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Medicinal and local food plants in the south of Alava (Basque Country, Spain)



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ABSTRACT

Ethnobotanical relevance: Medicinal and food plants in the Basque Country are an integral part of a fast changing culture. With a distinct tradition and language, this region of Europe provides an important example demonstrating the changing role of local and traditional knowledge in industrial countries. As other Mediterranean regions it preserves a rich heritage of using plants as medicine and food, offering a unique opportunity for studying the medicine food interface in an ethnopharmacological context. Therefore, the key goal of this study has been to contribute to an understanding of local and traditional plant usage, to evaluate their uses as food and medicine as well as to critically assess the role of these plants in the south of the Basque Country contributing to an understanding of how foods and medicines are used.

Methods: A mixed methods approach, including participant observation; open and semi structured interviews was used. Ethnobotanical field work included 183 people, ages ranged from 24 to 98 years old with a majority being between 70 and 80 years old (mean age 71) from 31 towns of three different regions. The basic interview was a one-to-one meeting, which often included field walking and collection of samples as directed by the informants. 700 voucher specimens (most of them with duplicates) were collected for the data obtained.

Using SPSS version 20 the gathered information was processed and the replies of the different informants were subsequently organised in variables like medicine and food plants, part of the plants used, forms of preparations, zones preferred for collecting these plants. The data were analysed based on the frequency of records. This type of approach allows us to understand the way the informant's categorize the species, and how these categories are distributed along the sample. In order to analyse the data three main categories of use were distinguished: Medicine (M), Food (F) and an intermediate Health-Food (H-F). The three categories were divided in 27 subcategories (common uses).

Results and discussion: The informants recognise and use a total of 184 species from 49 families. During interviews, 5658 individual use-reports were collected relating to three use-categories – as medicines, food and health-food. The two main groups with almost the same number of species each are health-food (75 species) and (locally gathered) food only (73), with medicinal uses only (36) being the smallest group. This highlights the important overlap between food and medicines.

Overall, three core families were identified (based on the number of use reports and in the number of species): Asteraceae (25 species), Lamiaceae and Rosaceae (24 each). The most frequently reported species are *Jasonia glutinosa*, *Chamaemelum nobile*, *Prunus spinosa* and *Quercus ilex* subsp. *ballota*.

The most important general use-subcategories are as raw vegetables (27.43% of the use-reports and including 81 species), infusions (14.74%/42) and gastrointestinal (12.53%/42). Conceptually foods and medicines are clearly distinguished but the intermediate group of health foods is more ambiguous.

Conclusion: Food and medicinal uses of plants are culturally closely linked. A wide range of plants are known and many still used. The analysis shows that the Basques use a wide range of species which are typical for Western European cultures. In comparison to other studies in the Mediterranean countries there are many similarities in the uses of different families, species of plants and their use and

Abbreviations: F, food; H-F, Health food; I, Izki; M, medicinal; V, Valderejo; VA, Valle de Arana; VIVA area, the combined area of Izki, Valderejo and Valle de Arana.

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preparations. Some of these plants are key Mediterranean species, often used for a multitude of uses as food and medicine.

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1. Introduction

“... to draw the attention of ethnopharmacologists to the dietary dimension of plant utilisation. The conventional approach in ethnopharmacology is to focus on the medicinal properties of plants without adequately exploring other categories of use. As a result, we are unduly circumscribed in our understanding of the extra-nutritive aspects of food phytochemistry” (Etkin and Ross, 1991, p. 25).

Nearly a quarter of a century has passed since Nina Etkin and Paul J. Ross led the ethnopharmacological discussion towards a (renewed) emphasis on the interface of food and medicine. It has been argued convincingly that we should set aside a place for food and try to understand its health promoting effects (Pieroni and Price, 2006).

Health(y) food has also entered mainstream discussions in many countries and the idea of “let food be your medicine” (attributed to Hippocrates, 460–377 BCA) is again a popular concept. An important aspect that is being highlighted in this discussion is the importance of today’s interest, from the markets and people, in functional foods, tailor-made to suit specific groups (e.g. the elderly, the young, physically active people, and people with specific conditions). The quest for diets which allow for a healthy ageing is strongly linked with increased life expectancy and larger financial assets of some sectors of the population (e.g. Heinrich and Prieto-García, 2008; Keatinge et al., 2010).

Indeed one of the well-known benefits of the Mediterranean diet is its long life expectancy (Willett et al., 1995) and many ethnobotanical surveys around the region show the importance of wild food plants and specifically wild vegetables in the Mediterranean diet (e.g., Pieroni et al., 2005; Rivera et al., 2005; Tardío et al., 2006; Leonti, 2012). Several authors have highlighted that one of the reasons that explain the prevalence of its consumption is that they have a clear positive influence on health (Leonti et al., 2006; Sánchez-Mata et al., 2012). For instance, a review of the wild vegetables traditionally used in Spain showed that 23 % of them were also orally taken as medicinal plants. They were mainly used to prepare infusions drunk to cure many different complaints, but some species were eaten with a specific medicinal purpose (Tardío, 2010). *Urtica dioica* leaves are for instance taken in omelettes against hoarseness (Pardo-de-Santayana, 2008) or hypertension (Bonet and Vallès, 2002). In the case of Southern Spain, a study made in Sierra de Alcaraz and Serranía de Cuenca showed an even higher rate, since 58% of wild foods had also medicinal uses (Rivera et al., 2005).

Besides its role for curing, they also play a major role as preventive remedies. People for instance consume many herbal teas such as *Chamaemelum nobile* L. or *Mentha pulegium* L. after meal to prevent indigestion (Pardo-de-Santayana et al., 2005; Menendez-Baceta et al., 2014). Other examples of valuable species are olive, garlic and lemon (Rivera and Obón, 1993).

Besides the local perception of the health benefits of wild foods, the high nutritional interest of many of these species is also well-known (e.g. Flyman and Afolayan, 2006; Guarrera and Savo, 2013; Morales et al., 2013). Many contain high amounts of vitamins and other antioxidants such as flavonoids, carotenoids of polyphenols, minerals, fibres and essential fatty acids, commonly in higher amounts than their cultivated relatives (Tardío, 2011). For instance, Zeghichi et al. (2003) found high antioxidant and mineral levels in the 25 Cretan species studied. The phenolic content was remarkably high in *Crepis vesicaria* L. Another interesting species is

Montia fontana L., with appreciable amounts of vitamin C, Mn, and very high lipid content being one of the richest source of omega-3 fatty acids among leafy vegetables (Tardío et al., 2006). The young shoots of *Asparagus acutifolius* L., *Humulus lupulus* L., *Bryonia dioica* Jacq. and *Tamus communis* L. are richer sources of carotenoids than many of the commercially available leafy vegetables (García-Herrera et al., 2014).

Therefore, local pharmacopoeias and gastronomies of Mediterranean industrialised countries have received growing attention (e.g. Pieroni et al., 2002, 2004; Hanlidou et al., 2004; Scherrer et al., 2005; Maxia et al., 2007; Hadjichambis et al., 2008; Nebel and Heinrich, 2009; Novais et al., 2004; Pardo-de-Santayana and Macía, 2015) and this has been linked to the impact of written traditions which have facilitated the dissemination and continued use of these medicinal plants (Leonti, 2011). Spain being one of the regions where more such ethnobotanical studies have been conducted because of its high biological and cultural diversity (e.g. Rivera et al., 2005, 2006; Tardío et al., 2005; Pardo-de-Santayana et al., 2007; Parada et al., 2009; Rigat et al., 2009; Benítez et al., 2010; González et al., 2010, 2011a,b; Carrió and Vallès, 2012; Viteri Alarcón, 2012; Rigat et al., 2013).

There is therefore relatively abundant information on inventories of medicinal and wild food taxa in Spain, but there are still poorly studied regions such as the Basque Country Autonomous Community (also known as Euskadi). Euskadi is one of the regions of the Basque Country (also called Basque Country greater region in order to differentiate it from the Basque Country Autonomous Community). The Basque Country comprises territories in northeastern Spain and southwestern France with a total population of 2,900,000 inhabitants (Barandiaran and Manterola, 2004). Its geographical position, at the interface of the Mediterranean and Eurosiberian botanical regions, offers a variety of climates and a diversity of ecosystems with a resulting high level of biological diversity.

Moreover Euskadi cultural diversity is very high, with two languages (Basque or Euskara) spoken within only 7234 km². Given its ethnic and cultural singularities, it has a long tradition of ethnographic studies e.g. (Barandiaran and Manterola, 1990, 2004) but its medicinal and food plants have been only recently addressed with an ethnobotanical perspective (Menendez-Baceta, 2015; Menendez-Baceta et al., 2012, 2014, 2015). In the last years several studies have been conducted in the adjacent regions Navarre and Cantabria: including Akerreta et al. (2007a,b, 2010), Calvo et al. (2011, 2013), Calvo and Cavero (2014, 2015), Cavero et al. (2011a,b) and Cavero and Calvo (2014, 2015), on Navarre; Pardo-de-Santayana (2004), on Cantabria. None of these studies provides comparative information on the use of food and medicinal species with the exception of a study carried out in the south of Biscay (Menendez-Baceta et al., 2012). The paper states that wild foods have not a clearly perceived medicinal role in the region. An exception was the use of mints for seasoning milk since this flavoured milk was recommended against intestinal worms. On the other side herbal teas were mainly perceived as medicines, and only few people drunk *Chamaemelum nobile* tea besides its medicinal function. The use of herbal teas in food contexts is locally not considered traditional and as Basque people are a pre-Indo-European ethnic group with marked differences with the surrounding regions they are not very permeable to such kind of new customs (Sóukand et al., 2013). Maybe one of the costumes of chewing leaves might be a missing link in the food-medicine

continuum (Menendez-Baceta et al., 2012).

Euskara was spoken throughout the Basque territories until the Middle Ages, but today the predominant languages are Spanish and French. Basque is a language with no known linguistic relatives, spoken by about 660,000 people mainly in the north of Spain and the southwest of France. For centuries there was no standard orthography, and Euskara was written with Romance spelling conventions (Baztarrika et al., 2010). In 2006, Euskara was the main language for 25% of the population of the Basque Country, most of them living in Biscay, Guipuzcoa and northern Navarra (Baztarrika et al., 2010). In the rural areas of Alava around Vitoria where these study was carried out the main language is Spanish.

AIMS: Given the lack of ethnobotanical research on the interface food and medicine and using the Basque Country as an example, we wanted to investigate the question: *How do the inhabitants in three regions of Alava in the Basque Country use the local flora especially as it relates to their use as food and medicine?* this study focuses on the use and knowledge of food and medicinal plants of Alava. The specific aims of this work were: (1) to describe the domain of medicinal and wild food plants, (2) to assess the cultural importance of the different species and food and medicinal categories and (3) to compare with other Mediterranean regions and see if the plant species and uses were similar.

