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ASPECTS CONCERNING THE FOOD INTAKE OF SOME POPULATION GROUPS IN BIHOR COUNTY IN THE PERIOD 2010 - 2013

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Abstract

The study looks at how the food ratio of individuals from population groups in Bihor county was covered during a period of four years. The size of groups ranged between 57 and 100 people, of both sexes and different ages, including individuals with different degrees of physical effort.The method employed was that of the individual food survey, for 24 hours. The average rations consumed by the four population groups were deficient with regards to both calories and nutrients, but they were properly prepared as a ratio between trofines. Too little vegetable fat was consumed as compared to animal fat. Meat and grain derivatives exceeded the recommended amounts, vegetables and fresh fruit were consumed in very limited amounts while fish was almost absent from the diet. Elderly persons's diets were closer to recommendations. Many subjects have not had either breakfast or snaks/light meals, compensating these with lunches and dinners exceeding in calories.

Key words: behavior, nutrition, obesity, malnutrition, prevention, risk

INTRODUCTION

People's lifestyles or specific behavior may be an important risk factor for health and the cause of frequent physical and mental imbalances. Some feeding habits become dangerous human „practices" that threaten both the health of individuals adopting them and the prosperity of the communities to which they belong, triggering significant social costs (Ionac N, 2003). Characteristic of the second half of the twentieth century is a polarization of mankind in terms of food intake, at one extreme being the millions of people living on the edge of survival, while at the other extreme, there are hundreds of millions of people for whom food is not a problem, neither as concern nor as regards their financial means (Olinescu R, 2002).

Thus the world oscillates between these two extreme situations: the one hand malnutrition, and on the other hand, excessive nutrition. Both affect health: malnutrition generates both deficiency diseases (anemia, rickets, dystrophy, blindness) and infectious diseases (tuberculosis), while overeating leads to chronic diseases related to nutrition (Popescu O, V Achim, AL Popescu, 2004).

A good balance between intake and the nutritional needs of a person is reflected in the possibility to maintain a good health. When there is a

deviation between the intake and needs, one can speak of malnutrition, which has direct and indirect consequences on health (Ionuţ C et al, 2004). Projections for 2015 and 2030 show that 576 million people will suffer from malnutrition in 2015 and 400 million by 2030, in developing countries (FAO, 2005).

Over 2 billion people have iron deficiency anemia (WHO, 2001). Data from N.H.S. show that more than 700 million people are affected by iodine deficiency, most of them living in less developed countries (WHO/UNICEF/ICCIDD,1999). The percentage of chronic degenerative diseases is estimated to increase to 57% of all diseases in 2020, with enormous costs for companies and governments (Epping-Jordan J et al, 2001).

In 1995 there were 84 million diabetics in developing countries, a number that will increase by more than 2.5 times, to 228 million by 2025 (Aboderin I et al, 2001). 70% of deaths caused by diabetes will occur in developing countries (WHO, 2003; WHO, 1998).

The premature labelling of chronic diseases as "diseases of affluence" is a misnomer, as they are encountered both in poorer countries and in less affluent population groups in developed countries. This change in the pattern of disease incidence takes place at an accelerated rate; moreover, it occurs at a faster rate in developing countries, as compared to what happened half a century ago in industrialized regions of the world (WHO, 2002; Popkin BM, 2002).

Teenagers, rather than children, are able to make more choices for themselves; social pressure to be thin and the stigma of obesity can lead to unhealthy eating behaviors (Baric I, R Kajfez , S Cvijetic, 2000) and a bad opinion about their body image. As they grow, their choices and preferences gain priority over the eating habits acquired in the family, as they have more control over what they eat, where and when they eat (Shepherd R, Dennison CM, 1996; Thomas J, 1991; Spear B, 1996).

The combination of an unhealthy diet and a sedentary life, with other risk factors, such as tobacco, has an additive or multiplicative effect, able to accelerate the speed at which chronic degenerative diseases are spreading throughout the world [WHO, 2002]. Physical inactivity is reported in developing countries as much as in the industrialized ones, the sedentary lifestyle being a risk factor for many chronic diseases. (WHO, 2003; Matsudo V et al, 2002).

