

## FACTS REGARDING THE PHARMACOGNOSTIC AND PHYTOCHEMICAL STUDY OF THE PLANT *Parietaria Lusitanica* L.<sup>♦</sup>

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Received: July 19, 2010

Accepted: March 22, 2011

**Abstract:** Specialized literature studies show that the species from the genus *Parietaria* have therapeutic usage in traditional medicine, which have diuretic, depurative, emollient, antitussive, antirheumatic, cholagogue, pectoral and laxative properties. In human medicine the aerial part of the plant is used externally for treating hemorrhoids and anal fissures. In this respect a pharmacognostic and phytochemical study of the species *Parietaria lusitanica* L. was initiated, species frequently used by the inhabitants from around Toulouse, France.

**Keywords:** *Parietaria*, phytochemical compounds

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♦ Paper presented at the 6<sup>th</sup> edition of *Colloque Franco-Roumain de Chimie Appliquée, COFrRoCA 2010*, 7-10 July 2010, Orléans, France

## INTRODUCTION

*Parietaria lusitanica* L., family Urticaceae, is an annual herbaceous plant, which grows in arid, rocky regions in the Mediterranean area and the Balkan Peninsula. In the Flora found in Romania is quoted the species *Parietaria lusitanica*  $\beta$ . *chersonensis* Láng and Szov. as being synonym to the species *Parietaria sérbica* Panč., which grows in detritus and in rocky caverns in Mangalia and Canaraua Fetii in Dobrogea and in the west part of the Danube at Cazane, in Banat county. The name of the plant comes from Apuleius (II A.D.), which named it paries (side, wall), from the place where it grows.

*Parietaria lusitanica* L., is a short plant with a wispy, simple or arborescent stem, the leaves are petiolate alternate, rounded oval, slightly subdued at both ends, scarcely hairy, being 3-nervates at the basis. Flowers are small, produced in clusters of 3-7 axils dichazial inflorescence, subsesile. In every dichazial the central flower is female, and the lateral ones are hermaphrodite. The bracts are linear lance shaped, joined at the basis and longer than the perigonium 4-laciniat (jagged). The androecium is formed by 4 stamens. The fruit is a small and oval nut. It blossoms in the months of may-august.

## MATERIAL AND METHOD

As study material was used the supra terrestrial part of the plant *Herba Parietariae lusitanicae*, harvest in June 2008 from around Toulouse France when the plant was in fully blossom. The harvest material was dried in natural conditions for two weeks. To check the identity and to establish the quality of the vegetal product all the steps of the pharmacognostic analysis as research methodology were covered.

To research from the histo-anatomic point of view, the material represented by vegetative organs (stem and leaves) were fixed and preserved in 70% ethylic alcohol, after which was performed a manual section, with the help of a hand microtome and of the botanical razor, using as support elderberry marrow [1, 2].

After obtaining the preparations were made color photos at the photonic microscope OPTIKA, with a digital photo camera Canon A540. Photo scale = 100  $\mu$ m.

In order to check the identity and to determine the quality of the vegetal working material was also performed a complex pharmacognostical analysis (macro and microscopic exam and global chemical exam).

The global chemical analysis consists in successive and selective extraction of the vegetal product, with different polarity solvents and dividing it with the help of chemical methods followed by performing some specific reactions through which can be identified different groups of active principles or specific chemical constituents [3].

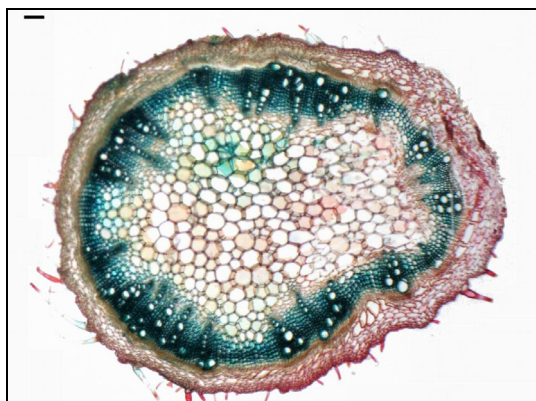
To determine the totals polyphenols was used the spectrophotometric method that has at the basis the determination of blue coloration intensity of molybdenum oxides formed by reducing the polyphenols of the reagent Folin-Ciocalteu (phosphomolybden wolphranum), with a V- 630 spectrophotometer (1 cm tanks and  $\lambda = 725$  nm).

