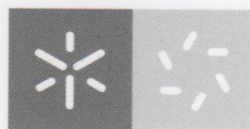
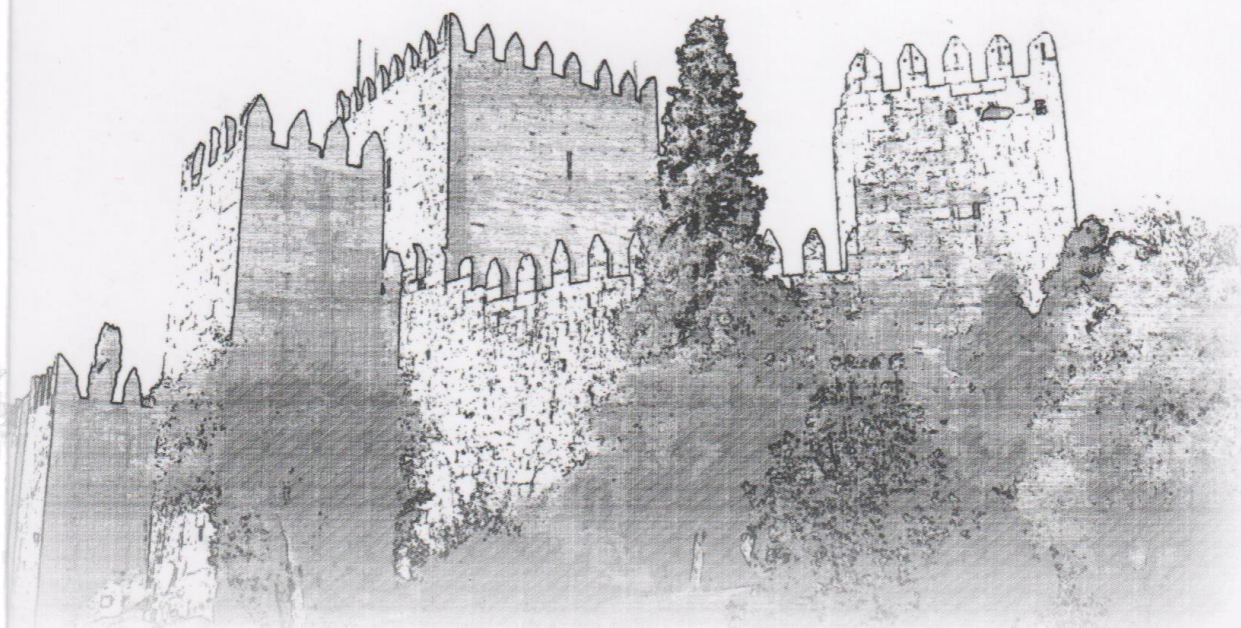


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formulation consists of equal weight of 6 Thai herbals: *Senna siamea* (Leguminosae), *Zollingeria dongnaiensis* (Sapindaceae), *Excoecaria agallocha* (Euphobiaceae), *Borassus flabellifer* (Palmae), *Achyranthes aspera* (Amaranthaceae) and *Sterculia foetida* (Sterculiaceae). The vehicle obtained by dissolving the ash of these herbs in water has been used for treatment of the diseases. This research aims to study physical properties and changeable of pH and elemental constituents of PI- KAD -DANG -HOK before and after burning process by muffled furnace and clay pot. The Ca, Mg, Na, K and Fe content were analyzed by Atomic Absorption Spectrophotometer. The elemental constituents were compared with *Orthosiphon aristatus* because this plant has been known about high potassium content and used for primary health care as diuretics. The physical properties evaluated were, percentage of moisture content (7.15 ± 0.17 % w/w), total ash (8.36 ± 0.05 % w/w), crude water extract (2.39 ± 0.01 % w/w), 95% ethanol crude extract (1.37 ± 0.01 % w/w), pH before burning (5.94 ± 0.01), pH after burning by muffled furnace (10.86 ± 0.03) and pH after burning by clay pot (10.94 ± 0.02). The essential elements analysis such as Ca, Mg, Na, K and Fe were significantly increased after burning ($p < 0.05$). Burning by clay pot significantly increased the amount of 5 elements than burning by muffled furnace ($p < 0.05$). Comparison of the amount of 5 elements in this medicine after burning with *O. aristatus* resulted that the amount of elements were significantly more than *O. aristatus* ($p < 0.05$). The results confirm usage as mineral supplement and predict diuretic effect from high content of potassium and sodium.

