STUDY REGARDING QUALITY FOOD PRODUCTS ON THE ZLATNA MARKETPLACE (ALBA COUNTY)

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Abstract:
The present work approaches a few problems related to the quality parameters of the food products starting from the present demands of the market economy. We have included in our study a large range of products that are permanently present market place, in a industrialized area. Some of them are vegetable products like: corn, potatoes, cabbage, carrot, spinach, together with other products. The study results highlight the degree of heavy metals contamination of these goods.

Keywords: vegetable products, heavy metals contaminations

1. General aspects

''Whoever an illness father may be, its mother is the wrong alimentation'', the Chinese will state, and they are right as maintaining one's health deals with some products and alimentary goods provision on the market; and of course, these must assure the right nutritional value and the right energy necessary for the vital processes, and not to transform the negative agents damaging the health and even providing

illness to organism. Aliments can be considered as environment factors in a direct relationship to man during his lifetime.

The oldest and the most important relationship is achieved by the fact that most aliments provide to our organism necessary nutritional substances in order to assure the energy for the indispensable vital processes, the proper substances synthesis and the formation of the active substances (hormones, enzymes) as well, issues that favours the normal metabolism flow. The right alimentation process deals with another essential condition as such: the consumed product should lack in negative agents or these should be found in reduced amounts in order not to damage to organisms. However there are some cases when aliments could contain such negative agents; they can damage and provide illness to some organisms. Some agents are biological (bacteria, viruses, parasites) others are chemical, toxic and cancer substances. The toxic substances have been always brought into account by the specialists, but in the latest decades some concrete causes appeared and these lead to a real toxic agents contamination. And here are some causes:

- the agriculture chemical processes;
- the environment pollution;
- the alimentation industrialisation using additives.

2. Metals with toxic potential in the alimentary products

From the nutritional point of view metals can be subdivided into two categories:

- *Metals* with a highly determined physiological role called essential or bio metals. Their lack or the simple insufficiency in the human body will determine after a period of time, careless aspects of the organism and even illnesses. From this specific category we may enumerate: Na, K, Ca, Mg, Fe,Cu, Zn, Mn, Mo, Co, Se.

- *Metals* proved not to be very important for life called unessential. Such metals are as: Pb, Hg, Al, Sn, Ag, Au, Ni, and Cr;

Their presence in our alimentation appears as a contamination. When the quantities of these metals are less significant than the normal possibilities of eliminating them through urine, digestive juices or other ways, they play the role of a chemical non-purifying agent that cross through the human body without producing biochemical damage.

However, the increasing in concentration for both these two categories of metals, for some levels, can favour the appearance of negative effects on human organism. The toxic potential metals reach to our bodies on various ways: together with the raw materials, the agriculture treatments, through processing, stocking and transportation, as well, and from the auxiliary materials and the waste waters also. Corrosion is another important effect of these metals. The toxic effect is dependent on the nature, quality and chemical shape provided by the alimentary product. There are other aspects which have to be brought into account, namely the percentage of the

contaminated aliments in the menus structure, the organism strength, the synergic or opposed effect of other chemical contaminated items and so on.

A very important property that can establish the degree of toxicity for organism is the metals and metallic compounds solubility. The gastric juice and the intestinal juice, the blood contains acids, bases, salts and so on. If taking the case of the nervous system, which is rich in fat elements, we will see that mercury or plumb are toxic. Other substances entering the body instead of being eliminated they are stocked in bulk in different tissues. They can remain there for a long period of time and produce toxic infections or illnesses.

Others may provide their negative effects after having been accumulated in a sufficient quantity. They are preserved in tissues and the more they are accumulated, the more various illnesses will appear. This cumulated effect can be met at Pb, Me, Ca. Another way of toxic metals rising is through a continuous accumulation process. This way, as continuous accumulation of new substances in the same tissues, they will become very sensible and the intoxicating process is produced.

Lead – Pb

The alimentary tans enclosed in metallic boxes deals mostly with the highest Pb contaminating issue. Pb passing process from the metallic box to the alimentary content will be not as easy as it seems, because St-Pb mixture posses a positive electrode potential compared to that of St-Fe. Consequently, the latest will be developed faster at the beginning of the process; while the polarity is reversible Pb can be accumulated in damaging quantities. The tans manufacturers have taken attitude on replacing Pb mixture with electric mixture.

In an official OMS document it is stated that lead disease is much more recognisable in Pb content than the environment pollution.

Pb content in the alimentary tans varies from country to country. In Great Britain the admissible quantity until 1975 was 2mg/kg being than reduced to 1mg/kg; in Japan 0,4mg/kg; in Switzerland 0,5mg/kg. The “Alimentarius Codex Committee” established as maximum limit 0,3ppm, but some authors consider it as 0,1ppm[5]. Nowadays, there is a general tendency of reducing Pb quantity as the old people and the children are the most consumers.

As far as the hard metals are concerned, the experts committee FAO/OMS recommended to renounce at the daily admissible quantity for the weekly admissible quantity in order to express better the level of Pb contamination. Pb admissible temporary weekly quantity was of 3 mg Pb/adults. A research study of FAO, published on 17th June 1975 revealed that the alimentary diet in the USA was around 1,8 mg Pb-60%of the weekly admissible quantity.

The Ministry of Health has established the Pb admissible limits concerning the alimentary products; the following table provides the most important Pb contents in mg/kg wet product.

