



Analysis of Traces of Heavy Metals in Samples of Flour Domestic and Imported

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Accepted on: 10-08-2016; Finalized on: 31-08-2016.

ABSTRACT

The subject of this research study, have been analyzed and the concentration of heavy metals, such as: Cd, Cu, Fe, Ni, Cr, As, Co, Mn and Hg, in local and imported flour in Kosovo, which citizens use as basic food, in everyday life, also obtaining knowledge about the processes that are performed in local factories and import of flour, ranging from abroad. For the determination of heavy metals in samples of flour, we use the standard method for analysis - ICP-OES, as contemporary method. Samples of flour were taken in three site-sampling, such as: S₁-Finesa-Devolli-Kosovo, which was acquired in Emona market, S₂-Divella -Farina-Italia, which was acquired in Maxi market in Ulpian and S₃-Riviera-Serbia, which is Interex buy in Pristine. All flour samples were taken according to the rules provided for sampling of powder samples, (flour milled-schist).

Keywords: Flour, heavy metals, Finesa, Divella, Riviera.

INTRODUCTION

Agriculture in Kosovo includes approximately 1,800 cooperatives and commercial firms, private and social, with 143,000 households, 70% of which are farms with more than 1 ha^{1,2}. The sector has very low labor productivity, combining well with very low monthly income¹⁻³. Kosovo is a major importer of agricultural products, with 288 million Euro, or 24% of total imports in 2005-2010^{1,3}. The import of food from total imports, differs markedly from the year 2000 was about 34%, raised to 27% in 2005/10 and fall to 24% in year 2015^{2,4,5}. The scandal of importing wheat expired state reserves of Serbia, the company “M and Silos” owned “Devolli Corporation”^{2,5} and returned to attention recently by Association Millers Kosovo, has shaken the government, but not the Customs, the latter preferred to remain silent, even though the charges are directed against them^{2,5}. According to the Association of Kosovo Millers Company “Devolli Corporation”, supported by Kosovo Customs, is feeding people (Albanians), on both sides of the border, with flour produced from wheat destined for animal feed^{2,5}.

Earlier, officially Agency Veterinary Food, we learned that flour “M and Silosi”, which entered into Albania, and produced grain reserves Serbian state, purchased by 7 cents from ‘M and Silos, resulted in 10.8 % protein^{3,6,13}.

The media and civil society, have asked official AVUK, to make available copies of the grain analysis, coming from Serbia and flour produced by “M and Silos”, according to officials, is considered confidential and analysis such cannot be made public^{3,5,6}. In most cases, the forms of analysis not the name of the company that produces the flour, or bought wheat. But despite this, we have learned that flour destined for Albania, after analysis resulted in

10.8 % protein. Meanwhile, European standard stipulates that flour for bread should have 12.5 % protein^{16,18,19}. In another analysis, protein flour has resulted in 10.8 %, the analysis in year 2014 is made meal that would go to Albania^{3,13}. Proteins, we calculate the material moist, but in Albania compute dry matter, officials have said earlier, thus justifying 10.8 %^{3,13,18}. Also on 2014, is making another analysis of the flour, the laboratory, and proteins have emerged 11.1 %, while year 2014 in another analysis, proteins are released 10.9 %³⁻⁵. In connection with the current scandal, which has produced a multiple offense, officials AVUK, said that never happened, products for animals intended for human consumption^{3,5}. Flour, not subject to detailed analysis laboratory, for all furnaces that produce pulp products. By default, every individual should consume 7-9 grams of fiber per day^{3,4}. They provide a process to normal functioning of some organs of the human body; these fibers are taken through the grain^{1,2}. The amount of fiber should be taken to the extent specified, ie should neither increase nor decrease, because no impacts on the body, if the body receives more than 9 grams of fiber (especially through consumption of brown bread) increases the presence of a substance which brings about prostate^{2,3}.

