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STUDYING THE CHEMICAL COMPOSITION OF MACRO AND MICRO ELEMENTS OF SILK AND WOOL FABRIC

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Abstract:

Thus, the studies carried out made it possible to determine the ash content, total protein content and the amount of nitrogen in wool and silk samples. The quantitative composition of macro- and microelements of the samples was investigated.

Keywords: ICP-mass spectral analysis, macro- and microelements, of IR spectrometry

The ash content of wool and silk was determined by burning the corresponding samples. The elemental composition of wool and silk was determined by ICP-mass spectral analysis, 26 macro- and microelements were found: Na, Mg, Al, P, S, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Mo, Sn, Sb, I, Ba, Hg, Pb, Bi. Among the microelements, iron has the maximum content in wool and silk samples, antimony has the minimum content for wool, and bismuth for silk [1-2]. Arsenic, mercury and antimony were found among the toxic elements. Phosphorus has the maximum content in wool and silk samples, magnesium has the minimum content for wool, and potassium for silk [3-4].

In wool and silk samples, 26 macro- and microelements were found. Table 1 shows data on the content of macro- and microelements in wool and silk samples. The results of the analysis are shown in Table 1.

Table 1. Mineral composition of the presented samples, g/kg

Name of elements	Content of main and impurity elements, g/kg	
	wool	silk
Na	1,83	1,45
Mg	0,67	0,35
Al	0,081	0,073
P	3,79	3,35
S	1,308	0,195
K	1,007	0,187
Ca	1,439	1,043
Ti	0,017	0,022
V	0,00046	0,00049
Cr	0,0209	0,0256
Mn	0,0096	0,0055
Fe	0,484	0,512
Co	0,00038	0,00036
Ni	0,0109	0,0138
Cu	0,0327	0,0276
Zn	0,0379	0,0096
As	0,0026	0,0011
Se	0,0432	0,0590
Mo	0,0029	0,0028
Sn	0,379	0,216
Sb	0,00026	0,00043

I	0,0065	0,0092
Ba	0,0157	0,00787
Hg	0,000929	0,001142
Pb	0,0013	0,0019
Bi	0,0023	0,0003

The following macroelements were found in wool and silk samples: Na, Mg, P, S, K, Ca (Fig. 1). Decreasing order of macronutrient content for wool P > Na > Ca > S > K > Mg, for silk P > Na > Ca > Mg > S > K. Wool has a higher macronutrient content than silk, i.e. 10.044 and 6.575 g / kg, respectively[5-6]. The highest content in wool and silk samples for P, the values are 3.79 g / kg and 3.35 kg / kg, and the lowest content for wool Mg (0.67 g / kg) and silk K (0.187 g / kg) (Table 1). In the samples of wool and silk, 17 trace elements were found (Fig. 1). The iron content was the highest among trace elements, for wool (0.484 g / kg) and silk (0.512 g / kg) [7-8]. Vanadium, cobalt and antimony have the lowest content among microelements (Table 1).

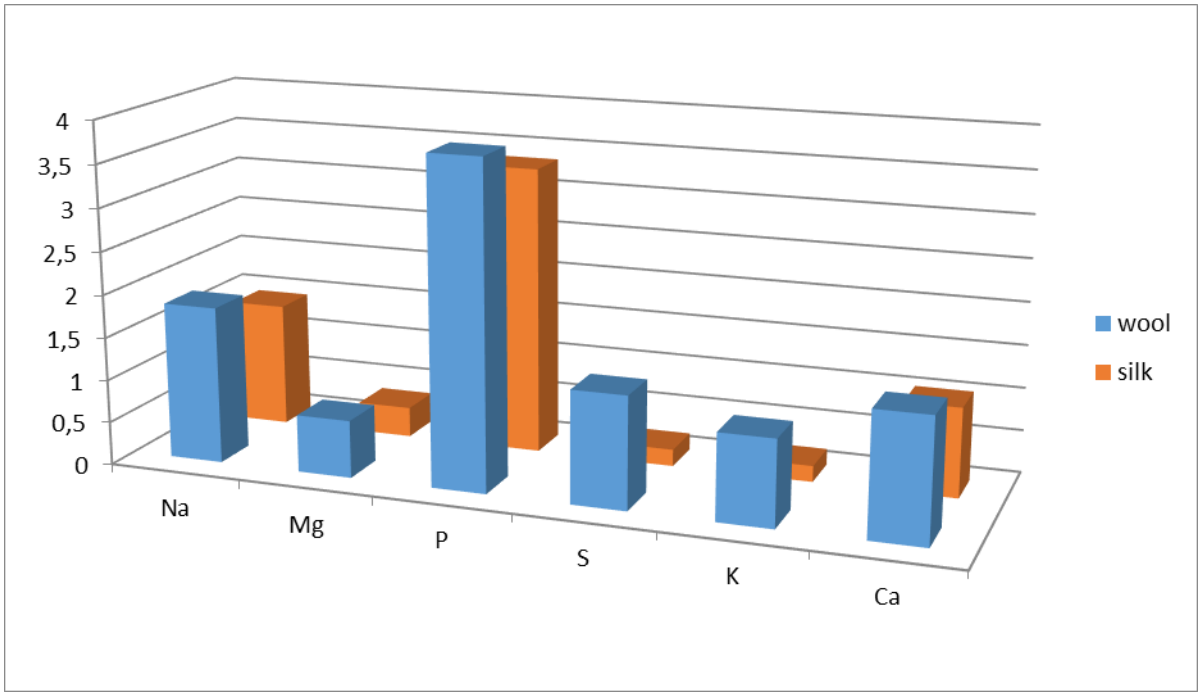

Fig. 1. Macronutrients found in wool and silk samples.

