

THE RESULTS OF THE STUDIES ON THE CONTENTS OF HEAVY METALS AND ARSENIC IN POULTRY PATE

Maria Borys Ewa Węgrzyn, Mieczysław Obiedziński,Meat and Fet Research Institute, Department Food Monitoring and Environment Protection,
04-190 Warsaw, ul. Jubilerska 4, Poland**Key words:** heavy metals, arsenic, emission spectroscopy, poultry pate.**Background**

Consumption of poultry in Poland is on average 14,5 kg per capita, which is rather low as compared with poultry meat consumption in European Union 20 kg per capita or in the USA or Israel where it is on average 40 kg. It is foreseen that in the future one could expect substantial increase in the consumption of poultry meat and processed products in Poland. Therefore for the last years more attention has been paid to the monitoring of different chemical substances harmful for human health, including heavy metals and arsenic, which could be present in poultry meat and processed products that are available on the Polish market.

Objectives

There is variety of processed poultry products available on the Polish market. The most popular ones are pates, which are produced not only from animal origin ingredients, but also with the use of plant origin raw materials. In previously reported studies we analyzed number of samples of poultry tissues and liver originating from different regions in Poland. The main objective of this study was to recognize the contents of heavy metals and arsenic in pates, which are produced not only from poultry ingredients but also with the use of plant origin raw materials.

Materials and methods

The samples of different poultry pates (81 samples in total) were sampled from the local market. The samples consist of products that were produced with the use of different ingredients such as paprika, tomatoes, mushrooms and herbs.

According to used analytical methodology the samples were digested with nitric acid in micro oven (Milestone typ 1200 Mega) followed by quantitative determination of cadmium, arsenic, zinc and lead using atomic emission spectrometry (ICP-AES Jobin Yvon typ 138 Ultrace). The content of mercury was determined directly in the samples using vapor generation and spectrometer of Altec typ Ama 254.

The performance of applied analytical procedures was continuously examined by parallel analysis of amiable reference materials of similar matrix, or spiked samples and participation in interlaboratory studies organized by FAPAS (Food Analysis Performance Assessment Scheme) from Great Britain.

Results

Table 1 presents the results of investigation and maximum residue limits (MRL) (according to the recent ordinance of the Ministry of Health in Poland issued on 27th December 2000) and limits of quantification (LOQ – limits of detection (LOD) are actually three times lower) of analytical methods. The results are also visualized on figures 1–4.

Table 1

Product	Element	Minimum+ Maximum	Median	90-percentile	MRL	LOQ
Poultry	Arsenic	n.d.	n.d.	n.d.	0,20	0,07
	Lead	n.d.±0,13	n.d.	0,09	0,60	0,07
N=81 [mg/kg]	Cadmium	n.d.±0,043	0,016	0,024	0,050	0,009
	Mercury	n.d.±0,0043	n.d.	0,0012	0,020	0,0005
	Zinc	3,74÷37,28	9,58	12,50	50,0	0,01

Legend: n.d.- not detected, below LOQ.

As one can see from the table 1 in all pate samples the levels of heavy metals and arsenic were below MRL, and for arsenic below LOQ and LOD. The contents of lead and mercury were very low, far below MRL. The median values for cadmium and zinc were rather low and even respective maximum values were still below MRL. The higher contents of these two elements were observed in pates produced with plant origin ingredients as compared to pates made solely of poultry tissues. This observation indicates necessity to pay more attention in the future to selection of ingredients (especially plant origin) for pate processing, in order to keep the contents of the two above-mentioned elements within the legally accepted levels. The contents of heavy metals and arsenic in poultry pate are on similar level as observed in poultry tissues.

Conclusions

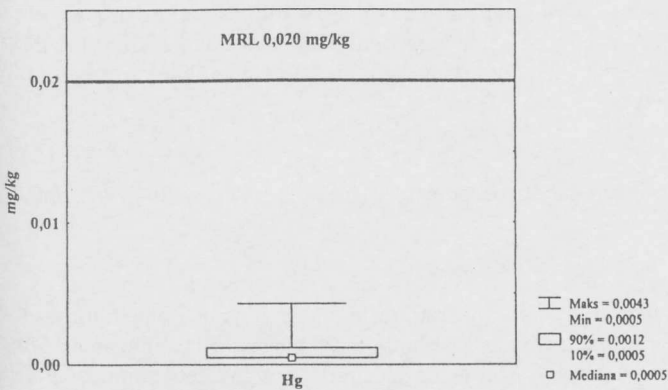
1. The levels of heavy metal and arsenic in poultry pate are within legal limits, therefore from that point of view these products are fit for human consumption.

2. In the future more attention should be given to the selection of plant raw materials (ingredients) for production of pates in order to keep the levels of cadmium and zinc within legal limits.

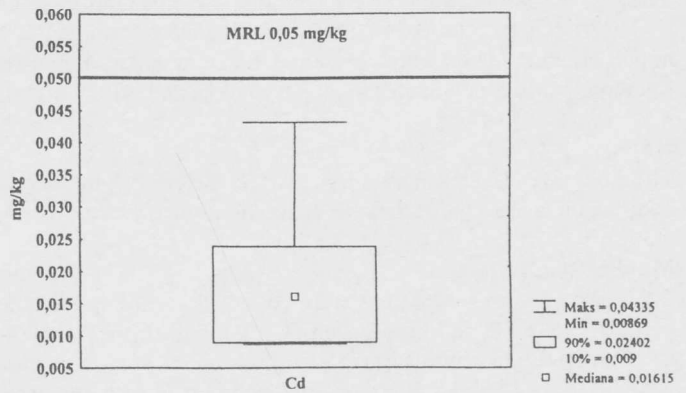
References

1. Żmudzki J., Szkoda J. 1995 – Stężenie pierwiastków śladowych w tkankach kur przyzagrodowych i fermowych – Medycyna Wet. 51 (10), 611-613.
2. Grys S. 1989 –Przedziały referencyjne oraz wartości informacyjne dla elementów mineralnych i witamin w osoczu, tkankach i jajach drobiu – Materiały 16. Konferencji Biochemicznej Zakładów Higieny Weterynaryjnej, 140-144.
3. Kijowski J. 2000 – Wartość żywieniowa mięsa drobiowego – Przemysł Spożywczy 3, 10-11.
4. Michna W., Boguszevska M., Bykowski P., Dąbrowski J., Obiedziński M.W., Szeke B., Żmudzki J. 1999 – Raport z badań monitoringowych nad jakością gleb, roślin, produktów rolniczych i spożywczych w 1998r – Państwowa Inspekcja Ochrony Środowiska, Biblioteka Monitoringu Środowiska, 92-99.

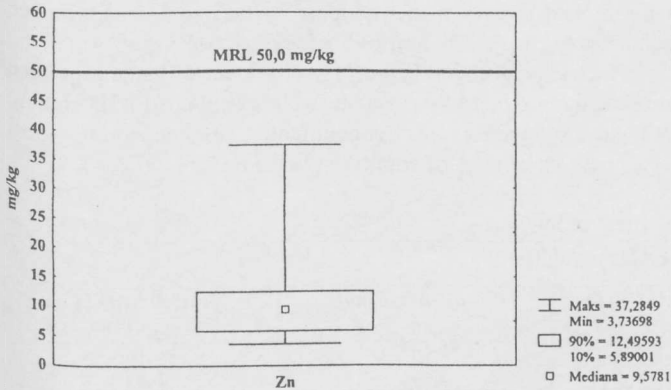
The content of Hg in polish poultry pate



The content of Cd in polish poultry pate



The content of Zn in polish poultry pate



The content of Pb in polish poultry pate

