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ASSESSMENT OF SOME CONTAMINANTS IN RAW MEAT, MAJOR PREMISE FOR FOOD SAFETY

L. ILIE, C. SAVU, CARMEN PETCU, L. TUDOR

Faculty of Veterinary Medicine– Bucharest

Summary

The main minimum condition in assuring the population's health is represented by the consumption of salubrious food, lacking those factors which could produce illness. The contamination or pollution of food with his organism or chemical substances causes the risk that a food became potentially harmfully to man. The main causes that influence the hygienic quality of the food products could be shortly presented as: natural toxicity, chemical Key words: heavy metals, spectrophotometer, food safety physical respectively biologic contamination or pollution.

The existence of toxic substances residues in food represents a major problem for food hygiene, because these can modify the state of health of all age consumers.

The main aim of Heavy metal residues determination from raw meat was to discover the action mechanisms of these substances, the development of development theoretical aspects of toxicology, the possibility of a more ample generalization of research conclusions through emphasizing antagonistic relations between the analyzed parameters (ex. cadmium and zinc. The zinc reduces considerably the toxic effect of air, waters or food pollution with cadmium, not only through inhibition of transfers from the intestinal wall, but also through it's interfering in other metabolic sequences, thus it can be used in the case of cadmium intoxication).

Materials and methods

The researches for establishing levels of physic-chemical residues (arsen, cadmium, lead, zinc, copper, mercury) in the meat raw material of cattle and pig were perfumed on a number of 112 samples of meat raw material, sampled from different meat processing units during 2006.

The determinations were accomplished through spectrophotometer method of atomic absorption. The principle is based on the determination of the concentration of a chemical element from the analyzed sample, through the measuring of an electromagnetic radiation absorptions with specific band, during it's crossing through the environment in which are distributed uniform atoms of the respective elements. The level of absorption is proportional to the concentration of atoms in distribution environment.

Results and discussions

Result presented the table 1 represent result of heavy metals and arsen determinations obtained after examining of 52 samples sampled for this aim in the first semester of 2006. These are 27 samples of beef (51.92 %) and 25 samples of pig meat (48.08 %).

There were identified samples which exceeded the limits for arsen which represented 3.8 %. Also, there were registered 3 samples (5.7 %) of pig meat whereat the zinc registered a much greater amount. A danger for consumers was represented by samples whereat was emphasized the lead, these gathering 5.7 % from the total of samples.

An single sample from the assortment of beef meat respectively two samples of pig meat, exceeded the limit for copper, representing an percentage of 5.7 % of inadequate samples.

As it can be noticed in table 2, in the second semester - 2006 there were sampled and analyzed a number of 60 meat samples, which were submitted to heavy metal and arsen residues determination. There were analyzed 26 samples of beef (43.33 %) and 34 samples of pig/pork (56.67 %).

Among these, a percentage of 1.7 % representing a sample of beef meat registered a content of cadmium that exceeded the maximum admitted limits. Three samples, of which 2 samples of pork meat and a sample of beef meat were stated inadequate because of the high amounts of lead. For the zinc determination analysis there were analyzed several samples from which one (1.67 %) represented by pig meat and two (3.33 %) of beef meat, didn't frame in normal limit.

Table 1

Result of the heavy metal and arsen residues determination from the processed row meat in the Ist semester 2006

No	Sample type	As mg/Kg	Cd mg/Kg	Pb mg/Kg	Zn mg/Kg	Cu mg/Kg	Hg mg/Kg
1	1 beef meat sample	absent	absent	absent	23.6	1.5	.
2	2 pig meat samples	absent	absent	absent	25.8	2.1	.
3	1 pig meat sample	absent	absent	absent	24.9	2.5	.
4	1 pig meat sample	absent	absent	absent	46.9	1.9	.
5	2 pig meat samples	absent	absent	absent	47.6	1.4	.
6	1 beef meat sample	absent	absent	absent	26.8	2.6	.
7	1 pig meat sample	absent	absent	absent	48.5	1.1	.
8	1 beef meat sample	absent	absent	absent	27.1	1.8	.
9	1 pig meat sample	absent	absent	absent	42.3	2.3	.
10	2 beef meat samples	absent	absent	**0.3**	25.5	2.5	.
11	1 pig meat sample	absent	absent	absent	28.5	**3.4**	.

