

THE DISTRIBUTION OF SOME METAL ELEMENTS IN DIFFERENT FRUITS FROM IMPORT

I. Gogoasă, I. Jianu, I. Gergen, Diana Moigrădean

Banat's University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Processing Technology, Calea Aradului nr. 119, Timișoara, RO-300645

Abstract

The paper present the distribution of some metal elements: Na, K, Ca, Mg, Fe, Mn, Cu, Zn, Co, Ni, Pb and Cd, in various imported fruits: bananas, lemons, nectarines and oranges. After analyzing the experimental results, we could notice that the distribution of metal elements in the above-mentioned fruits is not uniform. The fruits under study are characterized by high metallic nutritive elements and very low concentrations of metallic contaminants, under the limits set by law.

Keywords: *bananas, lemons, nectarines, oranges, Ca, Mg, K, Na, Fe, Mn, Zn, Cu, Co, Ni, Pb, Cd.*

Introduction

Fresh fruit are considered to be complete food products, as they contain a wide range of nutritious substances, which play a decisive role in the normal functioning of the human body.

The food quality of fresh fruit is also determined by the nature and quantity of the substances found in their composition; among these are the metallic elements. From the point of view of their nutritional value, the metals, which can be found in fruit and vegetables, can be classified into essential (biometals) and non-essential (Anke, 2004).

Some heavy metals can be grouped into the first category, like: Ca, Mg, K, Fe, Mn, Cu, Zn, Cr, Co etc. The non-essential metals are represented especially by: Hg, Cd, Pb etc. It is worth noting that, for both heavy metal categories, the increased concentration in fruit, above some levels considered optimum, determines toxic effects on the consumers.

That is why fruit, whether they are indigenous or not, must be tested both as a source of energetic nutrients, plastic and biostimulators, and as a source of some contaminated metallic substances, having a more or less serious impact on the vital physiological functions of the organism.

Thus, a permanent control of metallic element distribution is to be made. Also, research in the field of identifying the frequency of metallic contaminants in the various links of the food chain is needed, as well as specific action towards preventing and avoiding the commercialization of contaminated products.

The authors of the present paper made a study regarding the distribution of some metallic elements: Na, K, Ca, Mg, Fe, Mn, Cu, Zn, Co, Ni, Pb and Cd, in some imported fruits: bananas, lemons, nectarines and oranges. After analyzing the experimental results, we have come to the conclusion that heavy metal distribution in the fruits under study is not uniform.

These fruits are characterized by high contents of nutritious metallic elements and very low concentrations of metal contaminants, under the toxicity limits admitted by law.

Experimental

For the purpose of the experiment, some samples from different imported fruit bought from some traders in Iozefini Market in Timișoara were taken. For appreciating the heavy metals concentration from fruits, heavy metals were extracted using calcinations method and HCl solubilization (Gogoasa, 2003; 2005). All interested metals were determines by flame atomic absorption spectrometry.

Results and Discussions

The experimental results obtained after analyzing the metallic elements in the fruits under study, which are presented in Table 1, are below the normal limits for this kind of fruits. These data show a non-uniform distribution of metallic elements in all the analyzed assortments. Of all the investigated elements, the best represented in all the assortments are: K, Ca, Mg. Na and Fe appear in smaller quantities. The rest of the metals analyzed, also known as microelements, were

identified in much smaller quantities: Mn, Cu, Zn, Co, Ni, or extremely small: Pb, Cd.

Table 1. Metals contents (mg/kg fresh product), in some fruits from import

| Metal content, average values | Analyzed fruits | | | |
|-------------------------------|-----------------|--------|------------|---------|
| | Bananas | Lemons | Nectarines | Oranges |
| Na | 20.9 | 11.3 | 8.15 | 5.59 |
| K | 1989 | 1038 | 1234 | 1221 |
| Ca | 182 | 664 | 148 | 444 |
| Mg | 307 | 99 | 105 | 163 |
| Fe | 4.97 | 1.88 | 5.42 | 5.60 |
| Mn | 0.99 | 0.51 | 0.25 | 0.57 |
| Cu | 0.51 | 0.42 | 0.27 | 0.49 |
| Zn | 1.72 | 0.94 | 1.14 | 0.26 |
| Co | 0.33 | 0.17 | 0.23 | 0.27 |
| Ni | 0.17 | 0.23 | 0.42 | 0.26 |
| Pb | 0.16 | 0.12 | 0.13 | 0.15 |
| Cd | < 0.02 | < 0.02 | < 0.02 | < 0.02 |

When comparing the experimental values obtained with the maximal concentration limits set by the Romanian law for some toxic or potentially toxic metals (Table 2), we can notice that these are clearly below these levels (Order of Ministry of Health, 1998).

Table 2. Extract from Ord. M.S. 975/1998. Maximal limits for heavy metals in fruits (mg/kg fresh matter)

| Food products | Cd | Pb | Zn | Cu |
|------------------------|------|-----|-----|-----|
| Fresh or frozen fruits | 0.05 | 0.5 | 5.0 | 5.0 |

Conclusions

After analyzing the metal element distribution in bananas, lemons, nectarines and oranges, we can conclude that these imported fruits are characterized by high nutritious metallic element content (especially K, Ca, Mg, Fe etc) and very low concentrations of metallic contaminants (especially Cd and Pb), below the maximal toxicity limits admitted by regulations.

References

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