MATERIAL AND METHOD

Between 2010-2013, the staff of the Department of Food Hygiene within the Public Health Administration Bihor has conducted annual surveys (in autumn), as part of the National Health Programmes, in urban

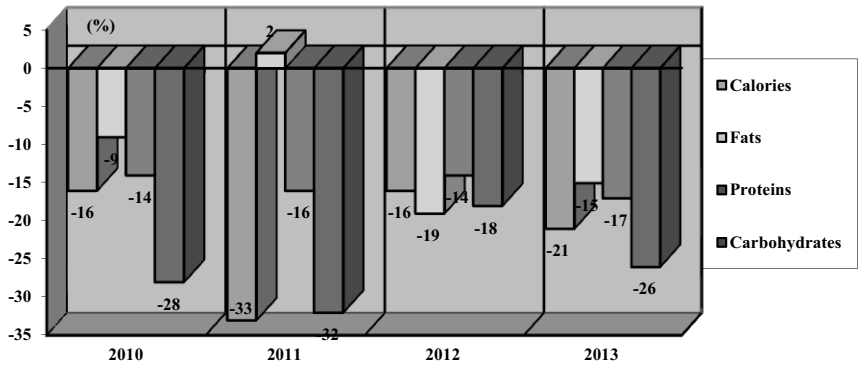
and rural communities in Bihor - Sălard (2010) Beiuş (2011), Sântandrei (2012), Oradea (2013), evaluating food intake and the declared feeding behavior, using the method of the individual food survey for 24 hours, in accordance with methodological specifications, developed by specialists of the Regional Centre for Public Health in Cluj Napoca.

The size of groups was different in the 4 years, ranging between 57 and 100 people, of both sexes, aged over 20 years. The structure of groups was homogeneous and, in the interpretation of the results, the amount of physical activity performed was taken into account, measured in degrees of effort. Tables of food composition were used in order to calculate the average daily calorie and trofin content of the menus consumed,.

Recommended values on food requirements, energy needs and the nutrients taken from meals were completed by the Regional Public Health Administration Cluj-Napoca, depending on age, sex, degree of effort, in accordance with the recommendations of the FAO / WHO and national recommendations.

RESULTS AND DISCUSSIONS

1. The average annual value (caloric and nutritional) of the consumed diet – deviations %



3)

4) Fig.1. Percentage of deviations recorded in relation to caloric intake and the nutrients

5)

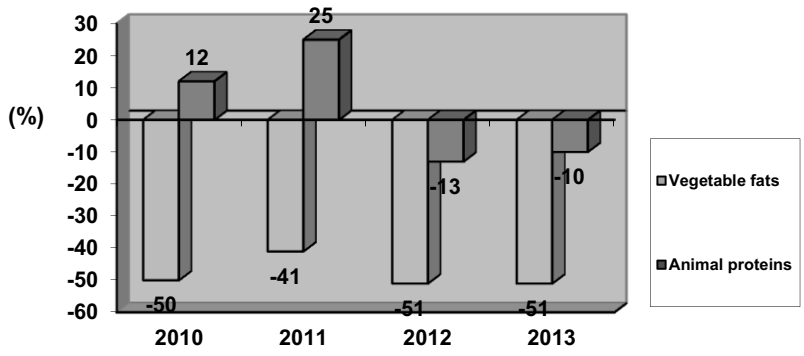
6) Every year, except 2001, one can observe an average caloric deficit and a global nutritional deficiency. In 2011, a slight excess of fat was

recorded in the average ration consumed by the groups included in the study (fig.1).

7)

2. Coverage of food needs in terms of quality of rations consumed during the period studied

Throughout the period mentioned above, food rations, as declared by the people in the studied groups, proved to be qualitatively unbalanced, with a significant deficit of vegetable fat, excess of animal protein in the first two years and a deficiency of animal proteins in the following years (fig.2).