12	1 beef meat sample	absent	absent	absent	45.6	2.3	.
13	1 beef meat sample	absent	absent	absent	27.6	1.8	.
14	2 beef meat samples	**0.2**	absent	absent	41.6	1.6	.
15	1 beef meat sample	absent	absent	absent	26.8	2.3	.
16	1 pig meat sample	absent	absent	absent	45.6	2.2	.
17	1 beef meat sample	absent	absent	absent	39.8	2.8	.
18	1 pig meat sample	absent	absent	absent	25.3	1.8	.
19	1 pig meat sample	absent	absent	absent	48.1	2.3	.
20	2 pig meat samples	absent	absent	absent	**52.4**	1.8	.
21	1 beef meat sample	absent	absent	absent	37.6	**3.3**	.
22	1 pig meat sample	absent	absent	absent	21.6	2.6	.
23	1 beef meat sample	absent	absent	**0.7**	31.6	1.4	.
24	1 pig meat sample	absent	absent	absent	36.4	1.7	.
25	2 beef meat samples	absent	absent	absent	32.5	2.5	.
26	1 pig meat sample	absent	absent	absent	22.5	2.2	.
27	1 beef meat sample	absent	absent	absent	21.6	1.8	.
28	2 pig meat samples	absent	absent	absent	32.3	2.6	.
29	1 beef meat sample	absent	absent	absent	33.5	2.4	.
30	2 beef meat samples	absent	absent	absent	38	1.9	.
31	1 pig meat sample	absent	absent	absent	36.9	2.3	.
32	1 beef meat sample	absent	absent	absent	**52.1**	2.7	.
33	1 pig meat sample	absent	absent	absent	25.6	2.6	.
34	2 beef meat samples	absent	absent	absent	24.3	2.4	.
35	1 pig meat sample	absent	absent	absent	39.8	**3.3**	.
36	1 pig meat sample	absent	absent	absent	42.5	1.8	.
37	2 beef meat samples	absent	absent	absent	44.6	2	.
38	1 beef meat sample	absent	absent	absent	49.5	1.4	.
39	1 pig meat sample	absent	absent	absent	48.7	1.9	.
40	2 beef meat samples	absent	absent	absent	35.8	2.6	.
41	1 pig meat sample	absent	absent	absent	36.8	2.5	.
	52	P.N.=3.8%	P.N.=0%	P.N.=5.7%	P.N.=5.7%	P.N.=5.7%	.

Table 2

Result results of the heavy metal and arsen residues determination from the processed row meat in the II nd semester 2006

No	Sample type	As mg/Kg	Cd mg/Kg	Pb mg/Kg	Zn mg/Kg	Cu mg/Kg	Hg mg/Kg
1	2 pig meat samples	absent	absent	absent	15.9	2.1	.
2	1 pig meat sample	absent	absent	absent	15.6	2.3	.
3	2 Beef meat samples	absent	absent	absent	16.5	2.5	.
4	2 pig meat samples	absent	absent	absent	15.8	1.8	.
5	2 pig meat samples	absent	absent	absent	16.3	2.1	.
6	1 beef meat sample	absent	**0.2**	absent	16.7	2.2	.
7	2 beef meat samples	absent	absent	absent	17.8	1.9	.
8	1 beef meat sample	absent	absent	**0.7**	15.8	1.5	.
9	2 beef meat samples	absent	absent	absent	18.9	2.5	.
10	2 beef meat samples	absent	absent	absent	19.4	1.9	.
11	2 pig meat samples	absent	absent	absent	18.6	2.8	.
12	2 beef meat samples	absent	absent	absent	15.2	2.7	.
13	2 pig meat samples	absent	absent	absent	17.4	1.9	.
14	2 beef meat samples	absent	absent	absent	**52.3**	2.3	.
15	2 pig meat samples	absent	absent	absent	16.8	2.5	.
16	2 pig meat samples	absent	absent	absent	16.5	**3.5**	.
17	2 pig meat samples	absent	absent	absent	14.9	1.9	.
18	1 pig meat sample	absent	absent	absent	16.3	**3.3**	.
19	2 pig meat samples	absent	absent	**0.9**	17.5	2.8	.
20	2 beef meat samples	absent	absent	absent	18.9	1.7	.
21	2 pig meat samples	absent	absent	absent	19.6	1.3	.
22	2 pig meat samples	absent	absent	absent	16.8	2.6	.
23	2 pig meat samples	absent	absent	absent	15.8	2.5	.
24	1 pig meat sample	absent	absent	absent	**54.1**	2.2	.
25	2 beef meat samples	absent	absent	absent	19.6	2.8	.
26	2 pig meat samples	absent	absent	absent	18.5	1.8	.
27	2 beef meat samples	absent	absent	absent	16.3	1.9	.
28	2 pig meat samples	absent	absent	absent	15.1	2.4	.
29	2 beef meat samples	absent	absent	absent	18.5	1.4	.
30	1 pig meat sample	absent	absent	absent	17.4	**3.2**	.
31	2 beef meat samples	absent	absent	absent	19.7	2.3	.
32	2 pig meat samples	absent	absent	absent	18.5	2.8	.
33	2 beef meat samples	absent	absent	absent	16.5	2.5	.

	60	P.N.=0%	P.N.=1.7%	P.N.=5.0%	P.N.=5.0%	P.N.=6.7%	.

The majority of the positive samples there were registered due to presence of copper in amounts that weren't framed in the limits admitted by the legislation. It's the case of 4 samples of pig meat which represented 6.7 % of the total number of samples.

Conclusions

- A total number of 112 samples, represented by pig and beef meat, were sampled during the study.
- Only in the first semester - 2006 there were registered positive samples for arsen, representing a percentage of 1.79 %, for two samples of beef meat considered inadequate from the point of view of this parameter.
- For the second semester - 2006 a percentage of 0.89 % was registered for a beef meat sample that contained amounts of cadmium that didn't respected the maximum limit admitted by law.
- Concerning the lead there were registered inadequate values in all study periods, the values being between 0.3 and 0.9 mg/kg.
- Inadequate values were registered also by samples analyzed from the point of view of the zinc content, the most important value (54.1 mg/kg) being registered in the case of a pork sample analyzed in the second semester of 2006.
- Referring to the copper parameter, a number of 7 samples of meat, representing 6.25 % from the total number of analyzed samples, registered inadequate values.

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