Table 1 Pb contents in the alimentary product

Nr. crt	Aliment	Number of samples	Maximum value	Minimum value
1	Milk	11	0,24	0
2	Cottage cheese	14	1,2	0
3	Cream cheese	17	1,25	0
4	Cacciocavallo	22	0,9	0
5	Pork	14	1,2	0
6	Beef	11	0,8	0
7	Meat tins	10	1,15	0
8	Sausages	14	1.3	0
9	Kippers	10	2,9	0
10	Bloaters	10	0,65	0
11	Oil fish tins	11	1,75	0,2
12	Tomato fish tins	10	1,85	0
13	Eggs	15	2,2	0
14	Grapes	11	0,09	0,15
15	Apples	10	0,6	0
16	Jam	10	0	0
17	White bread	10	0,9	0
18	Black bread	10	1,5	0
19	Corn	12	1,6	0
20	Dry beans	10	0,4	0
21	Bean tins	10	0,3	0
22	Pea	10	1,25	0
23	Onion	10	0,65	0
24	Potatoes	12	0,65	0
25	Tomatoes	10	0,3	0
26	Tomato paste	10	1,05	0
27	Spinach	10	1,35	0,3
28	Cabagge	10	0,5	0
29	Oil	10	1,2	0
30	Plum brandy	10	0,55	0,06
31	Wine	12	0,22	0,08
32	Soda	15	0,17	0,06

3. Researches on the heavy metals contamination of the alimentary goods

Bringing into account these premises we consider as necessary to develop a case study related to some aliments groups frequently met in every day alimentation.

Measurement Principle of Electrochemical Techniques

Preconcentration (plating) consists in the application of a constant reductive potential for a period of time, when takes place the adsorptive accumulation of metal on Hg surface:

Me (n^+)+ ne^- + Hg →Me (Hg) Stripping, when the metal ions or metal-complex accumulated on Hg surface is oxidised and the oxidation current, proportional with the metal concentration, is determined.

Instrumentation and software

The computer aided instruments used for potential control was BAS 100W equipped with Controlled Growth Mercury Electrode (CGME) West Lafayette, USA and the Portable Trace Element Analyser, PTEA –WAGTECH equipped with glassy carbon electrode, GCE. The classical three electrodes cell has been used for the cyclic voltammeter determinations (WE- GCE; CE- Pt wire and RE - Ag/AgCl). Reference (Ag/AgCl) and Pt wire auxiliary electrodes used to this work, were from BAS Co. The UNICAN Helios β UV-VIS spectrometer has been used to control the results of the electrochemical methods[5].

Table. 2 Experimental parameters

Experimental parameters	Cr	Ni	Cu	Zn
E1	-1600	-1400	-1000	-1400
E2	600	-650	-350	-1200
E3	900	-100	0	-850
E4	1500	500	50	100
T2	10	10	10	10
Potential (max)	850	-500	10	-900
Potential (min)	500	-150	-150	-1100
Electrolyte	ACCH	Con. ACCH	ACCH	ACCH

The samples were rendered soluble in HNO_3 0,5M, at a volume of 50 ml. The quantity of dried vegetable material used was of 0,5 g [5,6].

Results and discussions

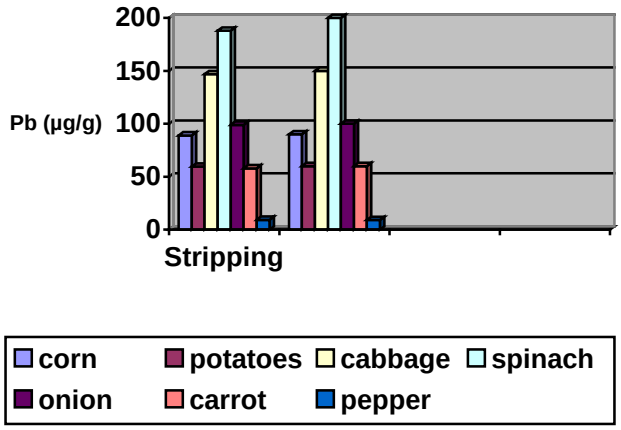
Consequent to measurements, high concentration values were registered in the area under study (Zlatna-Romania)[5,6]. The results' precision is higher in the case of the samples that had a higher concentration in heavy metals (Pb or Cd).

Table 3. Lead in vegetal material

Analysed sample	Pb (µg/g)	
	Stripping Potentiometry	GFAAS
Corn	88,9	90
Potatoes	59,5	60
Cabbage	149,6	150
Spinach	188	200
Wine (Riesling)	27,8	28
Wine (Cabernet)	13,8	14
Onion	96	100
Carrot	57,9	60
Pepper	9,1	9

The value in the Table 3 is the average of five determinations.

Figure.1 Lead in vegetable material



We tested the two methods used in the laboratory for safer results. Note that the values obtained are close but what is important is that the results highlight these goods food contamination with heavy metals, in our case lead. The values obtained are very high considering that the maximum permitted levels are 10 ppm for lead.

4. Conclusions

The products quality stands for an important and modern issue nowadays; satisfying the consumer's needs and requirements, maintaining people's health by providing on the consuming market available products and semi-products, all these matters will be considered as major items of food safety and people's security.

The study has revealed that food commodities in industrial areas may be contaminated with various chemicals. In our case we have shown that the marketplace, there may be food contaminated with heavy metals. This result draws a warning for those unable to protect consumers.

5. References

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