8) Fig.2. Percentage of deviations recorded in the rations of lipids and proteins consumed

3. Coverage rates of food intake, calculated with regards to nutrients

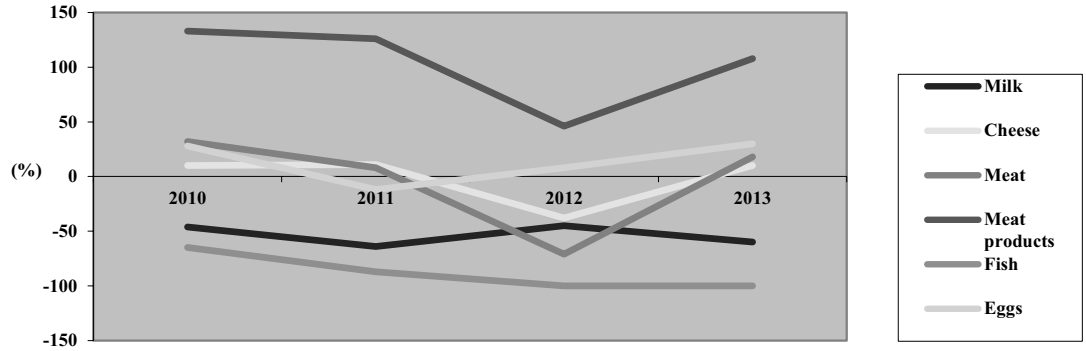
Table 1

Percentages of caloric rations consumed

Year		Lipids	Proteins	Carbohydrates
	Recommended	**20 – 35%**	**10 – 15%**	**50 – 70%**
2010	Consumed	33%	**14,4%**	**52,6%**
2011	Consumed	34,44%	**15,41%**	**51,01%**
2012	Consumed	30%	**14,4%**	**55,6%**
2013	Consumed	33%	**15%**	**52%**

A positive aspect that emerged refers to the fact that recommended proportions between nutrients were observed, despite the overall deficitary characteristic of rations (table1).

4. Average consumption on food groups



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10) Fig.3. Percents of deviations registered in the ration of animal food consumed

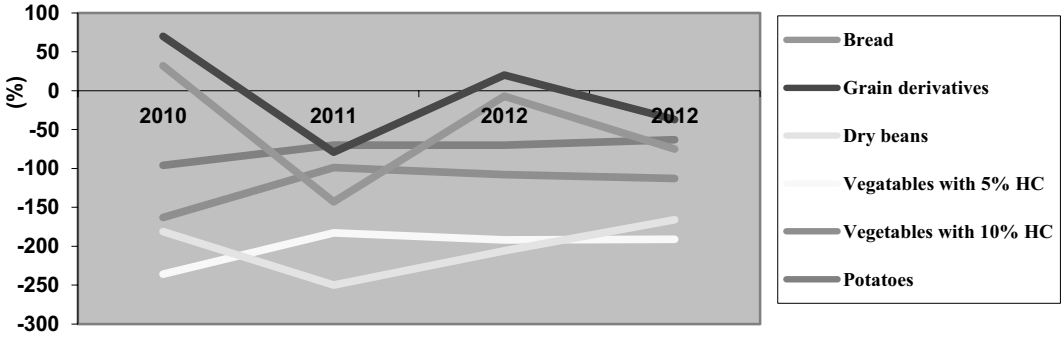

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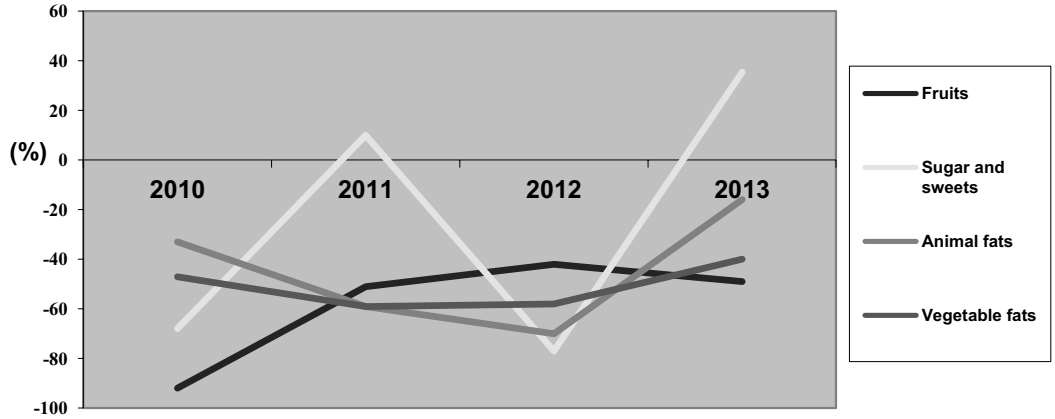
Fig.4. Percents of deviartions registered in the ration of vegetable food consumed



12)

Fig.5. Percents of deviations recorded in the ration of fruits, sugar and fats consumed

From among animal foods, mainly those derived from meat were consumed (large positive deviations recorded in all years), rather than meat

(for which there have been excesses, however, with the exception of 2012), cheese and eggs, or milk, which was consumed in very little quantities (deficit in all years), while fish was almost never consumed (fig.3).

