DETERMINATION OF MICRO AND MACRO ELEMENTS IN CAMEL-THORN PLANT USING OPTICAL EMISSION SPECTROMETRY AND X-RAY FLUORESCENT ANALYSIS

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Abstract. *Micro and macroelements contained in camel thorn are important for the growth, development and reproduction of livestock. Accordingly, the bag was selected as an object of examination, and optical emission spectrometry (ISP-OES) and X-ray fluorescence (XRF) analysis was conducted in order to determine the amount of micro- and macroelements in its content. As a result of the analysis, relevant conclusions were drawn.*

Keywords: *pocket, feed, research methods, optical emission spectrometry (ISP-OES), X-ray fluorescence (XRF).*

Literature analysis and research methods:

The flora of Uzbekistan is characterized by its diversity, spread from desert zones to mountain peaks. Wild plants growing in the country are an important source of food for animals. One of the most widespread wild plants in the territory of Uzbekistan is cranberries [1].

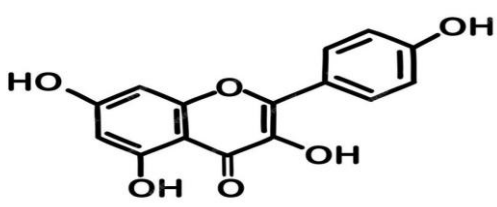
A camel thorn belonging to the leguminous family, reaching 60-80 cm in height. The flowers are small, red or pink. It blooms in May - September, seeds in August - October. The pods are individual, and their appearance is jointed like a scorpion's tail. The seed is covered with a peel. In irrigated lands, it grows as a weed along roadsides, ditches, canals, abandoned lands, and cultivated fields [2].

In Uzbekistan, there are 4 types of camel thorn (Alhagi canescenc - gray alder, Alhagi kirghisorum Schrenk - Kyrgyz alder, Alhagi pseudalhagi - false alder, Alhagi persarum Boiss - Persian alder [3].

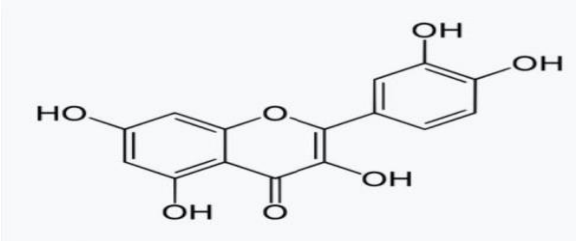
According to information, Alhagi canescenc and Alhagi sparsifolia species of camel thorn are found in some regions of Uzbekistan, including Fergana, Syrdarya, Bukhara, Jizzakh, Kashkadarya and Surkhandarya [4].

Camel thorns are mainly fodder for camels and sheep. Camel thorns contain 6.99 mg/g of flavonoids, 8.36 mg/g of alkaloids, 3.69 mg/g of saponins, and 2.05 mg/g of phenols [5].

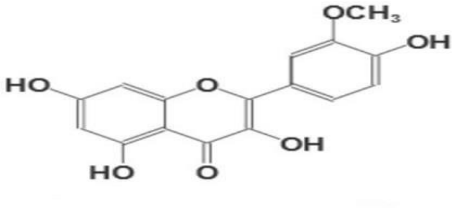
When studying the above-ground part (stem, leaf, thorn and flowers) of yarrow, it was found that there are biological flavonoids such as kaempferol, quercetin, isorhamnetin, chrysosplenetin, catechin, epigallocatechin gallate, isoquercitrin, lycorine and rutin: [6].



