

The mass spectrum obtained by bombardment with accelerated xenon atoms (6-8 keV) contained three peaks of MH^+ ions with m/z 640, 654, and 668, corresponding to enniatins B, B₁, and A₁. The ratio of the intensities of the peaks was 69:29:2 for the isolate 1/3 VNIIVS and 58:32:10 for the isolate 2/2 VNIIVS. Enniatin A, cyclo(N-methyl-L-isoleucyl-D-hydroxyvaleryl)₃, which has been described in natural materials, was not detected in the samples of biomass studied.

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MICROELEMENT COMPOSITION OF POLLEN OF SOME POLLEN-YIELDING PLANTS OF THE FLORA OF THE LITHUANIAN SSR

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It is known that pollen (the pollen load of bees) is rich in macro- and microelements [1-4]. We give the results of an investigation of the microelement compositions of the monofloral pollens (pollen loads) of eight species of pollen-yielding plants of the Lithuanian flora: Malus domestica Borkh. (cultivated apple), Trifolium pratense L. (red clover), Pyrus communis L. (common pear), Sinapis arvensis L. (charlock), Salix caprea L. (goat willow), Taraxacum officinale Wigg. (common dandelion), Pisum sativum L. (garden pea), and Ranunculus acer (tall buttercup).

The microelements were determined by instrumental neutron-activation analysis in a nuclear reactor. The principle of the method is the measurement of the gamma spectra obtained on the irradiation of a pollen sample with neutron fluxes of different densities. Sodium, magnesium, aluminum, chlorine, titanium, and copper were determined from the radionuclides formed on the brief (30-second) irradiation of samples weighing 0.2 g with a neutron flux having a density of $1.6 \cdot 10^{13}$ neutrons/cm², with subsequent measurement of the gamma spectra after 2.5 min and 2.5 h. To determine bromine, potassium, cobalt, iron, and zinc, samples of pollen weighing 0.1 g were irradiated with a neutron flux of $1.4 \cdot 10^{13}$ neutrons/cm² for 17 h. The gamma spectra of the samples were measured after 2 and 24 days on a semiconductor spectrometer.

Twenty different elements were determined in the samples of pollen investigated. Of them the macroelements potassium, calcium, and magnesium were found in the largest amounts, and the microelements cobalt and vanadium in the smallest amounts. The pollen also contained considerable amounts of aluminum and chlorine (Table 1). These were followed with

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TABLE 1. Concentrations of Microelements in Flower Pollens (bee pollen loads), µg/g

Element	Cultivated apple	Red clover	Common pear	Charlock	Goat willow	Common dandelion	Garden pea	Tall buttercup
K*	7.70±0.90	8.30±0.95	6.50±0.71	5.60±0.50	12.40±1.00	1.60±0.15	7.70±0.90	5.70±0.55
Ca*	4.70±0.39	3.20±0.27	3.30±0.28	3.40±0.29	5.40±0.48	3.50±0.31	3.30±0.30	3.30±0.45
Mg*	1.10±0.12	1.60±0.15	1.30±0.12	2.00±0.20	2.40±0.26	0.70±0.06	3.10±0.30	1.70±0.15
Cl	410.0±8.50	1.27±0.13*	380.0±8.00	420.0±8.50	240.0±6.90	1.60±0.14*	1.31±0.13*	990.0±10.0
Al	320.0±7.50	320.0±7.50	190.0±6.30	70.0±3.50	2.40±0.22*	80.00±3.80	110.0±5.10	70.0±3.50
Na	85.0±4.10	84.0±4.00	79.0±3.81	73.0±3.64	477.0±8.71	111.0±5.10	59.0±2.83	153.0±5.50
Fe	69.0±3.30	96.0±4.80	56.0±2.80	70.0±3.50	346.0±7.83	20.0±1.50	27.0±1.85	81.0±3.85
Ti	66.0±3.00	38.0±2.09	20.0±1.55	32.0±1.98	143.0±5.36	33.0±1.99	54.0±2.75	20.0±1.51
Sr	40.0±2.50	50.0±2.70	100.0±5.00	50.0±2.70	40.0±2.50	40.0±2.50	40.0±2.50	40.0±2.50
Mn	17.0±1.00	16.0±1.30	68.0±3.20	9.0±0.96	45.0±2.71	4.0±0.35	15.0±1.23	24.0±1.63
Zn	35.0±2.00	30.0±1.97	38.0±2.01	24.0±1.62	76.0±3.69	12.0±1.00	29.0±1.90	27.0±1.84
Cu	30.0±1.96	19.0±1.35	15.0±1.25	10.0±0.99	10.0±0.99	19.0±1.40	18.0±1.33	13.0±1.05
Mo	1.30±0.12	3.30±0.28	2.40±0.25	14.0±1.25	1.0±0.11	1.10±0.12	1.30±0.12	1.40±0.12
V	0.40±0.04	0.20±0.02	0.30±0.03	0.10±0.01	4.60±0.37	0.10±0.01	0.10±0.01	0.10±0.01
Ba	0.76±0.08	0.70±0.07	0.70±0.07	0.70±0.07	2.40±0.25	0.80±0.09	1.70±0.15	1.30±0.12
Br	1.30±0.12	0.49±0.05	0.85±0.09	0.40±0.04	0.67±0.06	0.36±0.03	0.45±0.04	0.54±0.05
Cr	0.20±0.02	0.20±0.02	0.20±0.02	0.23±0.02	0.37±0.04	0.30±0.02	0.20±0.02	0.40±0.03
Se	0.22±0.02	0.20±0.02	0.20±0.02	0.25±0.02	0.29±0.03	0.31±0.02	0.20±0.02	0.41±0.03
Co	0.19±0.02	0.14±0.01	0.10±0.01	0.08±0.01	0.30±0.02	0.11±0.01	0.22±0.02	0.10±0.01
Ni	0.09±0.01	0.09±0.01	1.00±0.12	0.76±0.08	1.60±0.13	0.60±0.05	0.99±0.09	1.92±0.17

*Results given in mg/g

respect to concentration by sodium, iron, titanium, strontium, manganese, zinc, and copper. The trace elements barium, bromine, chromium, selenium, nickel, and zinc were present in small amounts.

The pollen of goat willow stands out with respect to its content of macro- and micro-elements. As compared with the other samples, considerable amounts of potassium, aluminum, sodium, iron, titanium, vanadium, barium, and zinc accumulate in it.

The pollens of red clover, common dandelion, and garden pea were rich in chlorine. The largest amounts of calcium were found in the pollens of tall buttercup and goat willow, and of magnesium in the garden pea pollen. The cultivated apple pollen contained the highest amounts of copper and bromine, while that of the common pea contained the highest amounts of strontium and manganese.

Charlock pollen stands out by its high molybdenum content. The pollens of tall buttercup and goat willow contained more nickel and chromium than the other samples investigated. The richest in selenium was the tall buttercup pollen, and the richest in cobalt was the goat willow pollen.

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