Among vegetable foods, mainly those derived from cereals were consumed, alongside bread and potatoes (less); of vegetables those with 10% HC were eaten in larger percents than those with 5% HC, the largest deficit being recorded in the case of pulses/beans (fig. 4).

A consumption of sugar and sweets in excess was registered only in two years, animal and vegetable fats were used in very little quantities, as well as fresh fruit (fig. 5).

5. Coverage of the daily average energy (caloric) needs by age, sex and degree of effort

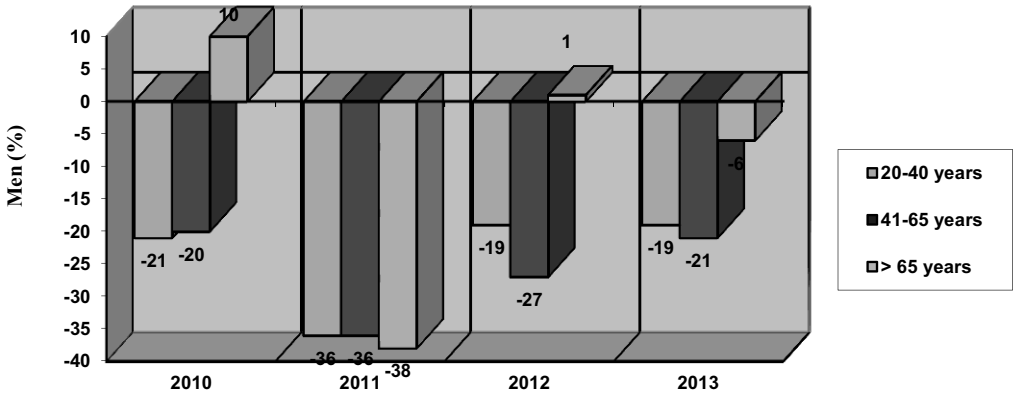


Fig.6. Men's caloric intake by age groups

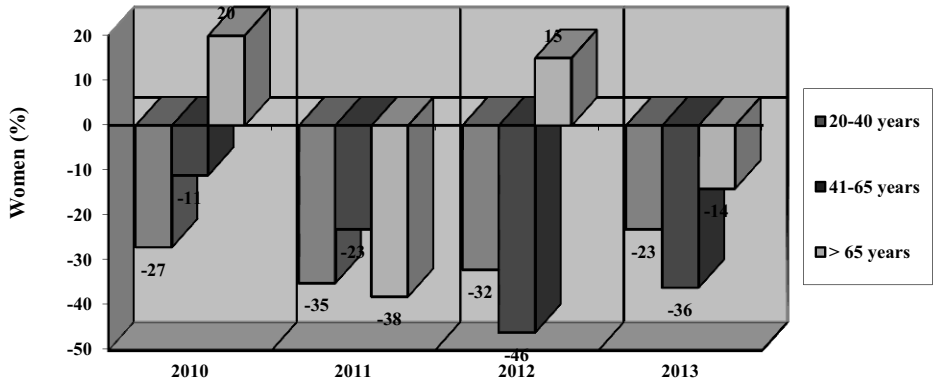


Fig.7. Women's caloric intake by age groups

For both sexes and during the entire period evaluated, there have been some caloric defficiencies, except 2010 and 2012, for persons aged above 65 (women and men).

The most significant defficiency was registered in 2011 and 2012 respectively, in the case of young women (20-65 years) (fig.6 and fig.7).

6. Percentage distribution of menues on meals

If the annual average caloric value for breakfast and light meals was reached, lunches and dinners were generally over-abundant.