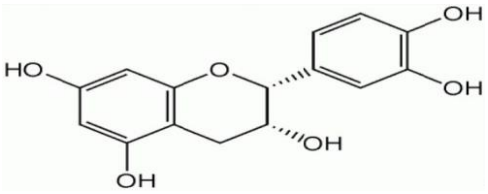
kaempferol



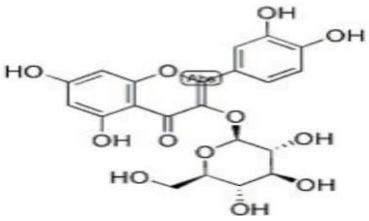
quercetin



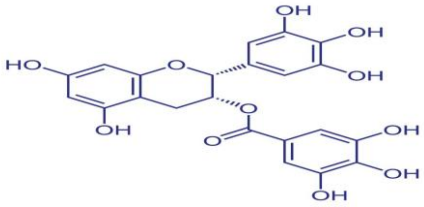
isorhamnetin



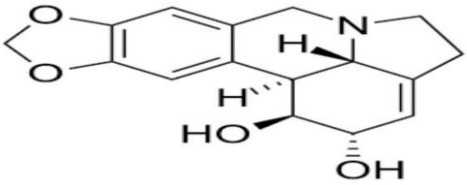
catechin



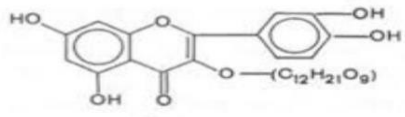
isoquercitrin



epigallocatechin gallate



lycorine



rutin

The review of the literature shows that the chemical composition and nutritional properties of the camel thorn have not been fully studied.

Therefore, Alhagi canescenc plant was selected as the research object. For this purpose, at the end of August, the upper part (stem) of the ripe pods was picked and chopped into 3-4 cm lengths. The presence of macro and microelements in the plant sample was determined by optical emission spectrometric (ISP – OES) and X-ray fluorescence (XRF) methods.

The optical emission spectrometric (ISP – OES) detection device has a high level of accuracy and allows to measure the elements in the sample with an accuracy of 10-9g.

Figures 1-2 show the determination of selenium and zinc elements in the shell sample by the optical emission spectrometric method.

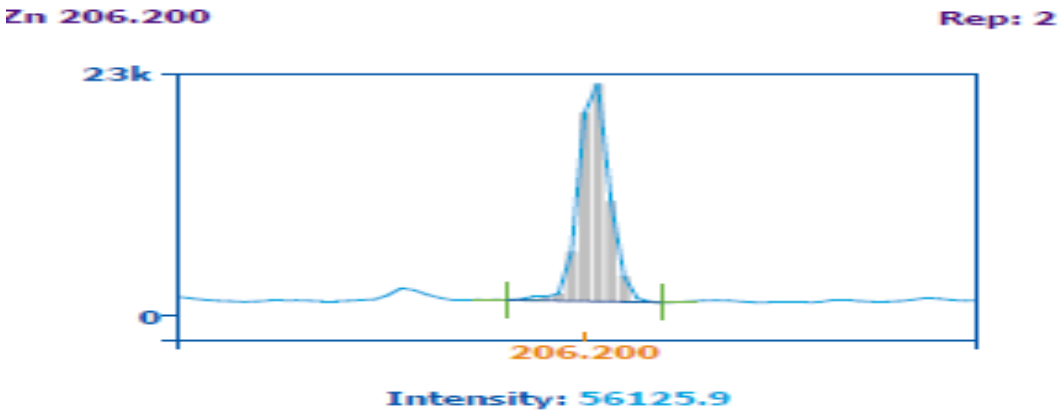


Figure 1. The result of determination of the zinc element in the camel thorn by the optical emission spectrometric method

