The maximal allowed nitrate levels for potatoes intended for storage are 250 mg of $NaNO_3$ per kg of the fresh tuber weight. The levels observed at the beginning of the storage period in 1997 were in a range of 122 to 181 $mg.kg^{-1}$. The highest levels were observed in the varieties Agria (181-204-165 $mg.kg^{-1}$) and Raja (151-218-183 $mg.kg^{-1}$). The nitrate content is rather an unstable parameter of quality, being strongly influenced by the usage of fertilizers and ambient conditions. In 1998 the nitrate levels exhibit little variance, which decline during storage.
The varieties Raja and Santé exhibited the highest levels of starch at the beginning of the storage period with 18.9 % and 18.10 %, respectively. The lowest levels, on the other hand, were found in Agria (13.66 %) and Impala (13.93 %). In the final stage of the storage period the starch levels dropped substantially, which was mirrored by an increase in the levels of sugars - its metabolites. The sharpest decline was observed in the variety Picasso (17.75-11.18-8.52 %) and, on the contrary, Agria exhibited the most stable starch content (13.66-14.73-11.54 %). The 1998 harvest was characterized by rather stable starch levels during the storage period in all varieties.
Observed levels of simple sugars in the examined varieties at the beginning of storage lay in a range of 0.75-0.98 %. The highest levels during the whole course of storage were observed in the variety Picasso (0.80-1.10-1.12 %), the lowest in Agria (0.50-0.50-0.79 %).
The 1998 sugar values were comparable in all varieties, only in the case of Impala and Picasso they exceeded 1 % during storage.
Reducing sugars (glucose and fructose) are an important parameter influencing the potential usage of the tubers for making potato chips, in which case their total amount should not exceed 0.25 % of their fresh weight. At the beginning of storage the level of the reducing sugars ranged up to 0.5 %, but only in the varieties Raja and Picasso their amount did not exceed 0.25 % recommended for fried products (Raja 0.21 %, Picasso 0.25 %). However, during the storage period the amount of the reducing sugars rose due to the starch bio-conversion.
In 1998 the varieties Agria and Santé exhibited the lowest reducing sugars levels.

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OCCURRENCE OF CADMIUM AND LEAD IN DAIRY PRODUCTS IN THE SLOVAK REPUBLIC

PAVELKA, M. - GOLIAN, J.
Department of Nutrition, Slovak University of Agriculture in Nitra, Tr. A. Hlinka 2, 949 01 Nitra, e-mail: Jozef.Golian@uniag.sk

Summary

We analysed 96 samples of dairy products (52 of yoghurts and 44 of cheese) on the content of cadmium and lead. An average values contents of cadmium and lead in yoghurts from import were 0,00246 mg/kg, respectively 0,03377 mg/kg and in domestic yoghurts 0,00192 mg/kg, respectively 0,04735. In cheese from import were the mean contents of cadmium and lead 0,00345 mg/kg, respectively 0,04782 and in cheese from domestic production 0,00236 mg/kg, respectively 0,05005 mg/kg.

Key words: cadmium, lead, dairy products, cheese, yoghurts

Introduction

Metals and other elements in the food are of interest because of their potential for effects on human health some have no known beneficial biological function and exposures may be harmful to health (Ysart et al. 2000)
For example, organic mercury compounds are neurotoxins, exposure to lead can be harmful to neuropsychological development, and cadmium can affect renal function. While some elements, such as copper, chromium, selenium and zinc are essential to health, they may be toxic at high levels of exposure (Ministry of Agriculture, Fisheries and Food, 1998a,b).
For safety of health in each populations is important a work regard on protect of food chain before contamination by heavy metals. It has been estimated, that contamination of food chain is 20 % due to own agronomic activity and 80 % is from pollution of foreign source, especially industrial activity. These facts have been conducted by to increase interests about monitoring of health harmless manufacturing food from view contents toxic, and too dangerous metals.

The intake of cadmium by organism can be effected too interaction with other elements. Those ions is knows important representation and concentration, which from aspect adsorption act competitive. Cadmium occurs in majority food, though in very low concentrations. Excessive quantity of cadmium is has been considered danger for his accumulated ability in target an organs, which can it, create different factional disturbances and health problems. The majority of food contains cadmium within 1 - 100 mg/kg.
Some our foods have been not definite limit on the contents of cadmium and are arrangement to categories others foods, which often effect problems at their appraisal from view level of contamination. The content of metals is under limit in base raw material do no achieve always, that consequential product will be suitable standard from view content of metal. Thence monitoring of natural distribution of the metal is necessary for estimate their true limits in the products.
According to Mehennaousi et al. (1999) was described, transfer of cadmium from milk to cream and curd. Before cadmium administration, the cadmium levels in milk were about 0,4 mg/l in ewes. Throughout cadmium administration the cadmium levels in milk were 3,3±1,4 mg/l in ewes and 2,5 ± 1 mg/l in milk. During cadmium administration, 86% of cadmium in ewe milk was dispersed in the skimmed milk and 17% in the cream. Most of milk cadmium was associated with casein fractions.
The valuation of per cent abundance individual the groups of foreign substances in year 1999 on weekly means to organism considering to allowance weekly means myself behind the most risk group consider heavy metals and especially cadmium. The maximum values weekly means they were calculated for cadmium 7 g/kg live weight (Krížová, Šalgovičová and Světliková, 2000).