Keywords: Elemental analysis, Thai traditional medicine, Pi-Kad-Dang-Hok

References:

Kolasani A, Xu H, Millikan M. Evaluation of mineral content of Chinese medicine herbs used to improve kidney function with chemometrics. Food Chemistry 2011; 127: 1465-1471.

P2P16 Mineral composition of pollen using inductively coupled plasma atomic emission spectroscopy

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Pollen collected by honey bees (bee pollen) is promoted as a health food supplement with a wide range of nutritional and health beneficial properties. While honey is an important source of proteins for the bee colony, pollen is the bees' main source for other important nutrients, such as minerals, fats, fibers, carbohydrates, and other substances. The composition of pollen is rather variable and depends on the botanical origin of the pollen. In this work we studied the mineral content of bee pollen of three botanical origins (*Cistus ladanifer* L., *Rubus ulmifolius* Schott, and *Calluna vulgaris* (L.) Hull) and two geographic sites in the central Portugal (Caniçal and Vale Grande). Inductively coupled plasma atomic emission spectrometry (ICP-AES) was used for the determination of cadmium, chromium, copper, iron, lead, manganese, and zinc. Prior to ICP-AES measurement, the samples were mineralized by treatment with HNO₃ and H₂O₂ at 100°C until complete digestion. The analyzed elements presented levels corresponding to the usual

reference range [1]. The concentrations of micronutrients (Cu, Fe, Mn and Zn) presented characteristic profiles which differed between the three plant species, but were similar in the two geographic areas. The main minerals observed for *R. ulmifolius* and *C. vulgaris* were Fe and Mn, and Zn for *C. ladanifer*. Heavy metals (Cd, Cr and Pb) were present at low concentrations (Table 1), indicating that there were no sources of contamination. In conclusion, the determination of micronutrients in pollen could be suitable for the identification of botanical species. The investigation of element profile, in combination with modern statistical data evaluation techniques, can be a promising approach to identify the botanical source of pollen.

Table 1- Mineral concentration of bee pollen (mg/kg).

Sites	Species	Cu (mg/kg)	Fe (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Pb (mg/kg)
Canical	<i>C. ladanifer</i>	7.4	40.7	8.6	63.0	<0.1	2.9	<1.4
	<i>R. ulmifolius</i>	12.7	80.5	203.0	47.0	<0.1	<0.4	<1.4
	<i>C. vulgaris</i>	8.8	123.4	266.0	36.0	<0.1	<0.4	<1.4
Vale Grande	<i>C. ladanifer</i>	7.4	39.8	9.0	46.0	<0.1	2.8	<1.4
	<i>R. ulmifolius</i>	13.2	83.2	197.0	48.0	<0.1	<0.4	<1.4
	<i>C. vulgaris</i>	8.6	124.7	250.0	32.0	<0.1	0.8	<1.4

Keywords: micronutrients; pollen, ICP-AES

References:

- [1] Campos MGR, Bogdanov S, Almeida-Muradian LB, Szczesna T, Mancebo Y, Frigerio C, Ferreira F. Pollen composition and standardisation of analytical methods. *J Apic Res and Bee World* 2008; 47: 156-163.

P2P17 Phytochemical profile and biological potential of *Allium rhodopeum* Velen.

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Members of the genus *Allium* have been used and cultured for thousands of years as vegetables and herbal drugs. Chemical composition and biological activities have been investigated in detail only for the two species of genus *Allium* (*A. sativum* L. and *A. cepa* L.), while the data on other species, including the wild-growing *A. rhodopeum* Velen, are very scarce. Therefore, the objective of the present study was to explore the chemical composition and biological potential (antioxidant, anti-inflammatory and antiproliferative properties) of the methanol extract of this species. Phytochemical profile was determined by measuring total phenolic, flavonoid and anthocyanin contents, by LC-MS/MS analysis of the extract, and by the headspace GC/MS analysis of the fresh bulb volatiles. The antioxidant activity was evaluated by measuring the effect on lipid peroxidation and by DPPH and NO assays, while the anti-inflammatory activity was assessed as an inhibitory potential on COX-1 and 12-LOX [1]. Antiproliferative activity was tested in three cancer and one healthy cell line (HT-29, MCF-7, HeLa and MRC-5) [2]. The total polyphenol, flavonoid and anthocyanin contents (all results shown in table) of *A. rhodopeum* extract were very low. The dominant phenolic compounds in the extract were quercetine-3-O-Glc, kaempferol-3-O-Glc, ferulic and vanilic acids. Dimeth-