2. Geographical and cultural background

2.1. Region of study

Research was conducted in communities of regions with high levels of biodiversity where forest and undisturbed areas remain. We selected three mountainous regions of the south of Euskadi in the province of Alava: Valdegovía, Valle de Arana and Izki (Fig. 1). They belong to two different geographical regions, Valdegovía to the *Valles Alaveses* (Alavan valleys) and Valle de Arana and Izki to the *Montaña Alavesa* (Alavan mountains). They are situated on the transition between the Mediterranean and Eurosiberian biogeographical regions. The main forest communities are dominated by oaks (*Quercus pyrenaica*, *Q. faginea* and *Q. ilex*), beeches (*Fagus sylvatica*), pines (*Pinus sylvestris*) and boxes (*Buxus sempervirens* L.), Izki including the largest reserve in Europe of *Quercus pyrenaica* forests (Marañón and Quintana, 1993). Two nature reserves are

included in the study area, Valderejo in Valdegovía and Izki, which gives the name to one of the regions.

Until a few decades ago the economy was based in an extensive and diversified agriculture, but have now changed to a more intensive and specialised crop production. For example, the region of Valle de Arana is well known for its potato plantations (Martínez Fuertes and Arriola Loiola, 2003). As happened in other Spanish and Portuguese regions, these changes in the way of life of rural people have severely eroded knowledge and customs related to the exploitation and management of most wild resources (Pardo-de-Santayana et al., 2007). From 1940 to 1960 pharmacies spread throughout the Basque Country, resulting in a loss of medical traditional knowledge (Barandiaran and Manterola, 2004).

The last decades have seen a development and promotion of tourism, due to the presence of natural parks which offer a rich biodiversity and an aesthetically pleasing landscape for the tourists. As well as natural beauty, both regions offer cultural activities, such as hunting, collecting mushrooms or visiting museum and villages.

The areas share similar demographics as all have an aged population. The density of population is low with the exception of Maetzu and Campezo (Izki), where density is higher due to the presence of industry. There is therefore a small proportion of people that have remained in their rural environment, exemplifying the last people depending on their environment and local resources. Generally, these small communities are surrounded by patches of fields where one can obtain some of the wild products used to prepare traditional medicines, foods or beverages. Today, most of these traditional activities have diminished, but some young people still practise shepherding, milking and gathering wild products, something that people consider part of their Basque culture (Menendez-Baceta et al., 2012).

Basque was spoken until the eighteenth century in most of the regions, but today Spanish is spoken in all three regions (Martínez de Madina and González de Viñaspre, 2012). For the present study these regions will be called Valdegovía, Izki and Valle de Arana, collectively as VIVA using the initials of the areas (V-I-VA).

2.2. Valdegovía (in Valles Alaveses)

Valdegovía has an area of 238.5 km² and its average altitude is 552 m above the sea level. There is a population of 1148 inhabitants scattered in 24 different villages and hamlets, most of them with

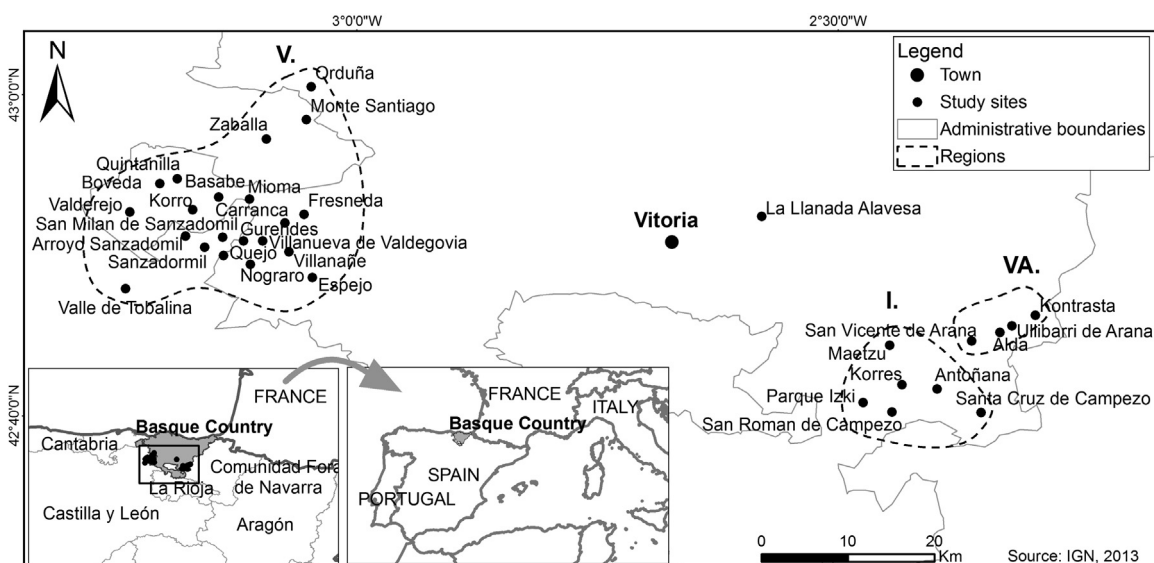


Fig. 1. Region of study - The Alava Region in the Basque Country, Northern Spain (modified after IGN 2013).

only 30 or 40 occupants due to migration. The area's inhabitants are highly dependent on agriculture as a source of main income. The main crops are wheat, barley, oats, rye, various other grains, potatoes, apples, cherries, pears, legumes and various vegetables. The area also has a vast amount of livestock, poultry and horses. Aside from agriculture the area receives some income as a result of touristic activities related to hunting (González, 2003). The Natural Park of Valderejo which opened in 1992 has become a very important part of the area's economy and life. Given the strong personal, historical and cultural links of Valdegovía with the people of the surrounding villages of the province of Burgos (see Fig. 1), seven villages from Burgos were also included in Valdegovía.

2.3. Izki and Valle de Arana (in Montaña Alavesa)

This region is made up of six municipalities (Arraya-Maeztu, Bernedo, Campezo, Valle de Arana, Lagrán and Peñacerrada-Urizaharra) covering an area of 534 km². Four of these six municipalities were selected for the study: Arraia-Maeztu, Bernedo, and Campezo forming the Izki area and Valle de Arana. The population (3181 inhabitants) is concentrated in small villages which are in close proximity to each other, only Maeztu and Santa Cruz de Campezo having more than 250 inhabitants while in the rest 30 out of the 46 have less than 50 inhabitants. In this region people tend to be specialized in agricultural activities and the majority of the population are pensioners. The construction and services sector is only important in Campezo and Maeztu. There are very few large businesses and a moderate number of micro-enterprises. Some specialise in forestry and others in producing asphalt and chemicals. Rural tourism is increasing its importance, especially because of people visiting the Izki Natural Park (PRO-Izki, 2015). Many people commute every day for work in Vitoria, the main city and capital of Alava.

3. Methods

3.1. Ethnobotanical data collection

Ethnobotanical fieldwork included 183 consented interviews (75 male and 108 female) conducted between November 2006 and November 2009. Informant age ranged from 24 to 98 years old with a majority being between 70 and 80 years old (mean age 71). They were selected using a snowball sampling technique since emphasis was made in selecting expert informants (Espinosa et al., 2012). We visited the retirement's homes where elder people spend the day and schools where children and teachers provided names of their relatives who know about plants and uses.

The main goal of the interviews was to understand traditional food and medicinal uses practiced in the area and how these categories overlap. The basic interview was a one-to-one meeting. The interviews were conducted in Spanish and had two main parts:

- A fixed structured part where the same questions were always asked focusing on: (a) local socio-economic environment, (b) plants and plant parts used in the past and nowadays as medicines and/or food; how were they prepared, (c) local plant names, and (d) habitat where each species grow and places of collection.
- A semi-structured free and fluent conversation, where the participants were encouraged to explore tangent aspects and details which often reveal very useful information about the area that provides precision and reliability to the information.

Interviews often included field walks and collection of samples as directed by the informants, depending on the physical condition and

time availability of the participant. Walks through allotments, gardens, managed woodlands, farms, grasslands, marshlands and cliff faces were essential for providing botanical samples and identification. During these walks first-hand knowledge could be obtained from watching the participant interact with their surroundings. Open ended questions arose from watching their actions.

In most of the cases after the first interview, other meetings were agreed for providing deeper information on the plants collected and their food and medicinal uses. A collection of plants (ambulant herbarium, medicinal plant samples) was made to show to the informants. Books and photos of plants and landscapes were also used to help informants remember locations where the plant grew and to help in the identification of the species. Finally, practical activities such as cooking the dishes or preparing the medicinal plants were also organised.

The vouchers collected during the walks were dried and preserved in the herbarium of the Centre for Pharmacognosy and Phytotherapy, UCL School of Pharmacy following standard botanical techniques (Martin, 1995; Alexiades, 1996) and mostly also deposited at the Museo de Ciencias Naturales de Álava (VIT). Identification is largely based on Aizpuru et al. (2003), García López and Allue Camacho (2004), as well as López de Guereñu (1975). For botanical nomenclature we follow *Flora iberica* (Castroviejo et al., 1986–2014) for families included therein, and *Flora Europaea* (Tutin et al., 1964–1980) for the rest.

3.2. Data analysis

The data collected in the field were organised in a database. Information was structured in use-reports (UR) (Ankli et al., 1999). URs are commonly defined as the informant **i**, mentions the use of the species **s** in the use-group **u**, (Tardío and Pardo-de-Santayana, 2008). As we found important differences within the regions of study on the plant parts used and the preparation and administration methods we included both aspects in our definition of a UR. Therefore in our study a UR was defined as the event in which informant **i**, mentions the use of the plant part **p** of the species **s** prepared and administered with the method **m** in the use-group **u**.

Three main use-categories were considered: Medicine (**M**), Food (**F**) and Health-Food (**H-F**):

- The group of medicinal plants (M) contains those species that were used in the area only for medicinal purposes, to prevent, heal and recover from different health conditions.
- Food plants class (F) includes the species that were ingested daily, but were not reported to be used medicinally in the area.
- The category of Health-Food plants (H-F) includes the species that have food and medicinal uses in the area.

The three categories were further divided in 27 subcategories each that account for the local concepts, views and experiences. For instance, burns, furuncles, acne, warts, herpes, wounds, skin ulcers were grouped in the medicinal group dermatological disorders.

The quantitative analysis of uses is based on species with three or more URs and we have only focused on data, where a specific use has been reported, i.e. generic responses like "as a tonic", "food use" were not considered.

Data collected were compared with unpublished (Puentes Amestoy, c. 1960) and published information from Basque ethnobotanical studies (Menendez-Baceta et al., 2012; Caverio et al., 2011a,b; Calvo et al., 2011), other Iberian works (Tardío et al., 2006; Pardo-de-Santayana, 2004; Rivera et al., 2006) and from Italy (Nebel, 2005; Nebel et al., 2006; Nebel and Heinrich, 2009; Lentini and VENZA, 2007).