By reducing the frequency of flour, increase the presence of carbohydrates or other indicators, it spells trouble for the organization, or does not provide all the elements needed during feeding^{3,10}. Then, an increase of the range, through supplements bran or flour fortification is done through vitamins. These are fixed rate, which is required by international institutions that monitor us^{4,11}. These have been approved and are natural, without any consequences for the organism^{4,5}. The introduction of these vitamins increases slightly, the cost of flour^{3,5}, but there is no impact on the price increase of the product



and one thing becomes very easy, in terms of performance, but also in this process is necessary^{5,13,21}, presence-engineering technology grain and food in general^{5,6,20}.

MATERIALS AND METHODS

It being understood that samples of flour, taken able to schist (like powdered substance), we can say that we should treat-dissolved with acid concentrate, and a peroxide other, as the optimal solution, while using or handling the sample to turning it into a liquid state and to analyze it later with one of the analytical techniques that we use.

However, carefully weigh 1000 mg/or 1g sample digestion, to add to it; 10 ml of HNO₃ and 2ml 65% H₂O₂ (to eliminate the organic contaminants in the sample), in a plastic tube or glass-Teflon. Stir carefully for 3-7 min, then enters the electric oven at 105°C about 40 minutes.

To avoid foam which sits at the top of the plastic tube-glass, wait until it has cooled to room temperature (about 20 min).

Caution when opening the tube, which may be in the student; 0.5-25 ml, acid vapour, which has solved the sample, can come in the form rapid and hood (pipes-tubes), with a good distribution skills, so care; eyes, face and body protection in general, because the amount of gas that will be collected during the process of digestion of the sample, can strangle you and you suddenly fainted. However, altogether this process should be conducted in digest or and in extremely convenient and isolated completely in a closed system working.

RESULTS AND DISCUSSION

Sampling points for; S₁-Finesa-M and Sillosi, Produced in Kosovo, S₂-Divella-Farina, Produced in Italy and S₃-Riviera- Produced in Serbia.

Table 1: The results of chemical analysis of samples (mg/kg dry matter). Level detection ICP-OES's.

Parameters	Unit Weight	Method	S1	S2	S3
As	mg/kg	BS EN 13805:2002E PA 6010c	<2ppb	<2ppb	<2ppb
Cd			<0.1ppb	<0.1ppb	<0.1ppb
Co			0.36	0.46	0.35
Cr			1.23	2.10	0.84
Cu			1.35	1.62	1.33
Fe			26.52	26.63	51.24
Hg			<1ppb	<0.1pb	<0.1ppb
Mn			2.51	5.16	2.50
Ni			0.51	1.04	<0.5ppb
Pb			<1ppb	<0.1pb	<0.1ppb
Zn			2.69	4.93	2.67

