RESEARCHES CONCERNIG COPPER POLLUTION EFFECTS ON ANIMALS IN ISALNITA CHEMICAL UNIT AREA

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Introduction

The development of industry makes possible the spreading in some areas, in air, water, soil and plants of some toxic components that could be concentrated by the different organism in the feed chain of human beings and animals (1, 3). The pollution phenomenon ceasing will be possible when the up-to-date technique is replaced by an ecologic technique and the fittings out plans are made by ecological criteria (4). A toxic element eliminated into the air by the chemical units is copper. The absorbed copper is vehiculated by plasmatic albumins then fixed in some organs (liver, kidneys, spleen). After absorption, in a large dose, copper is a methaemoglobinic element and a haemolytic one (2,5).

Materials and methods

There were sampled organ tissues (liver, kidneys, spleen) of ruminants from Isalnita chemical unit area where were analyzed the copper concentration. The samples belong to four checkpoints located at different distances from the pollutant source, respective: 2 km from Isalnita, 6 km from Almaj, 8 km from Breasta and 12 km from Mofleni.

Copper concentration was made by atomic absorption spectrophotometry.

Results and discussions

The results of researches are shown in table no. 1 and the charts no. 1 to no. 5.

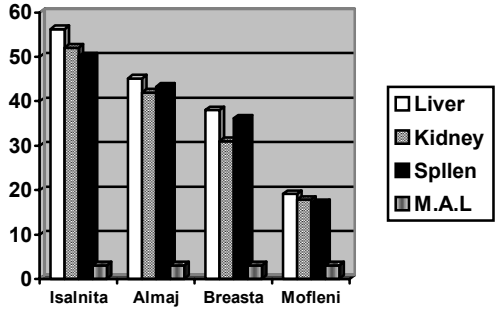
Table 1. Copper average concentrations in organs sampled from ruminants in Isalnita area

Sampling points	Distance to the chemical unit (km)	Number of samples	Species	The analyzed element (ppm)		
				liver	Kidney	spleen
Isalnita	2	25	Sheep	56,22	52,04	50,12
		10	Cattle	62,42	58,24	54,00
Almaj	6	23	Sheep	45,12	42,00	43,22
		8	Cattle	61,00	52,45	51,02
Breasta	8	25	Sheep	38,00	31,05	36,12
		8	Cattle	58,75	46,12	44,15
Mofleni	12	20	Sheep	19,12	17,82	17,00
		15	Cattle	30,12	21,04	21,14
Maximum admitted limit conformingly the Health Ministry Order 975/1998				3,0 ppm		

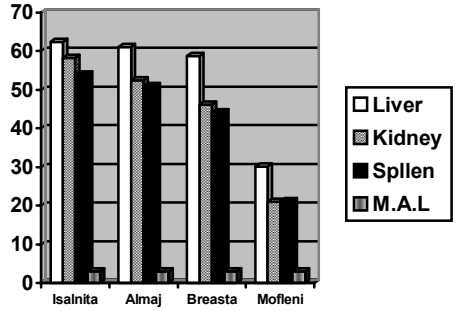
Charts no. 1

Copper average concentrations in organs sampled from sheep in Isalnita chemical unit area (ppm)

Charts no. 2

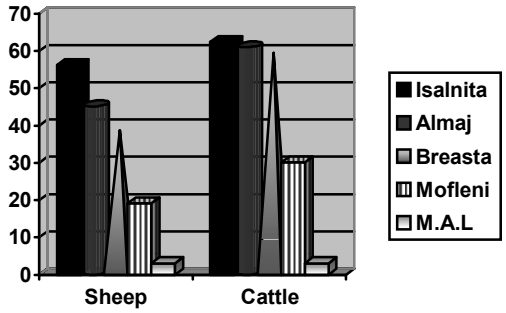


Copper average concentrations in organs sampled from cattle in Isalnita chemical unit area (ppm)



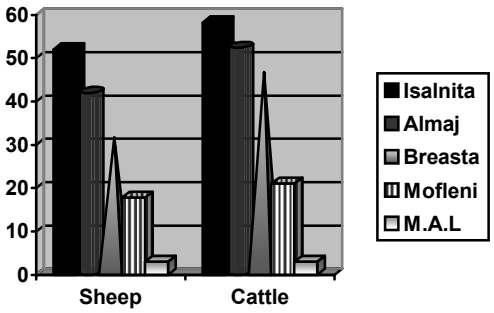
Charts no. 3

Copper average concentrations in ruminants' liver samples in Isalnita chemical unit area (ppm)



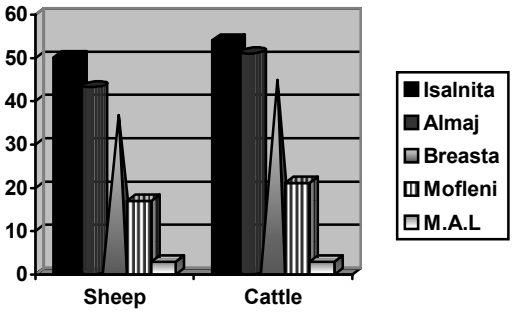
Charts no. 4

Copper average concentrations in ruminants' kidney samples in Isalnita chemical unit area (ppm)



Charts no. 5

Copper average concentrations in ruminants' spleen samples in Isalnita chemical unit area (ppm)



The copper concentration in liver samples per copper concentration in liver samples from slaughtered sheep in the chemical unit area recorded higher values beside the maximum admitted limits in Isalnita checkpoints by 18,74 times; in Almaj by 15 times; in Breata by 13 times and in Mofleni by 6,37 times.

The copper concentration in cattle liver samples exceeded the maximum admitted limit by 21 times in Isalnita; 20-31 times in Almaj; 19,5 times in Breasta and 10 times in Mofleni (conformingly the Health Ministry Order 975/1998).

It is noticed a decreasing of the copper concentrations in liver direct proportional to the distance from the checkpoints. Analyzing the data in table no. 1, concerning the copper concentration in kidney there is noticed exceeding in all samples and all species, no matter the distance to the chemical unit.

Thus, in sheep, the exceeding was higher by 6-17 times and in cattle by 7-19 times.

Regarding the spleen copper concentration there was recorded exceeding in all samples; thus the exceeding was higher by 6-17 times in sheep and 7-18 times in cattle.

The highest concentrations of copper are met in liver samples; then in kidney and spleen samples.

Following the necropsies carried out in sheep in Isalnita it was noticed: generalized haemolytic icterus, brown-yellow dystrophic liver, brown green congestive kidney, ascites, urinary-bladder with a reddish-brown content, intrafollicular spleen necrosis.

The high copper concentration in organs, correlated with the anatomicopathologic lesions led to the existing of a copper chronic poisoning in the chemical unit area.

Conclusions

1. Copper concentration in liver samples from sheep and cattle in Isalnita Chemical Unit are recorded an exceeding by 6-17 times beside the admitted limits.
2. In kidney samples, copper recorded exceeding by 6-17 times in sheep and 7-19 times in cattle.
3. Copper concentration in spleen exceeded the maximum admitted limit by 6-17 times in sheep and 7-18 times in cattle.
4. High copper concentrations in organs associated with anatomicopathologic lesions confirms the existence of a chronic copper poisoning in this area.

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