

# EFFECT OF CONTENT OF TRACE ELEMENTS IN THE DIET ON SERUM LYSOZYME ACTIVITY

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If the content of trace elements (Ni, Cu, Zn, Fe) in the diet is inadequate, the serum lysozyme concentration in rats is reduced. Cu and Ni are particularly important.

The object of this investigation was to study the effect of a deficiency of the trace elements Ni, Cu, Zn, and Fe in the diet of experimental animals on their serum lysozyme activity.

## EXPERIMENTAL METHOD

Albino rats (100) were kept on a caseine-starch diet in accordance with the instruction of the Institute of Nutrition, Academy of Medical Sciences of the USSR, which provides a salt mixture in which the content of trace elements can be varied at will, and which amounts to 4% of the total weight of the diet. Besides the macroelements Na, K, Ca, and Mg, the salt mixture included a number of trace elements belonging to the biologically essential group. The dose of trace elements lay within their range of biological action and was calculated relative to the body weight of the animals and the calorific value of the diet per rat.

The animals were divided into six groups: the rats of group 1 (control) received a balanced diet with respect to all food substances and trace elements. The following trace elements were excluded from the salt mixture in the diet given to the animals of the experimental groups: group 2) Ni, Cu, Zn, and Fe; group 3) Ni; group 4) Cu, group 5) Zn, and group 6) Fe.

The lysozyme titer was investigated three times, 60, 80, and 100 days from the beginning of the experiment. The lysozyme titer was determined by the usual method, using a culture of Micrococcus lysodeikticus.

The numerical results were analyzed by statistical methods. In addition, changes in indices to either side in the experimental groups were expressed as percentages of values obtained in animals of the control group, taken as 100%.

TABLE 1. Lysozyme Titer in Blood Serum

Group of rats	Time of observation (in days)											
	60				80				100			
	M	±m	t	change in percent	M	±m	t	change in percent	M	±m	t	change in percent
1 (Con- trol)	1:74	3,9			1:71	4,6			1:60	5,6		
2	1:30	5,7	6,4	-59,4	1:25	2,5	8,73	-64,8	1:27	2,8	5,89	-57,8
3	1:34	6,8	5,08	-54,0	1:29	3,1	7,44	-59,1	1:32	3,0	5,03	-50,0
4	1:20		13,9	-72,9	1:22	1,8	9,89	-67,6	1:29	2,6	5,73	-54,7
5	1:45	5,9	4,08	-39,1	1:35	2,6	6,66	-50,7	1:36	2,4	4,64	-43,7
6	1:57	6,0	2,37	-22,9	1:53	5,6	2:51	-26,3	1:49	4,8	2,08	-23,4

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## EXPERIMENTAL RESULTS

The experimental results are given in Table 1. A deficiency of all trace elements of the group in the diet (group 2) led to a sharp decrease in the serum lysozyme titer of the animals (by 57-64% compared with the control). Analysis of the role of individual trace elements showed that a significant decrease in lysozyme titer occurred only if Cu and Ni were deficient in the animals' diet. The lysozyme titers in animals of these groups (3 and 4, respectively) were close in value to the titer for the rate of group 2, whose diet was deficient in all trace elements of the group.

The study of this index of nonspecific immunobiological reactivity over a period of time, which yielded identical results of all the tests, confirm that the serum lysozyme titer regularly falls in the presence of an imbalance between trace elements in the diet.