## RESULTS AND DISCUSSIONS

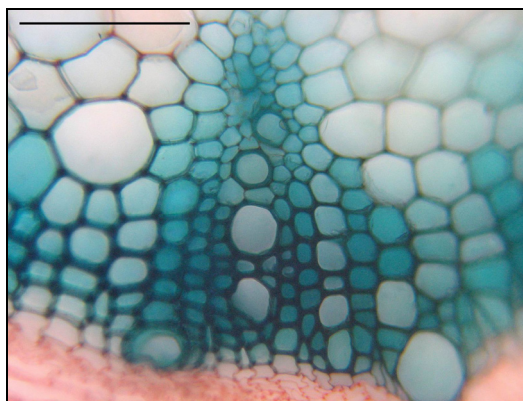
The macroscopic exam confirmed the description of the plant from the Flora of Romania [4].

The microscopic study of the transversal section of the stem pointed out that:

- simple stratified epidermis with isodiametric cells which has from place to place long, unicellular tector hairs and pluricellular secretive hairs with cylindrical pedicel which bears a pluricellular gland, peltata.
- relatively thick bark, type collenchyma in coasts and parenchyma in vallecules.
- central cylinder is thick in the stems' superior region, including many leading libero ligneous fascicules type collateral, separated by parenchyma – cellulose medullar rays; a medium stem, the leading tissues form 2 concentrically sinuous rings, one external, thin, libero and the other internal, thicker, lignin, resulted from ligneous fascicules completely lignified and medullar rays moderate sclerificated and intensely ligneous. In some bigger fascicules, lignin has already a secondary structure; at the lower region (base) the ligneous secondary ring is thicker.
- marrow is parenchyma – cellulose type with very big cells and very thin walls leaving between meatus (Figures 1 and 2).



**Figure 1.** Transversal section through the middle region of the stem



**Figure 2.** Transversal section through the middle region of the stem (portion from the lignin ring)

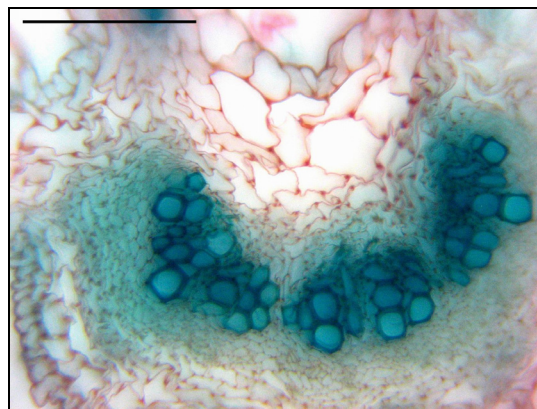
The transversal section of the foliar limb presents:

- the median nervure which is more protuberant then the abaxial. At this level, the epidermis has numerous tector hairs, and the cells are visibly radial lengthened, with the inner and exterior walls thicker than the others. The tree conductor fascicules are separated from the uniserie rays, and the ligneous vassels have an irregular disposition, between then being very few parenchyma cellulose cells. At the superior side the median nervure has few secretive hairs long pedicellate (bi- or tri- cellular pedicel) with a pluricellular peltata gland.
- the inferior epidermis has visibly smaller cells, isodiametric or slightly tangential lengthened.

- the mesophyll is different in palisade tissue on the superior layer and lacunose at the inferior layer.
- the inferior epidermis has cells with irregular contour, with updated walls, numerous tector hairs on the surface unit and different length; the shorter one always have a bent tip. In this epidermis are also presented the stomata type anomocytic, so the limb is hypostomatic.
- the mesophyll is different in palisade tissue on the superior layer and lacunose at the inferior layer (Figures 3 and 4).



**Figure 3.** The transversal section of the foliar limb



**Figure 4.** The transversal section of the foliar limb (the median nerve - the ligneous vessels)

After effecting the identification reactions groups of active principles were high lightened:

- in ethereal solution: sterols or triterpenoids, carotenoids, coumarin;
- in unhydrolyzed alcoholic solution: gaelic tannins and catechins, reducing compounds, heteroside triterpenoid;
- in hydrolyzed alcoholic solution: reducing compounds, osis and poliosis, catechin tannin.