Table 1
Top 25 food and medicinal species according to the number of use-reports.

Species ^a	Local names	Use-category and mode of use	Number of use-reports	Use-category number of use-reports (percentage of total) ^d
<i>Jasonia glutinosa</i> (L.) DC. Asteraceae; 593 T	té, té de monte, té de roca, té de puerto	<i>Herbal tea</i> : flowering shoots, infusion, alone or with <i>Chamaemelum nobile</i> , <i>Illicium verum</i> , <i>Prunus spinosa</i> , <i>Thymus vulgaris</i> or with milk <i>Digestive, stomach pain, diarrhoea</i> : flowering shoots, infusion <i>Liqueur</i> : flowering shoots, macerated in anisette	269 100 6	H-F 375 (6.63%)
<i>Chamaemelum nobile</i> (L.) All. Asteraceae; 743 T, PA	manzanilla, manzanilla amarga, manzanilla de altura, manzanilla de la sierra, manzanilla del monte, manzanilla fina, manzanilla pequeñita, manzanilla real	<i>Digestive, stomach pain, sickness</i> : inflorescences, infusion, liqueur, <i>patxaran</i> * <i>Herbal tea</i> : inflorescences, infusion, alone or with anisette, <i>Malva sylvestris</i> , <i>Thymus vulgaris</i> or <i>Helichrysum stoechas</i> <i>Relaxant</i> : inflorescences, infusion, alone or with <i>Malva sylvestris</i> or <i>Helichrysum stoechas</i> <i>Headache</i> : inflorescences, infusion <i>Skin inflammation, infection</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Clean the body</i> : inflorescences, infusion <i>Liqueur</i> : inflorescences, <i>patxaran</i> *	165 147 22 7 5 3 3	H-F 352 (6.22%)
<i>Prunus spinosa</i> L. Rosaceae; 322 T, M, PA	<i>fruit</i> : arán, escaramujo, endrino, arañón, churli, ciruela, endrina, carcarachi	<i>Liqueur</i> : fruits, <i>patxaran</i> * <i>Fruits</i> : raw, jam or syrup with cinnamon <i>Colds and coughs, sore throat</i> : fruits, decoction, drunk and gargles; bark, gargles <i>Digestive, stomach pain, diarrhoea</i> : fruits, decoction; fruits, liqueur, <i>patxaran</i> * <i>Infected wounds</i> ; bark, washings <i>Premenstrual pain</i> ; fruits, liqueur, <i>patxaran</i> *	88 75 45 38 3 3	H-F 268 (4.74%)
<i>Quercus ilex</i> subsp. <i>ballota</i> (Desf.) Samp. Fagaceae; 472 T	carrasca, encina; <i>fruit</i> : bellota	<i>Fruits</i> : raw, toasted <i>Coffee substitute</i> : fruits, toasted and ground into flour, infusion <i>Liqueur</i> : fruits, macerated in anisette <i>Flour</i> : fruits, ground into flour, bread and cakes <i>Herpes</i> : flowers, infusion, sometimes with <i>Juglans regia</i> leaves, washings; <i>wounds</i> : bark, decoction, washings <i>Clean the body</i> : roots and bark, infusion <i>Vegetables</i> : leaves, chewed	105 88 20 9 5 4 3	H-F 242 (4.28%)
<i>Santolina chamaecyparissus</i> L. Asteraceae; 352 T, PA	manzanilla, manzanilla de buey, manzanilla de burro, manzanilla de caballo, manzanilla basta, manzanilla de campo, manzanilla gorda, santolina	<i>Digestive, stomach pain</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Ingrown nails</i> : aerial parts, boiled and left macerating in water, washings; boiled and smashed, topical; <i>skin infections</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Relaxant</i> : inflorescences, infusion <i>Hair loss</i> : inflorescences, infusion, washings	108 85 10 4 3	H-F 210 (3.71%)
<i>Thymus vulgaris</i> L. Lamiaceae; 111 T	tomillo	<i>Colds and chest infections, sore throat</i> : flowering shoots, infusion, alone or with honey, lemon or <i>Foeniculum vulgare</i> <i>Seasoning</i> : flowering shoots, flavour meat, olives*** <i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammation and infections</i> : flowering shoots, infusion, washings; ointment, <i>pomada sanjuanera</i> **; <i>mouth infections</i> : flowering shoots, infusion, washings <i>High blood pressure, clean the blood, heart problems, fluid retention</i> : flowering shoots, infusion, alone or with honey, lemon, <i>Rosmarinus officinalis</i> or with <i>Jasonia glutinosa</i> and <i>Chamaemelum nobile</i> <i>Digestive</i> : flowering shoots, infusion with <i>Ocimum basilicum</i> <i>Rheumatism and arthritis</i> : flowering shoots, tincture in cologne <i>Cystitis</i> : flowering shoots, infusion with <i>Chamaemelum nobile</i> <i>Relaxant</i> : flowering shoots, infusion	42 36 33 13 25 5 7 4 3	H-F 168 (2.97%)

Rosaceae; 426 T	carnero, chispío	<i>Vegetables</i> : young shoots, peeled, raw	35	
<i>Fagus sylvatica</i> L. Fagaceae; 195 T,M	obe, haya; <i>fruit</i> : hayuco	<i>Fruits</i> : raw <i>Vegetables</i> : leaves, raw, chewed <i>Flour</i> : fruits, toasted and ground into flour, mixed with wheat or other cereals, bread	69 11 8	F 88 (1.56%)
<i>Tanacetum parthenium</i> (L.) Sch. Bip.† Asteraceae; 354	moriza, manzanilla, manzanilla de huerta, manzanilla de jardín	<i>Digestive, stomach pain</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion <i>Relaxant</i> : flowering shoots, infusion	37 24 16	H-F 77 (1.36%)
<i>Arbutus unedo</i> L. Ericaceae; 90 T,M,PA	abis, bordo, borto, burrubote, madroño	<i>Fruits</i> : raw, jam <i>Liqueur</i> : fruits, macerated in anisette	71 3	F 74 (1.31%)
<i>Rosmarinus officinalis</i> L. Lamiaceae; 26 T,PA	romero	<i>Seasoning</i> : flowering shoots, flavour meat, olives*** <i>Rheumatism and arthritis, body pains</i> : flowering shoots, tincture in alcohol or oil infusion with <i>Cupressus</i> sp., frictions <i>Sore throat, colds and phlegm</i> : flowering shoots, infusion, alone or with honey <i>Relaxant</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion	25 16 12 10 10	H-F 73 (1.29%)
<i>Achillea millefolium</i> L. Asteraceae; 18	cien flores, manzanilla, milflores, milenflora, milenrama	<i>Digestive, stomach pain, diarrhoea</i> : flowering shoots, infusion, alone or with <i>Lythrum salicaria</i> <i>Herbal tea</i> : flowering shoots, infusion <i>Piles</i> : flowering shoots, put in a piece of cloth and kept in the trousers' back pocket until dry <i>Rheumatism and arthritis pain</i> : flowering shoots, ointment, leaves and flowers pomada sanjuanera** <i>Circulatory problems, clean the blood</i> : flowering shoots, infusion <i>Headache</i> : flowering shoots, bag left under the pillow, inhalations <i>Fruits</i> : raw, toasted <i>Liqueur</i> : fruits, macerated in anisette	27 14 11 8 7 4 59 9	H-F 71 (1.25%) F 68 (1.20%)
<i>Corylus avellana</i> L. Betulaceae; 379 T,M	avellano; <i>fruit</i> : avellana	<i>Fruits</i> : raw <i>Liqueur</i> : fruits, macerated in anisette or liquor <i>Digestive</i> ^a fruits, liqueur in anisette or liquor	45 19 3	H-F 67 (1.18%)
<i>Prunus avium</i> (L.) L. Rosaceae; 227 T	cerezo; <i>fruit</i> : cereza, cereza silvestre	<i>Seasoning</i> : flowering shoots, flavour pasta, stews, salads <i>Sore throat, colds and phlegm</i> : flowering shoots, infusion with milk, <i>Malva sylvestris</i> or <i>Rosmarinus officinalis</i> ; decoction, steam inhalations <i>Diarrhoea, stomach pain, digestive</i> : flowering shoots, infusion <i>Relaxant</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion	27 14 11 9 5	H-F 66 (1.17%)
<i>Origanum vulgare</i> L. Lamiaceae; 44 T,PA	orégano	<i>Fruits</i> : jam; boiled with pears, apples, prunes and raisins <i>Depression</i> : fruits, liqueur in wine <i>Liqueur</i> : fruits, macerated in wine <i>Eyes inflammation</i> : fruits, decoction, washings	35 11 13 3	H-F 62 (1.10%)
<i>Cydonia oblonga</i> Mill. †; Rosaceae; 542	membrillo	<i>Fruits</i> : raw, boiled with sugar and wine	60	F 60 (1.06%)
<i>Fragaria vesca</i> L.; 531 T, M	<i>plant and fruit</i> : amabia, amahueta, amayeta, fresa, mahueta, marrubia, mayeta, metra, fresa de monte, fresa pequeñita, fresa salvaje, fresa silvestre			

* *Patxaran*: *Prunus spinosa* fruits are macerated in anisette for five or six months with coffee beans, cinnamon bark and *Chamaemelum nobile* inflorescences.

** Pomada sanjuanera: Ointment prepared frying together many plants such as: *Achillea millefolium*, *Allium ampeloprasum*, *Anagallis arvensis*, *Calendula officinalis*, *Chamaemelum nobile*, *Cruciata glabra*, *Eleocharis quinqueflora*, *Glycyrrhiza glabra*, *Hedera helix*, *Hypericum hirsutum*, *Hypericum perforatum*, *Inula montana*, *Jasonia tuberosa*, *Lavandula latifolia*, *Malva sylvestris*, *Mentha × piperita*, *Pinus sylvestris*, *Plantago lanceolata*, *Plantago major*, *Potentilla erecta*, *Potentilla reptans*, *Primula veris*, *Pulmonaria longifolia*, *Ranunculus ficaria*, *Rumex* sp., *Sambucus nigra*, *Santolina chamaecyparissus*, *Symphytum tuberosum*, *Thymus vulgaris*, *Tussilago farfara*, *Verbascum thapsus* and *Verbena officinalis*.

*** Olives in brine: olives are macerated in water with salt until the bitter flavour has left. Then they are macerated in cold water, garlic, thyme and rosemary for two months

^a Unless indicated by a cross (†) all species are non-cultivated; species which are both cultivated and non cultivated are indicated with two crosses (††).

^b Collector: Rocío Alarcón.

^c Comparison with other authors: T (Tardío et al., 2006), M (Menendez-Baceta et al., 2012), PA (Puente Amestoy, c. 1960).

^d Use-category: H-F (health-food), F (food), M (medicine).

