareous area), so, our ethnobotanicity index (8.28%) is lower than in most of the other Mediterranean areas studied.

The 210 unreported or uncommon uses found, corresponding to 80 plant species show a high degree of ethnobotanical novelty. The *ratio* between the number of unreported uses and the total number of medicinal plants cited (NRU/P index) is considerably high (1.35), indicating a high degree of knowledge about this matter in the studied area. But this information may be lost in a few years if an effort to invert the present tendency is not made.

#### 4.5. New or uncommon uses

Some plants reported in ethnobotanical studies are the appropriate candidates to be the subjects of further phytochemical and pharmacological studies: (1) plants with new or uncommon uses; (2) plants referred to by at least three independent informants (Table 1); (3) plants with identical or similar uses in different areas.

In this study a total of 48 plant species share two of these conditions (were referred by more than three independent informants and present new uses). These plants are those we propose to be subject of detailed pharmaceutical studies (Table 1—species signalled with ♣).

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