To appreciate the quality of the vegetal product were effected two preliminary determinations, which had the following values:

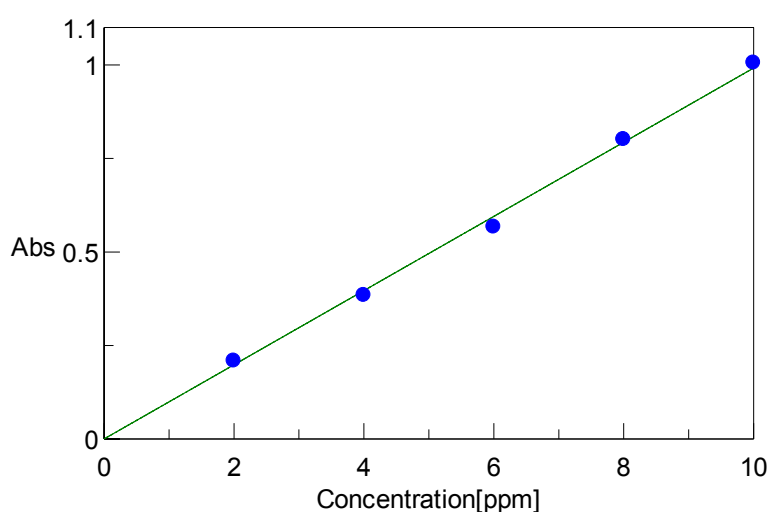
- 12.11 % w –drying losses;
- 22.0095 % w – water soluble substances;
- 17.8339 % w – ethanol soluble substances.

It was determined the total polyphenols content through the spectrophotometric method based on the determination of blue coloration intensity of molybdenum oxides formed by reducing the polyphenols with the Folin-Ciocalteu reagent, at 725 nm.

To calculate the total amount of polyphenols a reference standard curve marked with known quantities of tannic acid was used, as reference substance, in 0.1% substance. The reproducibly method was verified through the linearity of the curve, the repeatability of the results and standard deviation (Figure 5).

**Table 1.** Construction of the standard reference curve of tannic acid

Sample	Tannic acid solution volume 0.1 mg.mL <sup>-1</sup> [mL]	Reactive Folin-Ciocalteu (1:1) [mL]	Sodium carbonate 20% [mL]	Final volume [mL]	Tannic acid [μg.mL <sup>-1</sup> ]	A (725 nm)
Blank	0.0	1	9	10	0	0.000
1.	0.2	1	8.8	10	2	0.2086
2.	0.4	1	8.6	10	4	0.3841
3.	0.6	1	8.4	10	6	0.5669
4.	0.8	1	8.2	10	8	0.8007
5.	1.0	1	8.0	10	10	1.0057



**Figure 5.** Reference standard curve

$Y = A \times X$ ;  $A = 0.0991693$ ; Correlation Coefficient = 0.998499; Standard Error = 0.18234

The quantity of polyphenols highlighted in the vegetal product *Parietariae lusitanicae herba* varies between 0.280 – 0.420 g/100 g.

**Table 2.** Result of determination the total polyphenols from the vegetal product obtained from the species *Parietaria lusitanica* (France)

Analyzed vegetal product	V <sub>sol. B</sub> [mL]	V <sub>f</sub> [mL]	A 725 nm	Concentration from reference standard curve (C <sub>det.</sub> ) [μg.mL <sup>-1</sup> ]	F <sub>dil.1</sub>	F <sub>dil.2</sub>	Total polyphenols (w/w) in the vegetal product [%]
<i>Parietariae lusitanicae herba</i>	0.5	5	0.0836	0.84295	25	10	0.420
	1.0	5	0.1629	1.64277	25	5	0.410
	1.5	5	0.2035	2.05231	25	3.33	0.341
	2.0	5	0.2466	2.48642	25	2.5	0.310
	2.5	5	0.2782	2.80552	25	2	0.280

## CONCLUSIONS

A pharmacognostic and phytochemical study of the species *Parietaria lusitanica* L. was initiated and conducted. Macroscopic and microscopic studies confirmed the plant's identification. Spectrophotometric analysis of plant extract evidenced a polyphenols content of 0.280 – 0.420 g/100 g.

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