4. Results and discussion

4.1. Food, health foods and medicines

Table 1 presents the top 25 species according to their number of UR and the rest of the species with three or more URs are included in Appendix 1. Species with less than three URs were not included in the Appendix, since it is commonly accepted that they are less reliable (Johns et al., 1990; Le Grand and Wondergem, 1987). Overall, 184 species of 49 families have been recorded in the different regions of study based on a total of 5658 individual URs. The vast majority of all species are used for food purposes, i.e. exclusively as a food or as a health food, respectively (food, F: 73 species; health food, H-F: 75) while medicinal uses (M) account only for 36 species.

Almost 40% of the all species are in the complex group of health foods. These species are in essence food plants with a locally acclaimed health claim. This highlights the important overlap between food and medicines (Etkin and Ross, 1982). Scientifically they have often been classified as either a medicine or a health food, but the interconnectivities are complex and in these cases we classified these species as H-F. These resources may have different roles or functions in the study area:

1. Most plant uses are classified in essence by function, i.e. a certain preparation is used as a health food and as such as part of the regular diet or it is used for a specific medicinal purpose (difference by function). For instance, *Juglans regia* fruits are usually consumed raw before lunch or as an afternoon snack without any conscious medicinal use, but are also consumed specifically to prevent high cholesterol and heart problems.
2. In other cases the function is different in terms of what plant parts are used, the fruit may be a healthy snack and the leaves a medicine with a specific role (difference based on the botanical drug used). For instance, *Sambucus nigra* berries are eaten raw or used to prepare jams, while the infusion of the flowers is taken for colds, and its branches are burnt for inhalations against colds.
3. In some cases the difference is based on the form of preparation of the product to be consumed (difference based on the form of preparation). For instance, *Hypericum perforatum* flowering shoots are used to prepare a herbal tea, and also to prepare an ointment called *pomada sanjuanera*, that is prepared frying them together with many other plants.

A very large share (39.66%) of all species used belong to three families: Asteraceae (25 species), Lamiaceae and Rosaceae (24 each). This is similar to other studies in the Mediterranean (Pieroni et al., 2002, 2004; Novais et al., 2004; Guarrera et al., 2005; Rivera et al., 2005; Scherrer et al., 2005; Leonti et al., 2006; Nebel, 2005; Rivera et al., 2006; González-Tejero et al., 2007; Maxia et al., 2007; Guarrera et al., 2008; Parada et al., 2009; Calvo et al., 2011) and in other parts of the world such as North America (Moerman et al., 1999). Menendez-Baceta et al. (2014) also reiterate the importance of Asteraceae and Rosaceae in the local pharmacopoeia of other Basque regions in Alava and Biscay. Menendez-Baceta et al. (2012) reported on the importance of the Rosaceae and Fagaceae in human food, too.

4.2. Plants used as food and medicine

Plants in this group have a double usage or one use which is clearly at the food-medicine interface and include foods and beverages with specific acclaimed health benefits. In essence this functionalistic distinction is one which is linked to the perceived (i.e. emic) benefits, but at the same time this group also is somewhat artificial, since it is not recognised by people as a distinct group. Also included are species which have dual uses, both more in a food context and one which is medicine-centred.

Most of the top 25 species according to their number of UR are H-F. *Jasonia glutinosa* (6.6% of the UR), *Chamaemelum nobile* (6.2%), *Prunus spinosa* (4.7%), *Quercus ilex* subsp. *ballota* (4.3%), *Santolina chamaecyparissus* (3.7%) and *Thymus vulgaris* (3.0%) stand out as being central to the inhabitants of the region (Table 1). Seven species are food only (*Castanea sativa*, *Rubus castroviejoii*, *Rubus caesius*, *Fagus sylvatica*, *Arbutus unedo*, *Corylus* and *Fragaria vesca*). These species are widely used and have a high cultural salience.

This calls into question an important paradigm in ethnopharmacology, and we need to consider ways to present medicinal and food properties in an integrated way (cf. Etkin and Ross, 1991; Rivera et al., 2005). Our informants generally do not draw a very strict line between food and medicinal plants, highlighting the ambivalent nature of these two categories. The majority of the informants recognise that food plants can prevent or heal disease or “cleanse” the body.

Plants are used according to the needs of the people and different preparations, uses, applications, etc. Culturally speaking, people will manage the plants with proactively focusing on their uses for ailments, diseases, as food, beverages, etc., with the intention of preventing health problems from emerging, or subsequent treatment, if they do emerge.

The challenges of the borderline between food and medicines is well illustrated by *Jasonia glutinosa* (*té de roca*) and *Chamaemelum nobile* (*manzanilla*) which are common and important social beverages reported in the VIVA regions and generally prepared as infusions or macerations. An infusion of *J. glutinosa*, is the most popular local tea and in many Spanish regions is widely available as a speciality beverage, also served in restaurants (Pardo-de-Santayana and Morales, 2004; Pasep-ef-Saouazaoa fu am., 2005). Consequently, its importance in local Basque phytotherapy and as a health food is not surprising. It is used both as an herbal tea for general use and specifically to help with digestion, in case of stomach pain or diarrhoea. There clearly is an overlap between these uses and there can be no sharp dividing line between a general use just as a food (i.e. without any health-related expectations), as a health food or as a specific medication to treat stomach pain, or diarrhoea (i.e. they are medicinal by function). Both its use as a general herbal tea and as an herbal medicine have a high number of use reports. Its popularity is linked to the chemical profile of the species and especially the high content of essential oil rich in camphor, borneol and *cis*-nerolidol (Pardo-de-Santayana et al., 2005) and one can link these constituents both to its use as a food and as a medicine.

The situation is very similar in the case of *Chamaemelum nobile*, the second most popular species again with uses as a medicine in case of gastrointestinal disorders, as a general digestive or as a herbal tea with a more general usage. In another region in the Basque Country, *C. nobile* is the most commonly used species used for stomach-aches and digestive pains and disorders (Menendez-Baceta et al., 2014). The uses and names of the species have remained important in the area at least since 500 years ago as mentioned by Puente Amestoy (c. 1960) in his study of the inedited manuscript *Libro de plantas* (Plants book) of Fray Juan de Vitoria written in 1587. These two species, along with *Santolina chamaecyparissus* (1.5%) and *Anthemis arvensis* (2.0%) stand as an example of aromatic plants important in local Basque culture as herbal teas and digestive infusions. The three species are called *manzanilla* (chamomile), a generic term that has been used in Spain to refer to many species used for treating digestive conditions (Pardo-de-Santayana and Morales, 2006). Many other species including *Lithospermum officinale*, *Artemisia alba* and *Jasonia tuberosa* are used to prepare non-alcoholic beverages, mainly herbal teas.

The third most cited species is *Prunus spinosa* which fruits are mainly used for preparing a very popular liqueur called *patxaran* or *pacharán*. Many of its uses were also mentioned in the manuscript of Juan de Vitoria (Puente Amestoy, c. 1960). Liqueurs, like

herbal teas are important social beverages. They are generally prepared by combining several herbs, fruits and nuts with 17 species being used (3.98%). The most quoted were the fruits of *Prunus spinosa*, *Prunus avium*, *Malus sylvestris*, *Rubus ulmifolius*, *Cydonia oblonga* (all Rosaceae) and of *Arbutus unedo*, *Quercus ilex* subsp. *ballota*, *Juniperus communis*, *Juniperus oxycedrus* and *Juglans regia*. Important herbs were *Chamaemelum nobile*, *Helichrysum italicum*, or *Berberis vulgaris*. These liqueurs again are health foods, since they are drunk while socializing after meals, but also with the expectation of being a digestive, and they are used to manage minor gastrointestinal complaints.

Another key group of products are the various fruits processed in a variety of ways. The fourth most cited species is *Quercus ilex* subsp. *ballota*, widely used as a snack (toasted fruit) and as a coffee substitute. In this case explicit medicinal uses are much rarer and are specifically for treating herpes. Many other species may be used as 'coffee substitutes' including *Hordeum vulgare* (0.6% of UR), *Castanea sativa* (0.4%), *Quercus ilex* subsp. *ilex* (0.3%), *Cichorium intybus* (0.2%), *Quercus faginea* x *Quercus pyrenaica* (0.2%), *Quercus faginea*, *Quercus* sp., *Vicia faba* (0.1%). The choice is generally based on flavour of the processed fruit or seed which can vary between sweet, bitter and astringent. Combinations and variations of the flavour make the beverages unique and special. For example, the seeds of *Castanea sativa* are toasted then ground and boiled or infused in hot water. The roasted roots of *Cichorium intybus* are widely used combined with different species of *Quercus*. During and after the Spanish civil war *Cichorium intybus* was an important coffee substitute and its use is still remembered throughout Spain. (Guzmán, 1997; Triano et al., 1998; Fernández Ocaña, 2000; Bonet and Vallés 2002; Tardío et al., 2005). Other species, such as *Vicia faba* are used in a similar way to the Ecuadorian Highlands (runner-bean coffee or *café de haba*).

Condiments are also represented in the top 25 species. *Thymus vulgaris* is the sixth most cited species, being mainly used for treating respiratory disorders and for seasoning meat and olives. *Origanum vulgare* and *Rosmarinus officinalis* are also highly valued. People in the VIVA region have a wider preference for plants used for seasonings than in other Basque regions where people do not consider the use of spices as a Basque tradition since they associate condiments with immigrant populations from central and southern Spain (Menendez-Baceta et al., 2012; Menendez-Baceta, 2015).

A large number of species have a use as a general "tonic" or because they are simply considered to be healthy. However, this group is not discussed further and the following analysis concentrates on preparations with specific health claims.

Most key species (*Prunus spinosa*, *Quercus ilex* subsp. *ballota*, *Santolina chamaecyparissus*, *Thymus vulgaris*, *Sambucus nigra*, *Juglans regia* or *Rubus ulmifolius*) are also important food and/or medicinal plants in many other Spanish regions (Leonti et al., 2006; Tardío et al., 2006; Quave et al., 2012). Obviously the similitude is higher with the neighbouring regions. The highest similitude was found with Middle Navarra, an area that borders VIVA in Valle de Arana (Cavero et al., 2011b). Four of the top 5 species are shared (*S. chamaecyparissus*, *Jasonia glutinosa*, *Chamaemelum nobile*, and *Prunus spinosa*). Other Navarran regions are not so similar. For instance in Middle Navarra only three of its top 5 medicinal species (*S. chamaecyparissus*, *Thymus vulgaris*, and *Rosmarinus officinalis*) are among the top 25 of VIVA (Calvo et al., 2011), and only two in Northern Navarra (*C. nobile*, and *Tanacetum parthenium*) (Cavero et al., 2011a). The similitude with the wild food plants consumed in other areas of Euskadi (southern Biscay and northern Alava) is also quite high, since four of the top 5 wild food species (*P. spinosa*, *R. ulmifolius*, *Castanea sativa* and *Fagus sylvatica*) are in the TOP 25 of VIVA. More differences appear when the medicinal plants of southern Biscay and northern Alava are compared. None of the top 5 medicinal species are in the top 25 of VIVA (Menendez-Baceta et al., 2014). Nearly half of the wild food

plants mentioned in Gorbeialdea, are shared with VIVA area (Menendez-Baceta et al., 2012).