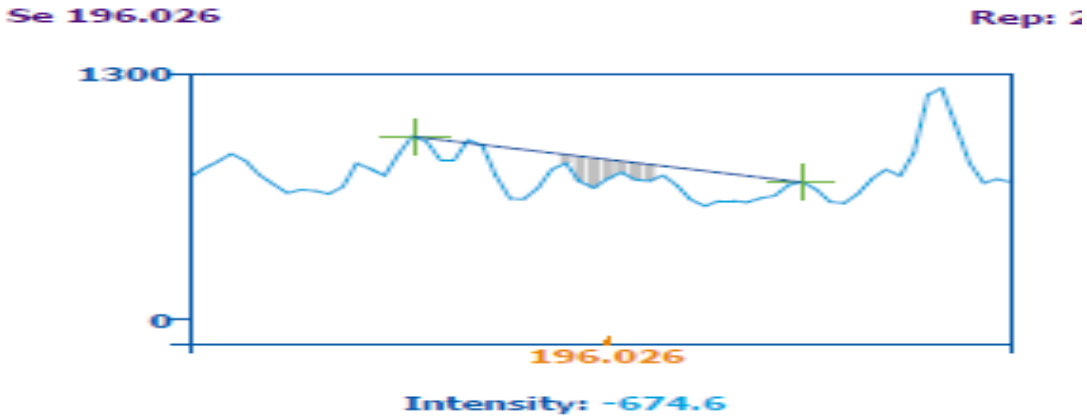


Figure 1. The result of determination of the selenium element in the camel thorn by the optical emission spectrometric method

Table 1 shows the amounts of selenium and zinc elements in the shell sample checked by the optical emission spectrometric method

1-table

OES analysis results

Example	Zn 670.784 in (mg/100g)	Se 206.836 in (mg/100g)
Camel thorn	6,238	0

The results of X-ray fluorescence (XRF) analysis of the pocket sample are given in Figure 3 and Table 2.

Figure 3. X-ray of the camel thorn specimen

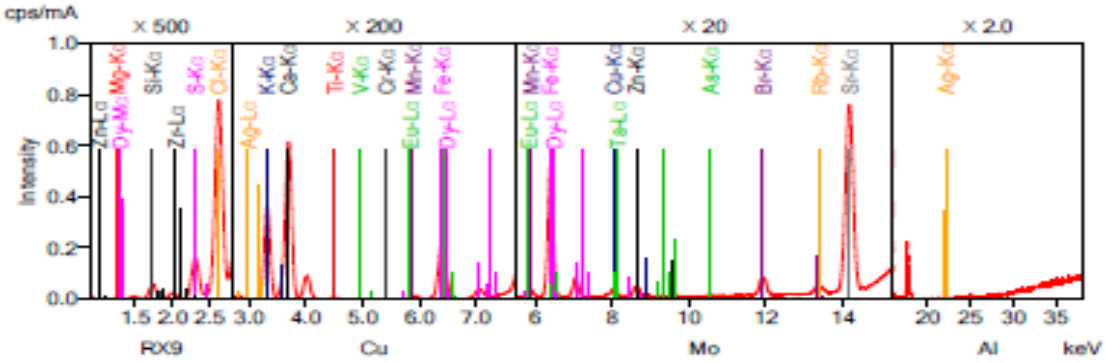


Figure 3. X-ray fluorescence (RFA) analysis result.

2-table

The amount of macro and microelements in the camel thorn (mg/kg)

Element name	The amount is mg/kg	Element name	The amount is mg/kg	Element name	The amount is mg/kg
Copper (Cu)	0,0030	Bromine (Br)	0,0018	Rubidium (Rb)	0,0006
Potassium (K)	3,14	Titanium (Ti)	0,0136	Strontium (Sr)	0,0115
Calcium (Ca)	3,59	Vanadium (V)	0,0013	Zirconium (Zr)	0,0763
Silicon (Si)	0,857	Chromium (Cr)	0,0010	Zinc (Zn)	0,0032

Magnesium (Mg)	0,526	Manganese (Mn)	0,0079	European(Eu)	0,0093
Chlorine (Cl)	1,26	Iron (Fe)	0,117	Silver(Ag)	0,0003
Sulfur (S)	0,509	Arsenic (As)	0,0003	Tantalum (Ta)	0,0017

Conclusion: When the composition of the bag was studied and analyzed by optical emission spectrometry (ISP-OES) method, it was found that zinc element was present in its composition, and it was not possible to determine the trace element selenium.

The results of X-ray fluorescence (XRF) analysis revealed that the shell contains 21 chemical elements from the periodic table.

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