Material and methods

We analysed 52 samples of yoghurts and 44 samples of the cheese on the content of cadmium and lead. From 52 samples of yoghurts, were 28 from domestic producers and 28 from importers of the abroad, and from 44 samples of cheese were 22 of samples from domestic production and 22 of samples from import. The samples were accidentally removal from commercial markets. The analyse of samples were made in the accredited laboratory system by compressive mineralization in combination with system AAS.

Results and discussion

The collection 96 of analysed samples, from those were 52 of the yoghurts and 44 of the cheese, we are statistically evaluated. Main variation-statistical characteristics of the cadmium observed samples are reported in table 1, and for lead in table 2. From table 1 followed, that mean value the contents of cadmium at products from import was higher, than at domestic dairy products. The mean value at cheese from import and domestic production were 0,00345 mg/kg, respectively 0,00236 mg/kg, while the mean value at yoghurts 0,00246 mg/kg, respectively 0,00192 mg/kg. The mean values of lead at cheese from import and domestic production were 0,04782 mg/kg, respectively 0,05005 mg/kg and at yoghurts 0,03377 mg/kg, respectively 0,04735 mg/kg. Any sample no exceeded maximum residue limit (MRL) 0,03 mg/kg for cadmium and 0,2 mg/kg for lead, which are valid by Food codex in the Slovak Republic.

Table 1 Main variation-statistical characteristics of cadmium in yoghurts and cheese

Characteristic	Yoghurt		Cheese	
	Import products n=26	Domestic products n=26	Import products n=22	Domestic products n=22
$\bar{x}$ (mg/kg)	0,00246	0,00192	0,00345	0,00236
s	0,00179	0,00093	0,00263	0,00122
s_x	0,00035	0,00018	0,00056	0,00026
v %	72,88	48,61	76,18	51,48

Table 2 Main variation-statistical characteristics of lead in yoghurt and cheese

Characteristic	Yoghurt		Cheese	
	Import products n=26	Domestic products n=26	Import products n=22	Domestic products n=22
$\bar{x}$ (mg/kg)	0,03377	0,04735	0,04782	0,05005
s	0,01712	0,02264	0,03312	0,02541
s_x	0,00336	0,00444	0,00706	0,00542
v %	50,71	47,82	69,25	50,77

The variability coefficient of cadmium was higher in the products from import, in intervals from 48,61% to 72,88 % at yoghurts and from 51,48% to 76,18 % at cheese. The higher variability of dairy product from import is given too thereby, that products derived from 6 different countries. While variability coefficient for lead was from 47,82% to 50,71% at yoghurts and from 50,77% to 69,25% at cheese.
At evaluated of differences among contents of cadmium in yoghurts from import and from domestic production by T-test were found, that differences between averages are statistically significant. It involve, that between contents of cadmium in yoghurts from import and from domestic production are statistically significant differences ($T_{0,01}$ = 2,831^{+}).
On the other hand differences in contents of cadmium in the cheese from import and from domestic production weren't statistically significant ($T_{0,01}$ = 2,787^{+}). From presented of results showed, that contents of cadmium in the cheese from import approached to values of cadmium, which occurred in domestic cheese.
It was found significant differences between contents of lead at yoghurt from import and of domestic production at used of T-test ($T_{0,01}$= 2,0623^{+}). The values of correlation coefficients weren't statistically significant.
To similar results arrived too Husain et al. (1996) and Wilplinger et al. (1995), which found important differences between followed dairy products.

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MONITORING OF HEAVY METALS IN FRUITS AND VEGETABLES WITHIN THE NETWORK OF SHOPS AND LOCAL MARKETS

Anna HRUŠKOVIČOVÁ
Department of Chemistry, Slovak Agricultural University in Nitra, Tr. A. Hlinku, 94976 Nitra, Slovakia

Summary

There were investigated the contens of lead, zinc, copper, nickel, chromium and cadmium in the samples of apples, pears, carot and parsley. These contents where compared with the content limits of heavy metals. On the basis of the results which indicates exceeding of permissible limits of heavy metals contents in analysed commodities, there is a need to devote a considerable attention to hygienic convenience of these foods for health consumption of these items by human population.There were not determined over-limit contens of zinc and copper in samples of apples, pears, carrot and parsley. The highest overstepping of permisible amounts of lead and nickel was analysed in parsley (60 % of samples). The similar situation was with chromium and cadmium, when 30 % of parsley samples showed exceeded concentrations.The best results were achieved with pears, which exceeded limit content only with nickel (28,57 % of total number of samples) and all other element concentrations were below the limit values.

Key words: heavy metals, vegetables, fruits, content limits, contamination, the highest permissible contents