Such similarities may either be based on an exchange of practise or on parallel developments. Keeping the interconnected histories of the people in Northern Spain in mind, an exchange of practice seems to be the most plausible explanation. A standardisation of the knowledge is based on historical events that can strengthen or weaken the knowledge of plants, according to the needs of the people for a given time period. For example, Weckerle et al. (2009) argues that under Mao's government important information and books were distributed in order to improve the health care system. Herbals have exerted a strong influence increasing the similarity of plant knowledge among rural populations in China. However, distinct local use of plants also exists, indicating that plant knowledge, specific to each rural community, is alive and practised. In the Basque Country, after the civil war in 1936, much of the traditional knowledge of species was lost (Barandiaran and Manterola, 2004). This is an indicator that political currents have a strong influence on whether people preserve their knowledge, or whether the knowledge is lost (Menendez-Baceta et al., 2015).

Overall, this study highlights that due to centuries of interconnectivities, there is a strong overlap in practices and there are many instances of shared practice, pointing both the usefulness of these species and to the active sharing of knowledge and practice. Interestingly, the similarity of the area with the rest of the Iberian Peninsula is higher than in Basque areas where Basque is still the main language (Menendez-Baceta et al., 2015).

4.3. Medicinal plants: Identifying key species for common health conditions

There is a group of 36 species used only for specific medicinal purposes (M) that are not used as food plants. These species are ingested only for specific health conditions. The lack of any usage as a health food is linked both to the taste and other sensory characteristics of products derived from these species but also to their often very strong pharmacological effects (for example as a purgative).

As reported in many studies (e.g. Heinrich et al., 1998; Cavero et al., 2013) dermatological conditions have the highest percentage of URs (3.3%, 21 species). The most popular species in this group are *Tilia platyphyllos* (0.8% of URs), *Chelidonium majus* (0.7%), *Verbena officinalis* (0.4%); *Rhamnus alaternus* (0.6%), *Plantago major* (0.3%) and *Cistus salvifolius* (0.3%). Interestingly, *Verbena officinalis* is also highlighted by Menendez-Baceta et al. (2014).

The second largest subgroup is "emotional problems" with 1.2% of the UR and four species employed; most notably *Tilia platyphyllos* (0.9%) and *T. cordata* (0.2%). Another key subcategories are respiratory conditions, (1.1%) with 9 species included, most importantly *Verbena officinalis* (0.5%). A range of plants is used for cleansing the body (0.80% of) and their use is limited to special health conditions, like for example purging with *Rhamnus alaternus* and *Centaureum erythraea* (0.3%). In the case of urogenital conditions (0.8%), *Equisetum arvense* (0.4%) and *Lepidium latifolium* (0.3%) stand out as the most important species. In the case of gastrointestinal conditions (28%), the most relevant species are *Parietaria judaica* (0.1%), used as a decoction to "cleanse the liver", and *Illicium verum* and *Mentha pulegium* (0.07%, 4) that are used for its digestive properties. No species stands out in the small cardiovascular subgroup (0.30%), with *Rhamnus alaternus* (0.2%), *Verbena officinalis* and *Plantago major* (0.1%) each.

4.4. Food plants: identifying key species for collected food consumption

We documented 73 locally collected species used only as a food and not having a medicinal report. The most popular species are

Castanea sativa (2.2%), *Rubus castroviejoi* (1.7%), *Rubus caesius* (1.6%), *Fagus sylvatica* (1.6%), *Arbutus unedo* (1.3%) (Table 1).

Prepared foods include *Castanea sativa* (0.8%), *Cynara cardunculus* (0.2%), *Ruscus aculeatus* and *Sonchus oleraceus* (0.2% both). Salads are made with fresh leaves, adding vinegar, olive oil and salt. Some people bring all these elements to the field and when they find different species they prepare the salad in the field and eat it as a snack, or sometimes they eat them without preparations.

Only eight species were recorded as infusions without any medical claim (0.8%) most notably *Mentha aquatica* (0.2%), *Teucrium capitatum* and *Marrubium vulgare* (both 0.1%), highlighting that infusions generally are seen as a food with a medical purpose. Interestingly we only recorded very few reports for uses in jams, (0.3%), most importantly *Arbutus unedo* (0.1%, 4), *Ribes rubrum*, *Ribes nigrum*, *Rubus castroviejoi* (0.1% each).

4.5. Plant parts and life forms

In the overall sample, fruits were used most commonly (33.7% of the URs), followed by dry inflorescences (13.6%), dry flowering aerial parts (7.2%), flowering shoots (6.6%), with the remainder accounting for less than 6% of the total UR. Herbs are the most popular life form used accounting for 55.8% of all uses, followed by trees 28.1% and shrubs 16.2%. Fruits (18.5%) represent the most widely used plant part in the H-F group, followed by dried inflorescences, (13.5%) and dry flowering aerial parts (7.1%). In the group of local food plants (F), fruits (15.1%) were the part most frequently reported, followed by tender leaves (2.5%) and tender shoots (1.3%). In the case of medicinal plants (M), dry flowers (1.4%) represent the most widely used plant part; followed by fresh leaves and latex (both 1.0%).

4.6. Methods of preparation

Infusions (38.5%), crude plant materials (33.7% of the UR), decoctions (10.2%) and macerations (7.3%) are the most widely used methods. In case of preparations used both as a food and a medicine, infusions are the most popular form of preparation (33.9%), followed by raw plants (15.9%), boiling (6.9%), maceration (6.2%), roasted (2.1%), decoction and fried (1.8% both) and burning (0.4%).

Infusion is also the preferred method for M (4.0%), followed by direct application of the crude drug (2.0%), frying (1.1%), decoction (0.7%), boiling (0.4%), macerating (0.4%), and burning (0.1%). According to the 25 most important species, the species are prepared between eight and two different ways, pointing to a high degree of versatility of these species. Some species stand out for having a very versatile range of modes of preparation: *Sambucus nigra* and *Thymus vulgaris* (6 methods of preparations); *Urtica dioica*, *Quercus ilex* subsp. *ballota*, *Juglans regia*, and *Prunus spinosa* (5 each), in all cases linked to both their cultural importance as such and the diversity of uses they get.

The use of unprocessed fruits is of particular importance, with 15 species yielding fruits including berries and nuts such as *Sambucus nigra*, *Rubus ulmifolius*, *Castanea sativa*, and different species of acorns. All are consumed when they are ripe. A unique case is *Sorbus domestica* which needs to be ripened near the point when it becomes putrid (Table 1).

Another interesting group are chewable stems, leaves and barks called *masticantes* and used to obtain juices, fibres of the plants. For instance, the stems of *Rubus* species (called *carneros*) are peeled and chewed, the leaves of *Quercus ilex* subsp. *ballota* and *Fagus sylvatica*, are eaten or the seeds of *Triticum aestivum* are eaten immature and raw. The role of masticants as a source of phytochemicals has been previously highlighted (Johns et al., 1996; Leonti et al., 2006; Menendez-Baceta et al., 2012), since it might be related with the prophylactic effect of secondary chemicals.

The seeds of five species (0.7%) are roasted and ground into flour, sometimes mixed with corn flour (*Zea mays*) to be used for baking

bread: *Quercus ilex* subsp. *ballota*, *Fagus sylvatica*, *Castanea sativa* and *Triticum aestivum*. Again this is a widespread tradition in Spain with a long history of use and species may be used interchangeably. In periods of scarcity, acorns were prepared as flour to make bread and other dishes (Triano et al., 1998; Tardío et al., 2006; Blanco and Cuadrado, 2000; Fernández Ocaña, 2000) a food use which can be traced back to prehistoric Spanish settlers (Tardío et al., 2006).

Other remarkable modes of preparation are jams and desserts (e.g. *Sambucus nigra*, *Rubus ulmifolius* and *Vaccinium myrtillus*), and liqueurs (e.g. *Prunus spinosa*, *Sideritis hyssopifolia*), some of them marketed as quality local produce as in other Spanish regions (Pardo-de-Santayana et al., 2007).

The latex of several *Euphorbia* species is applied directly against verruca and moles but also as cheese rennet. Presently some families still collect the latex when it is very thick for preparing the cheese. They maintain the practice because “the taste is different” and it keeps the cheese for a longer time without it rotting. The need to find new tastes, new dishes, and to break the routine of the same dishes, having multiple preparations allows a wide variation in flavours for the same species.

4.7. The sources of locally used plants

An ongoing debate has focused on the zones where such resources are gathered. *Basoa* (forest and other uncultivated places further away from the farmhouse) account for 46.9% of the total UR, an interesting result since other studies (Frei et al., 2000; Stepp and Moerman, 2001; Kujawska and Pardo-de-Santayana, 2015) had shown that zones close to the house tend to be the main sources of such products. Certain species that require social gatherings for their collection are usually found within this ecozone. When people collect plants they undertake other activities such as caring for animals, hunting and sharing time with other people. *Fincas* (cultivated fields) were the second most important zone (20.1%), followed by house garden (10.8%) and food garden (10.5%).

5. Conclusion

There is no sharp line dividing local food and medicine. This is a culturally constructed division and also influenced by environmental conditions, cultural background, traditional knowledge of the natural resources (useful plants in this case), education, economy, political movements, etc. (Collen et al 2015). From the analysis it also becomes apparent that these categories are dynamic. The preparations are characterized by having multiple methods of preparations and flexibility to use under subcategories of food and medicinal properties.

From the biogeographical location, it is clear that the Basque Country does not belong to the western Mediterranean region; however it shares with the latter a similar biodiversity and bio-cultural aspects. In comparison with other studies in the Mediterranean there are many similarities in the uses and preparations of different species of plants. Our study demonstrates that some of these plants are key Mediterranean species, used as food and medicine. Consequently, the study leads to new conceptual and practical implications in the way of understanding the meaning of Mediterranean regions, Mediterranean species, which involve more than the geographical location.

In all human cultures food diversity and diet are strongly linked to health. Such plant products may form a basis for developing novel useful products (like health foods) from this biocultural diversity. The present research provides baseline information that offers the possibility of further research into the traditional knowledge of the local people of the VIVA regions in the Basque Country. It is possible

and necessary to maintain and further develop the information for future local and global uses which is a basis for conservation and sustaining and using these resources. If society's desire is for new products which are sustainable, then much of what has been found in this research will provide the basis for potential new nutraceuticals. This information may even lead to economically profitable applications at a local, national and international level.

In the Basque Country further research on local and traditional knowledge regarding medicinal plants and food plants is needed. This study is just a stepping stone in trying to fulfil this need.