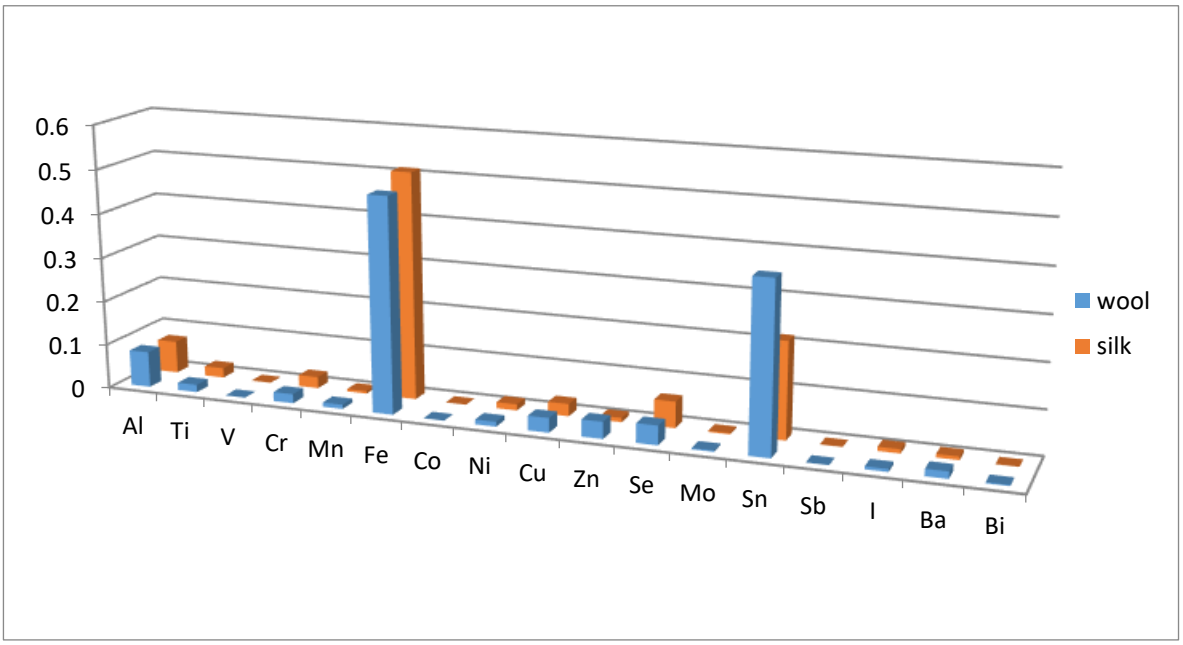

Fig. 2. Trace elements found in wool and silk samples.

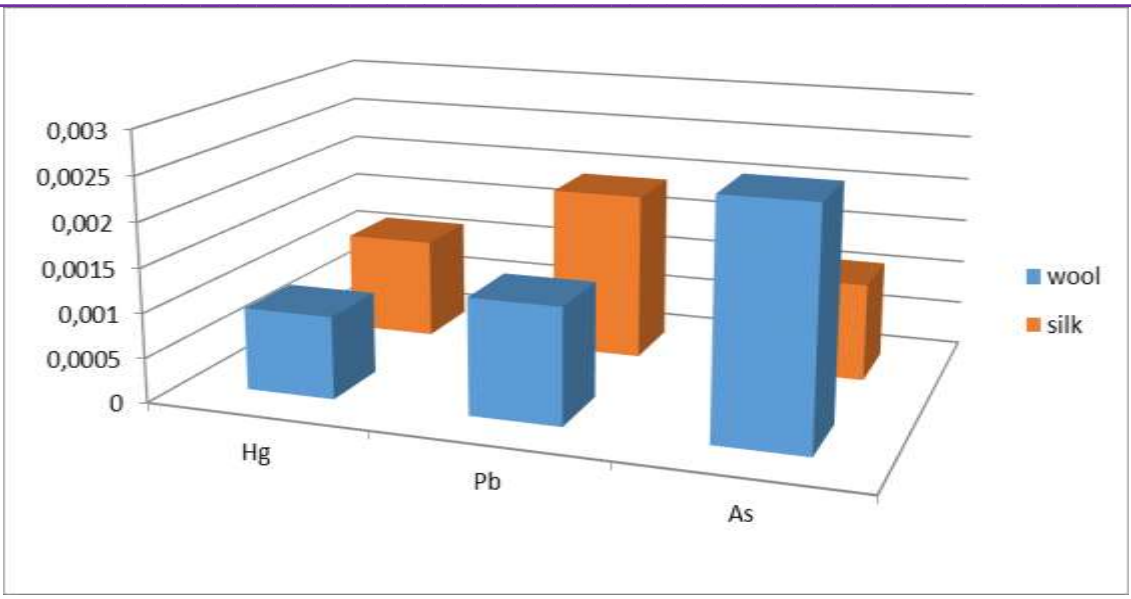

Fig. 3. Toxic elements found in wool and silk samples.

Among toxic elements, mercury, lead and arsenic were found (Fig. 3). Their content is significantly less than the MPC for food products [9].

CONCLUSIONS: Thus, the studies carried out made it possible to determine the ash content, total protein content and the amount of nitrogen in wool and silk samples. The quantitative composition of macro- and microelements of the samples was investigated.

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