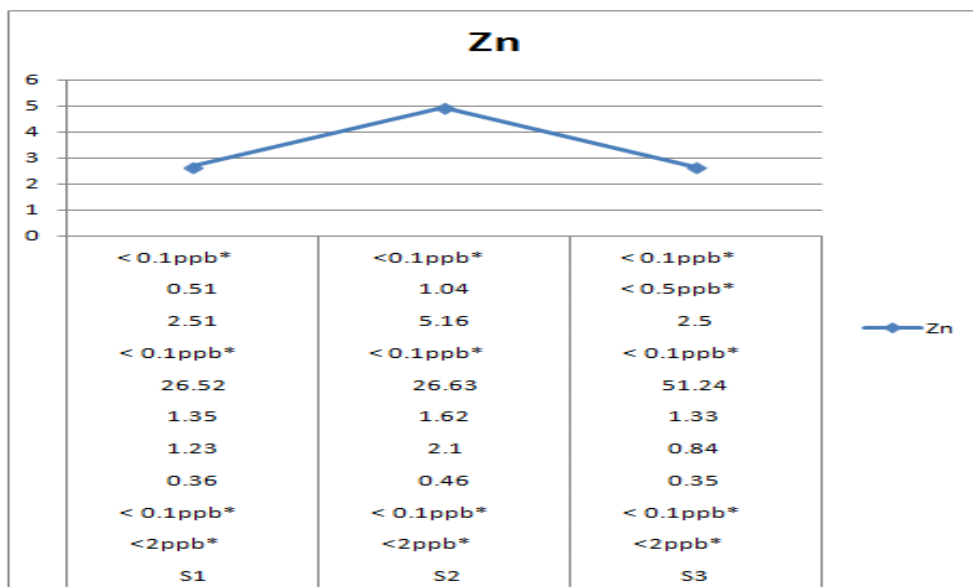


Figure 1: Graphical presentation of values system in three samples of flour.



The research results are presented in tables and graphs for each site-sampling, are presented the values of the elements which were analyzed in samples of flour as: S_1 , S_2 and S_3 , for certain time period of the research. Table 1 shows that the concentration of heavy metals in flour, in the first sample; S_1 , to some elements it is higher, but since we are dealing with movable values of these elements, especially some elements which are toxic, then their impact is large contaminants in the body.

It is well known that heavy metals are counted among the most dangerous pollutants non-degrading, then these high concentrations of heavy metals, posing significant risks to the environment and so the chain to the human body through food and water. These metals, in the form of salts pass water systems in different ways, and then shaped ion can bind to compounds other and after penetration into the body, causing toxic effects and cancer diseases incurable and population, generally in terms environmental.

In the second sample S_2 , easily seen, it is observed a difference amongst the values represented in the analyzed elements. Seen comparable value elements, compared with each other, but not great comparisons between S_1 and S_2 , especially elements such as: Cd; < 0.01 ppb, As; < 2ppb, Fe; 26.63, Mn; 5.16, Ni; 1.04 and we have very high values in zinc which ranges from, Zn; 2.69 until 4.93, while the values of the concentration of; Co, Cr, Cu and Hg are almost similar values in both samples and can say that they are concentrations lower than concentrations of Fe and Zn, can affirm that these values, somehow they are allowed and can be compared with the standards and norms allowed by the EU and WHO.

As a result of sample heterogeneity and variations in measurement values obtained represent the average of three measurements of the concentration of two repetition. The concentration of values presented as: Co, Cr, Cu, Fe, Mn, Ni and Zn, in the analyzed samples is higher, compared with the rates permitted under, the Direktive EC 1881/2006.

CONCLUSION

Experimental results based on samples of flour, obtained from: S_1 -Finesa-M and Sillosi, Produced in Kosovo, S_2 -Divella-Farina, Produced in Italy and S_3 -Riviera-Produced in Serbia and analyzing these samples had, we came to a conclusion with the following conclusions:

Flour analyzed the standards of values is permitted, as far as the concentration of elements; Co, Cr, Cu, Fe, Mn, Ni and Zn, that almost seven elements, have passed any acceptable limit European, because they have exceeded the norms by twice, EC Directive 1881/2006. Therefore, we conclude that the value of the samples taken at three sampling points that are outside the limits of the maximum allowed, according to the norm and according to EU standards and WHO's, for flour and products of his own. Also, based on the results obtained, we conclude that the amount of arsenic, cadmium and lead, almost are

growing, then close the borders to allow minimal, maybe we rely on certain standards of some countries that are more stringent and stricter, by any means these elements should not exceed the allowed values minimum, because as it is known, these elements are highly toxic and contaminated, the organism alive and are not essential, therefore, their presence in the flour and the products of his own. They are too dangerous for living organs, in particular for the stomach and the digestive organs.

The obtained results from three samples indicate that most of the elements defined in Flour in: S_1 , S_2 and S_3 , have given values that exceed the limits allowed maximum, which makes flour unsafe for use and further treatment in the destination, of his own bread and other dough products, the population of use for food.

Therefore, it really reflects the problem and immediate concern for the citizens and the population at large, which consume the flour for bread and other flour products, used for everyday meals, from the world of living of this country.

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Source of Support: Nil, Conflict of Interest: None.