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Appendix A

Medicinal and food uses of plants in VIVA area with three or more use-reports.

Family Species ^a Collection number ^b Comparison with other authors ^c	Local names	Use-category and mode of use
APIACEAE		
<i>Apium graveolens</i> L. †; 629 T	apio	<i>Clean the blood</i> : tender leaves and stems, boiled <i>Vegetables</i> : tender leaves and stems, boiled alone or with other vegetables; boiled or raw, in salads <i>Clean the blood</i> : roots, boiled <i>Clean the skin</i> : seeds, macerated in olive oil, frictions <i>Vegetables</i> : raw, alone or salads; boiled, stews <i>Warts</i> : roots juice that rise when salt is added in a hole made at the top of the root, topical
<i>Daucus carota</i> L.; 33 T	zanahoria	<i>Colds and sore throat</i> : leaves, infusion, alone or with <i>Thymus vulgaris</i> <i>Digestive</i> : leaves, infusion, alone or with <i>Thymus vulgaris</i> ; or with <i>Illicium verum</i> , <i>Mentha arvensis</i> and <i>Glycyrrhiza glabra</i> <i>Vegetables</i> : young shoots, raw, snack, salads <i>Vegetables</i> : tender leaves, raw, salads; soup <i>Conjunctivitis</i> : leaves, infusion, washings <i>Seasoning</i> : leaves, flavour salads, meat, stews
<i>Foeniculum vulgare</i> Mill.; 620 T	anís, anís basto, hinojo	<i>Skin burns, cellulitis</i> : tender leaves and flowers, ointment, <i>pomada sanjuanera</i> **
<i>Heracleum sphondylium</i> L.; 673 <i>Petroselinum crispum</i> (Mill.) Fuss; 133	hoja agria perejil	<i>Herbal tea</i> : inflorescences, infusion <i>Relaxant</i> : dry flowers, infusion <i>Stomach pain</i> : inflorescences, infusion <i>Vegetables</i> : tender leaves, boiled
ARALIACEAE		
<i>Hedera helix</i> L.; 774	hiedra	<i>Digestive, stomach pain</i> : flowering shoots, infusion
ASTERACEAE		
<i>Anacyclus clavatus</i> Pers.; 660 T	manzanilla, manzanilla de burro, manzanilla loca	<i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw, salads <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Arctium minus</i> (Hill) Bernh.; 579 T,PA	bardana	<i>Digestive, stomach pain</i> : flowering shoots, infusion
<i>Artemisia alba</i> Turra; 523 PA	manzanilla	<i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw, salads <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Calendula officinalis</i> L.; 303	caléndula	<i>Digestive, stomach pain</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw, salads <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Cichorium intybus</i> L. †; 212a T,PA	achicoria	<i>Digestive, stomach pain</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw, salads <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Cynara cardunculus</i> L. †; 30 <i>Cynara scolymus</i> L. †; 634 <i>Helichrysum italicum</i> G. Don f.; 528	cardo alcachofa, cardo manzanilla, perpetua	<i>Digestive, stomach pain</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw, salads <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Helichrysum stoechas</i> (L.) Moench; 188	manzanilla, manzanilla perpetua	<i>Digestive, stomach pain</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw, salads <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Inula montana</i> L.; 148 <i>Jasonia tuberosa</i> (L.) DC; 755 T	árnica té de tierra	<i>Digestive, stomach pain</i> : flowering shoots, infusion <i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw, salads <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Lactuca sativa</i> L. †; 381 <i>Matricaria discoidea</i> (Pursh) Rydb.; 614 T	lechuga manzanilla	<i>Digestive, stomach pain, sickness</i> : inflorescences, infusion <i>Herbal tea</i> : flowering shoots, infusion <i>Skin inflammations or infections, burns, eczema</i> : inflorescences, oil infusion, topical; <i>infected wounds</i> : inflorescences, ointment, <i>pomada sanjuanera</i> ** <i>Sweets</i> : inflorescences, raw <i>Coffee substitute</i> : roots, roasted and ground into flour, infusion <i>Vegetables</i> : leaves, raw in salad <i>Vegetables</i> : leaf stalks and midribs, raw, boiled <i>Vegetables</i> : stem stalks and midribs, raw, boiled <i>Digestive</i> : inflorescences, infusion <i>Herbal tea</i> : inflorescences, infusion <i>Liqueurs</i> : inflorescences, macerated in anisette with coffee and immature walnuts
<i>Onopordum acanthium</i> L.; 166 T	cardo, toba	<i>Liver pain</i> : leaf stalks and midribs, boiled <i>Vegetables</i> : tender leaves, soup

<i>Sonchus oleraceus</i> L.; 17	lechoso	Warts: leaves, juice, topical Vegetables: tender leaves and stems, boiled with potatoes, soup; boiled, in salads
<i>Sonchus tenerrimus</i> L.; 260	lechoso	Clean the stomach: tender leaves, salad Kidney problems: leaves, infusion
<i>Tanacetum corymbosum</i> (L.) Sch. Bip.; 245	manzanilla, tanaceto	Herbal tea: inflorescences, infusion
<i>Tanacetum vulgare</i> L. †; 355 T, PA	manzanilla, matricaria cabeza grande	Intestinal worms: inflorescences, infusion Herbal tea: inflorescences, infusion Relaxant: inflorescences, infusion
<i>Taraxacum officinale</i> L.; 399 M	diente de león, lechoso	Stomach pain: inflorescences, infusion Clean the blood: leaves, infusion; thin the blood: leaves, boiled; cholesterol lowering: leaves, raw Clean the liver: leaves, raw; infusion
<i>Tussilago farfara</i> L.; 668	tusilago	Vegetables: leaves, raw, snack, salads Skin inflammations and infections, wounds: leaves, ointment, pomada sanjuanera** Colds: leaves, infusion
BERBERIDACEAE		
<i>Berberis vulgaris</i> L.; 122	agrace, agranzón	Fruits: raw Liqueur: fruits, macerated in anisette
BORAGINACEAE		
<i>Borago officinalis</i> L. †; 64 T, PA.	borraja	Clean the blood: leaf stalks and midribs, boiled Coughs and colds: flowers, infusion Vegetables: leaf stalks and midribs, boiled, stews. Sometimes bottled Herbal tea: fructified aerial parts, infusion Liver pain: fructified aerial parts, infusion Colds and bronchitis: flowering aerial parts, infusion; fresh leaves, syrup
<i>Lithospermum officinale</i> L.; 592 PA.	té de bola, té de perla	
<i>Pulmonaria longifolia</i> (L.) Huds.	pulmonaria	
BRASSICACEAE		
<i>Brassica nigra</i> (L.) W.D.J. Koch †; 683 <i>Brassica oleracea</i> L. †; 573 <i>Lepidium latifolium</i> Medik.; 345 <i>Rorippa nasturtium-aquaticum</i> (L.) Hayek; 540 T, M.	mostaza negra, nabo silvestre berza; young shoot: pámpano hoja del riñón, rompediedra berro	Vegetables: leaves, raw, boiled in salad or with cabbage Vegetables: young shoots, raw; leaves, boiled Kidney stones, cystitis: leaves and flowers, infusion Vegetables: leaves, raw, salad
<i>Sinapis arvensis</i> L.; 125	nabo silvestre, sereu	Clean the blood and body: leaves, raw, salads Vegetables: leaves, raw, salad
CAPRIFOLIACEAE		
<i>Sambucus ebulus</i> L.; 216 PA.	yezgo	Skin inflammations: flowers, burnt, smoke bath
<i>Viburnum lantana</i> L.; 553 T	morriónera; Fruit: morrión	Fruits: raw
<i>Viburnum tinus</i> L.; 652	Fruit: marmararila, marmarrade	Fruits: raw
CARYOPHYLLACEAE		
<i>Silene vulgaris</i> (Moench) Garcke; 287 T	colleja, molleja	Vegetables: tender leaves and stems, salted with egg; boiled
CHENOPODIACEAE		
<i>Beta vulgaris</i> var. <i>conditiva</i> Alef. †; 211	remolacha	Clean and thin the blood: roots boiled Vegetables: roots, boiled, salad
<i>Beta vulgaris</i> var. <i>maritima</i> (L.) Moq. †; 219 T	acelga silvestre	Diabetes: young shoots, boiled, stews, soups Vegetables: fresh shoots, dipper in batter, fried; boiled, stews
CISTACEAE		
<i>Cistus albidus</i> L.; 613 PA	hierba lobera	Skin infections, wounds: aerial parts, decoction, washings
<i>Cistus salvifolius</i> L.; 594 PA	hierba lobera, jara, lobera	Kidneys problems: aerial parts, decoction Internal ulcers: aerial parts, decoction Skin infections: aerial parts, decoction, washings
CLUSIACEAE		
<i>Hypericum perforatum</i> L.; 105 T, PA	golondrina, flor de San Juan, hipérico, hierba de San Juan	Clean the kidney: flowering shoots, infusion, alone or with <i>Melissa officinalis</i> or <i>Cistus</i> sp. Diarrhoea: flowering shoots, infusion Insomnia, relaxant, sadness: flowering shoots, infusion with <i>Melissa officinalis</i> ; depression: inflorescence, oil infusion, frictions Herbal tea: flowering shoots, infusion, alone or with <i>Melissa officinalis</i> Skin infections and inflammations: flowering shoots, ointment, pomada sanjuanera**
CONVOLVULACEAE		
<i>Convolvulus arvensis</i> L.; 671 T	amapola de carihuela	Vegetables: tender leaves and flowers, raw
CRASSULACEAE		
<i>Hylotelephium telephium</i> (L.) H. Ohba †; 405 <i>Sedum spurium</i> M. Bieb.; 729	bálsamo, siempreviva bálsamo	Infected wounds, skin inflammation: peeled leaves (without epidermis), topical Infected wounds, skin inflammations: peeled leaves (without epidermis), topical
<i>Umbilicus rupestris</i> (Salisb.) Dandy; 342	bálsamo, campanilla, chupamateria, hierba callera, ombligo de Venus, sacamateria	Infected wounds, skin inflammations, corns, hard skin, warts: peeled leaves (without epidermis), topical Vegetables: leaves, raw, salads; boiled with <i>Urtica dioica</i> , <i>Medicago sativa</i> and other vegetables, soups, sometimes bottled

CUCURBITACEAE

Cucurbita ficifolia Bouche.†; 365 calabaza, calabazo, calabaza de cabello de ángel

Fruits: jam (*cabello de ángel*), boiled with sugar
Vegetables: tender stems, seeds raw; flowers, dipper in batter, fried

CUPRESSACEAE

Juniperus communis L.; 49 T, PA enebro

Digestive: cones, raw
Earache: cones, almond oil infusion, warmed in a bain marie, ear drops
Liqueur: cones, macerated in anisette, liqueur or gin
Rheumatism and arthritis pain: cones, oil infusion with *Rosmarinus officinalis*, frictions
Skin infections: cones, ground, poultice; warts: cones, boiled with salt, compresses; same number of cones as warts in a piece of cloth, buried in the ground

Juniperus oxycedrus L.; 546 T abrojo, enebro, ginebro

Liqueur: cones, macerated in anisette, liquor or gin

Juniperus phoenicea L.; 249 abrojo romero, sabina

Warts: cones and branches, boiled with salt, compresses

DIOSCOREACEAE

Tamus communis L.; 656 T, M, PA uva de perro

Rheumatism and arthritis pain: fruits, raw, frictions

EQUISETACEAE

Equisetum arvense L.; 733 PA. cola de raposo, cola de ratón, cola de zorro

Bruises: aerial parts, ground, poultice
Clean the blood: fertile aerial parts, decoction with *Taraxacum officinale* leaves
Diuretic, kidney problems: aerial parts, infusion

ERICACEAE

Arctostaphylos uva-ursi (L.) Spreng.; 200 T gayuba

Prostate inflammations, cystitis: fruits and leaves, infusion; kidney infections, diuretic: fruits and leaves, infusion with *Erica vagans*

Erica vagans L.; 460 brezo
Vaccinium myrtillus L. T, M, PA arándano, ráspano, rámpano

Fruits: raw
Herbal tea: flowering aerial parts, infusion
Fruits: raw

EUPHORBIAEAE

Euphorbia peplus L. lechetrezná
Euphorbia serrata L. lechetrezná

Warts: latex, topical
Warts: latex, topical

T
Euphorbia villosa Waldst. & Kit. ex Willd.; 771 lechetrezná

Warts: latex, topical

Euphorbia sp.; 565 lechetrezná

Cheese rennet: latex
Warts: latex, topical

FABACEAE

Glycyrrhiza glabra L. †; 789 T regaliz

Herbal tea: aerial parts and roots, infusion

Lathyrus cicera L. †; 651 arverjilla, guisante silvestre
Medicago sativa L.; 222 alfalfa

Digestive: aerial parts and roots, infusion; stem chewed
Herbal tea: aerial parts, infusion, alone or with *Mentha arvensis*
Clean the blood: young shoots, with water
Depression: young shoots, infusion, alone or with milk
Herbal tea: young shoots, infusion
Vegetables: young shoots, raw; soup with *Urtica dioica*, *Umbilicus rupestris* and other vegetables
Diabetes: seeds, infusion
Fruits: seeds, stews
Vegetables: fruits, shoots, raw, soups, stews
Vegetables: seeds, soups, stews
Anaemia: immature seeds, boiled; seeds, toasted and ground, infusion
Coffee substitute: seeds, toasted and ground into flour, infusion
Vegetables: immature seeds, boiled and salted or puree

Phaseolus vulgaris L. † alubia

Trigonella foenum-graecum L. † alholva
Pisum sativum L. †; 328 guisante
Vicia faba L. †; 220 haba

FAGACEAE

Quercus faginea Lam.; 44 T, M roble encina; leave: pasto de roble

Coffee substitute: fruits, toasted and ground into flour, infusion
Flavouring cheese: fruits, olive oil infusion with *Juniperus communis* cones and *Lavandula latifolia*

Quercus faginea x *Q. pyrenaica*; 516 roble

Fruits: raw, toasted
Skin infections, wounds: bark, poultice
Coffee substitute: fruits, toasted and ground into flour, infusion
Fruits: raw, toasted

Quercus ilex L. subsp. *ilex*; 515 T, M encina

Herbal tea: leaves and fruits, infusion
Vegetables: leaves, chewed
Coffee substitute: fruits, toasted and ground into flour, infusion
Fruits: raw, toasted

Quercus sp.; 676; 158 roble

Coffee substitute: fruits, toasted and ground into flour, infusion
Vegetables: leaves, chewed

GENTIANACEAE

Centaurium erythraea Rafn; 479 T centaúra, centaúra menor, sanguinaria

Clean the blood: flowering shoots, infusion
Depression: flowering shoots, infusion
Digestive: flowering shoots, infusion
Vegetables: flowering shoots, raw

Gentiana acaulis L. pan de cuco

GROSSULARIACEAE

Ribes alpinum L.; 543 T, PA grosellero; fruit: abubilla, agrace, grosella

Fruits: raw

Ribes nigrum L.†; 683 PA grosellero; fruit: grosella

Fruits: raw; jam

<i>Ribes rubrum</i> L.; 370 T	arazón, fruit: grosella, grosella roja, uvín, uvín rojo	Fruits: raw; jam
<i>Ribes uva-crispa</i> L.; 727 T	uva espín	Fruits: raw
ILLICACEAE		
<i>Illicium verum</i> Hook. f.†; 773	anís	Digestive: fruis, infusion, alone or with <i>Foeniculum vulgare</i> and <i>Glycyrrhiza glabra</i> ; liqueur, fruits macerated in anisette with <i>Prunus spinosa</i> fruits
LAMIACEAE		
<i>Calamintha nepeta</i> (L.) Savi; 440 T	menta, menta del monte, orégano del monte	Herbal tea: aerial parts, infusion Relaxant: aerial parts, infusion
<i>Lavandula latifolia</i> Medik.; 276 PA	lavanda	Relaxant: inflorescences, infusion; flowering shoots, oil infusion, frictions Flavouring cheese: inflorescences, olive oil infusion with <i>Juniperus communis</i> cones and acorns Skin infections: flowering shoots, ointment, pomada sanjuanera** Herbal tea: aerial parts, infusion
<i>Marrubium vulgare</i> L.; 596 PA	menta hedionda	
<i>Melissa officinalis</i> L. ††; 474 T, PA	melisa	Bronchitis: aerial parts, infusion Herbal tea: aerial parts, infusion, alone or with <i>Hypericum perforatum</i> Relaxant, depression: aerial parts, infusion, alone or with <i>Hypericum perforatum</i> Stomach pain: aerial parts, infusion Herbal tea: leaves, infusion
<i>Mentha aquatica</i> L.; 719 T, M, PA	menta, menta poleo	Seasoning: leaves, flavour rice pudding, meat, soups Herbal tea: leaves, infusion, alone or <i>Lathyrus cicera</i>
<i>Mentha arvensis</i> L.; 721 PA	hierbabuena, hierba santa, menta	Seasoning: leaves, flavour rice pudding
<i>Mentha x gentilis</i> L. †; 296	hierbabuena, menta	Herbal tea: leaves, infusion Relaxant: leaves, infusion
<i>Mentha longifolia</i> (L.) Huds. T	hierba santa, menta silvestre	Digestive: leaves, infusion Seasoning: leaves, flavour rice pudding
<i>Mentha x piperita</i> L. †; 123	hierbabuena, hierba santa, menta	Digestive, stomach pain: leaves, infusion Herbal tea: leaves, infusion Relaxant: leaves, infusion Seasoning: leaves, flavour rice pudding
<i>Mentha pulegium</i> L.; 265 T, PA	batán, menta lombricera, menta poleo	Digestive, stomach pain: leaves, infusion; liqueur, macerated in anisette with <i>Prunus spinosa</i> fruits, <i>Rosmarinus officinalis</i> and <i>Thymus vulgaris</i> Intestinal worms: leaves, infusion
<i>Mentha spicata</i> L.; 338 T	hierbabuena	Digestive, stomach pain: leaves, infusion Herbal tea: leaves, infusion Relaxant: leaves, infusion Seasoning: leaves, flavour meat, soups, rice pudding
<i>Ocimum basilicum</i> L.††; 407	albahaca	Digestive: leaves, infusion with <i>Thymus vulgaris</i> Relaxant: leaves, infusion, alone or with <i>Thymus vulgaris</i> Seasoning: leaves, flavour, meat, pasta, stews Clean the stomach: flowering shoots, infusion Herbal tea: flowering shoots, infusion
<i>Phlomis lychnitis</i> L.; 598 T	candilera	Herbal tea: leaves, infusion
<i>Salvia lavandulifolia</i> Vahl; 332 T, PA	salvia	Relaxant: leaves, infusion Seasoning: leaves, flavour meat, stews Herbal tea: flowering shoots, infusion
<i>Teucrium capitatum</i> L.; 599 T, PA	sanguinaria	Herbal tea: flowering shoots, infusion
<i>Thymus mastichina</i> (L.) L.; 9 T	tomillo	Colds and respiratory problems: flowering shoots, infusion with lemon
<i>Thymus praecox</i> Opiz; 600 T	orégano silvestre	Herbal tea: flowering shoots, infusion
<i>Thymus zygis</i> L.; 172 T	tomillo	Headache: flowering shoots, infusion Colds and chest infections: flowering shoots, infusion Seasoning: leaves, flavour meat, stews
LAURACEAE		
<i>Laurus nobilis</i> L. †; 128 M	laurel	Digestive: leaves, infusion Seasoning: leaves, flavour meat, sausages, snails, fish, stews
LILIACEAE s.l. (incl. Alliaceae, etc.)		
<i>Allium ampeloprasum</i> L.; 562 <i>Allium cepa</i> L. †; 335	ajete, ajo silvestre, puerro, puerro silvestre cebolla	Seasoning: bulb and pseudostem, flavour meat, stews soups Seasoning: flowers, bulb and pseudostem, flavour meat, stews, soups Skin inflammations and infections: second layer of the bulb, heated, poultice; skin burns: first layer of the bulb, fried, put in a piece of cloth, poultice Vegetables: pseudostems, boiled, stews Colds and phlegm: bulbs, raw Digestive: bulbs, macerated in olive oil Flavouring: bulbs, flavour, meat, stews Prevent infections: bulbs, soup with bread (<i>sopa de ajo</i>) Rheumatism and arthritis pain: bulbs, macerated in olive oil Vegetables: bulbs, raw
<i>Allium porrum</i> L. †; 235 <i>Allium sativum</i> L. †; 334	puerro ajo	Vegetables: young shoots, raw
<i>Asparagus acutifolius</i> L.; 236 T, PA	esparraguera; young shoot: espárrago, espárrago silvestre	Vegetables: young shoots, raw
<i>Asparagus officinalis</i> L. PA	young shoot: espárrago	Vegetables: young shoots, raw
<i>Merendera montana</i> (L.) Lange; 405	quitameriendas	Seasoning: stamen, flavour rice (colourant)

T			
<i>Ruscus aculeatus</i> L.; 571T	rusco		Vegetable: young shoots, raw; boiled or salted
MALVACEAE			
<i>Althaea officinalis</i> L.; 454	malvavisco		Colds: flowering shoots, infusion; roots, syrup
T, PA			
<i>Malva moschata</i> L.; 437	malva; fruit: quesito		Colds: flowering shoots, infusion
			Fruits: immature fruit, raw
<i>Malva neglecta</i> Wallr.; 438	malva; fruit: quesito		Colds: flowering shoots, infusion
T, PA			Fruits: immature fruit, raw
MYRTACEAE			
<i>Eucalyptus globulus</i> Labill.; † 780	eucalipto		Colds and sore throat: leaves, infusion, alone or with lemon; boiled, inhalations
MORACEAE			
<i>Ficus carica</i> L. †; 778	Fruit: higo		Fruits: raw
M			
OLEACEAE			
<i>Ligustrum vulgare</i> L.	aligustre		Fruits: raw
PAPAVERACEAE			
<i>Chelidonium majus</i> L.; 115	berruguina, celidonia, flor del yodo, golondrina		Bruises: flowering aerial parts boiled
PA			Relaxant: flowering aerial parts
			Warts: latex, topical
PINACEAE			
<i>Pinus sylvestris</i> L.; 560	pino		Colds: shoots, infusión
			Fruits: seeds, raw, toasted
PLANTAGINACEAE			
<i>Plantago lanceolata</i> L.; 288	llantén, llantén macho, llantén menor		Skin inflammations: leaves, raw, poultice; corns: leaves, ointment, pomada sanjuanera**
T, M, PA			Swollen areas: leaves, decoction, washings
			Skin infections: leaves, infusion, washings; infected wounds: leaves, crushed in a cloth, poultice; bites: leaves, poultice; herpes: ointment, pomada sanjuanera**
<i>Plantago major</i> L.; 384	llantén, llantén hembra, llantén femenino		Kidney problems: leaves, infusion
T, PA			Piles: leaves, crushed in a cloth, poultice; ointment, pomada sanjuanera**
			Digestive: leaves, infusión
POACEAE			
<i>Hordeum vulgare</i> L. †; 776	cebada		Coffee substitute: fruits toasted and ground into flour, infusion
<i>Triticum aestivum</i> L. †	trigo		Fruits: immature fruits, raw
			Flour: fruits, ground into flour, bread
<i>Zea mays</i> L. †	maíz		Flour: fruits, ground into flour, bread (talo or moroqui)
POLYGONACEAE			
<i>Rumex</i> sp.	acedera, achitabla		Vegetables: tender leaves, raw, salad
PRIMULACEAE			
<i>Anagallis arvensis</i> L.; 627	muraje		Skin inflammations and infections, burns, corns, wounds: leaves and flowers, ointment, pomada sanjuanera**
PA			Sweets: flowers, nectar, sucked
<i>Primula veris</i> L.; 283	flor de mayo, flor de San José, pámpano		Skin inflammations: leaves and flowers, ointment, pomada sanjuanera**
			Vegetables: tender leaves, raw
RANUNCULACEAE			
<i>Ranunculus ficaria</i> L.; 527	celidonia menor		Burns: flowers and leaves, ointment, pomada sanjuanera**
RHAMNACEAE			
<i>Rhamnus alaternus</i> L.; 375	carrasquilla		Colds, sore throat: flowering branches, infusion
T, PA			High blood pressure, thin the blood: flowering branches, infusion
ROSACEAE			
<i>Amelanchier ovalis</i> Medik.; 552	guillomo, alcornio; fruit: arándano silvestre, manzana silvestre		Fruits: raw, jam
T			
<i>Fragaria x ananassa</i> (L.) Mill. †; 125	Plant and fruit: fresa, marrubio		Fruits: raw
<i>Crataegus monogyna</i> Jacq. ; 698	espino albar, espino blanco, fruit: anrolica, enrolica, manzana del pastor		Constipation: flowering branches, infusion
T,M			Fruits: raw
			High blood pressure, thins the blood: flowering branches, infusion
<i>Malus domestica</i> L. †; 312	manzano; fruit: manzana		Relaxant: flowering branches, infusion, alone or with <i>Melissa officinalis</i>
			High blood pressure, thins the blood: flowering branches, infusion
<i>Malus sylvestris</i> Mill.; 738	manzano silvestre; fruit: gustincha, maguilla, maguillo, maila, majilla, manzana silvestre		Relaxant: flowering branches, infusion, alone or with <i>Melissa officinalis</i>
T, M			Constipation: flowering branches, infusion
			Fruits: raw
			Liqueur: fruits, macerated in anisette or liquor, alone or <i>Chamaemelum nobile</i>
<i>Mespilus germanica</i> L.; 785	níspero		Fruits: raw
T, M			
<i>Potentilla reptans</i> L.; 101	cinco en rama		Piles: leaves in a piece of cloth until dry
PA			Skin infections, wounds: flowering shoots, ointment, pomada sanjuanera**
<i>Prunus avium</i> (L.) L.; 227	cerezo silvestre; fruit: cereza		Fruits: raw
T, M			Liqueur: fruits, macerated in anisette
<i>Prunus insititia</i> L.; 314	cerezo silvestre, ciruelo silvestre; fruit: arañone		Fruits: raw
T, M			
<i>Prunus mahaleb</i> L.; 539	cerezo de mahoma, ciruelo silvestre		Fruits: raw
T			
<i>Pyrus communis</i> L. †; 228	peral; fruit: pera		Fruits: raw, fruit salad, salad
<i>Rosa canina</i> L.; 697	escalambrujo, rosál, tapaculo; young shoot:		Fruits: raw

T	carnero, mato	<i>Liqueur</i> : fruits, macerated in anisette <i>Vegetables</i> : young shoots, peeled, raw
Rosa sp.; 281	calambrujo, rosa silvestre, tapaculo; <i>fruit</i> : arañón, carajachi, escalambrujo; <i>young shoot</i> : carnero, mato	<i>Colds and bronchitis</i> : fruits, decoction <i>Fruits</i> : raw, boiled with sugar <i>Vegetables</i> : young shoots, peeled, raw
Rubus idaeus L.; 730	frambuesa; <i>young shoot</i> : carnero, mato	<i>Fruits</i> : raw <i>Vegetables</i> : young shoots, peeled, raw
T		<i>Fruits</i> : raw
Rubus sp.; 301	zarza; <i>fruit</i> : mora; <i>young shoot</i> : carnero, mato	<i>Vegetables</i> : young shoots, peeled, raw
Sanguisorba minor Scop.; 424	pimpinela	<i>Vegetables</i> : tender leaves, raw, snack, salad
T		
Sorbus aria Crantz; 511T	mostajo; <i>fruit</i> : manzanica silvestre	<i>Fruits</i> : raw
RUBIACEAE		
Galium aparine L.; 630	amor de hortelano, lampazo	<i>Vegetables</i> : tender aerial parts, raw
RUTACEAE		
Citrus limon (L.) Osbeck †	limonero; <i>fruit</i> : limón	<i>Colds, sore throat</i> : leaves, infusion with lemon juice or <i>Eucalyptus globulus</i> <i>Stomach pain, diarrhoea</i> : fruits, juice
SCROPHULARIACEAE		
Veronica sect. beccabunga Griseb. ; 577	berra, berraña	<i>Vegetables</i> : tender leaves, raw; boiled, salads
M		
Scrophularia alpestris Gay ex Benth.; 717	hierba mora, lengua de perro	<i>Skin infections, burns</i> : leaves, raw with olive oil or heated with oil, poultice <i>Chest infections</i> : flowers, infusion, syrup <i>Colds, cough, asthma</i> : flowers, infusion <i>Earache</i> : flowers, olive oil infusion, ear drops
Verbascum thapsus (L.); 156	gordolobo	
TAXACEAE		
Taxus baccata L.; 325	tejo	<i>Fruits</i> : aril, raw
T, M, PA		
TILIACEAE		
Tilia cordata Mill.; 452	tila	<i>Relaxant</i> : flowers, infusion
T		
Tilia platyphyllos Scop.; 558	tila	<i>Relaxant</i> : flowers, infusion <i>Toothache</i> : flowers, infusion
T		
URTICACEAE		
Parietaria judaica L.; 561	parietaria	<i>Liver pain and clean</i> : aerial parts, infusion <i>Circulatory conditions, thin the blood</i> : tender leaves and stems, boiled, soup; raw, frictions <i>Gall stones</i> : tender leaves and stems, boiled, soup <i>Herbal tea</i> : aerial parts, infusion <i>Rheumatism and arthritis pain</i> : tender leaves and stems, boiled, soup; raw, frictions <i>Stimulate immune system</i> : tender leaves and stems, boiled, soup <i>Vegetables</i> : tender leaves and stems; boiled, soup, stews, salted
Urtica dioica L.; 153	ortiga	<i>Circulatory problems, clean the blood</i> : tender leaves and stems, boiled, soup; raw, frictions <i>Vegetables</i> : tender leaves and stems; boiled, soup
T, M		
Urtica urens L. ; 117	ortiga	<i>Colds, sore throat</i> : aerial parts, decoction; <i>sinusitis</i> : aerial parts, fried with egg, poultice <i>Cholesterol-lowering</i> : aerial parts, decoction <i>Skin infections and inflammations</i> : aerial parts, decoction, washings; aerial parts, ointment, <i>pomada sanjuanera</i> **
T		
VERBENACEAE		
Verbena officinalis L.	verbena	
PA		
VITACEAE		
Vitis vinifera L. †; 787	vid; <i>fruit</i> : uva	<i>Vegetables</i> : Young shoots, raw
T		

For symbols and acronyms, see also [Table 1](#).

* *Patxaran*: *Prunus spinosa* fruits are macerated in anisette for five or six months with coffee beans, cinnamon bark and *Chamaemelum nobile* inflorescences.

** *Pomada sanjuanera*: Ointment prepared frying together many plants such as: *Achillea millefolium*, *Allium ampeloprasum*, *Anagallis arvensis*, *Calendula officinalis*, *Chamaemelum nobile*, *Cruciata glabra*, *Eleocharis quinqueflora*, *Glycyrrhiza glabra*, *Hedera helix*, *Hypericum hirsutum*, *Hypericum perforatum*, *Inula montana*, *Jasonia tuberosa*, *Lavandula latifolia*, *Malva sylvestris*, *Mentha × piperita*, *Pinus sylvestris*, *Plantago lanceolata*, *Plantago major*, *Potentilla erecta*, *Potentilla reptans*, *Primula veris*, *Pulmonaria longifolia*, *Ranunculus ficaria*, *Rumex sp.*, *Sambucus nigra*, *Santolina chamaecyparissus*, *Symphytum tuberosum*, *Thymus vulgaris*, *Tussilago farfara*, *Verbascum thapsus* and *Verbena officinalis*.

*** Olives in brine: olives are macerated in water with salt until the bitter flavour has left. Then they are macerated in cold water, garlic, thyme and rosemary for two months.

^a Unless indicated by a cross (†) all species are non-cultivated; species which are both cultivated and non cultivated are indicated with two crosses (††).

^b Collector: Rocío Alarcón.

^c Comparison with other authors: T ([Tardío et al., 2006](#)), M ([Menendez-Baceta et al., 2012](#)), PA ([Puente Amestoy, c. 1960](#)).

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