In the past 3 years, about 20% of the subjects did not have breakfast. Most often they did not have light meals as well, the year that distinguishes in this respect being 2010 (fig.8 and fig.9).

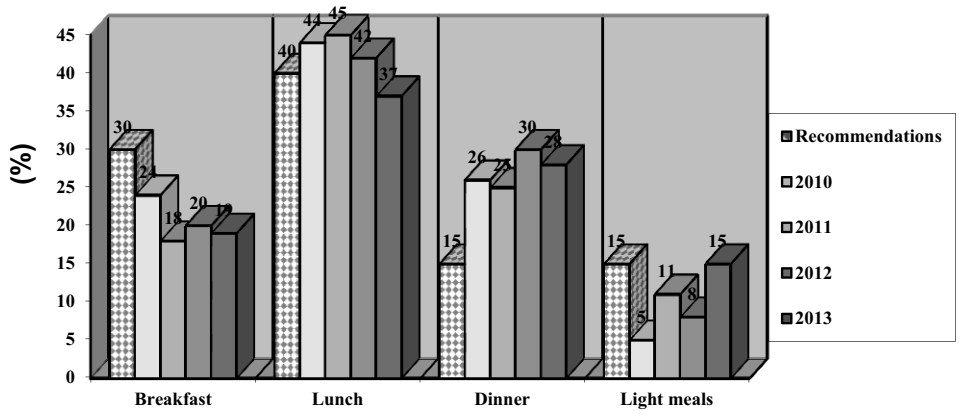


Fig.8. Daily percentage distribution on meals of food consummed

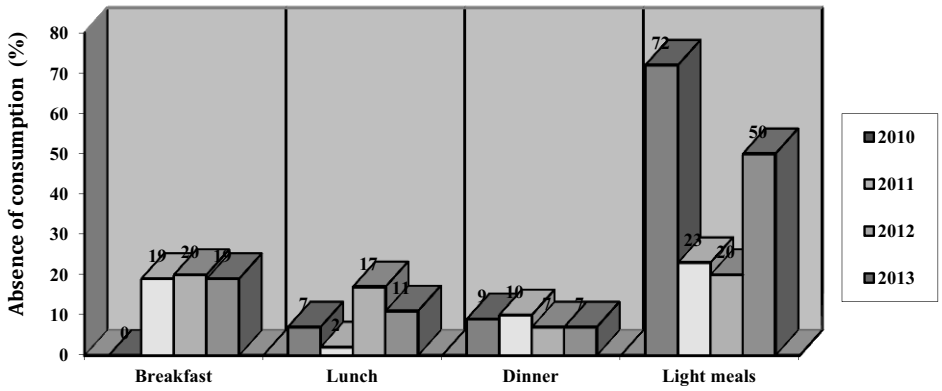


Fig.9. Absence of food consumption at the main meals

CONCLUSIONS

Overall, the population groups evaluated had a poor diet throughout the period taken into consideration, calorie rations being insufficient to cover nutritional and trofic needs (as regards quality as well), but were judiciously structured in terms of calorie macronutrients.

The diet was based mainly on meat and cereals, while vegetables were consumed in small quantities, either raw and cooked.

The fish was not among the consumers' preferences (and there is no tradition or education in this respect in our area), and fresh fruit were consumed in quantities that are not appropriate.

Elderly persons' rations were closer to recommended values (these being however slightly too rich in relation to physical effort).

A significant proportion of subjects did not serve breakfast or snacks, compensating this absence with lunches and dinners too rich in calories.

It is necessary to continue insisting on the correct and complete information of the population, especially as regards disadvantaged groups, who have more difficult access to education and information through the Internet and mass media.

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THE DOSAGE OF THE IONS OF CALCIUM, MAGNESIUM AND IRON IN RED BEET JUICE BEFORE AND AFTER BOILING

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Abstract

This paper intends to determine the concentration of the ions of calcium, magnesium and iron in fresh red beet juice, thermally unprocessed, using the voltammetric method. We have also determined the concentrations of these ions in the red beet juice obtained after boiling the beet in its skin, using photometric method.

Key words: : red beet, dosage, calcium, magnesium,

INTRODUCTION

The red beet is a biennial plant, cultivated in most parts of the country. The beetroot contains glucides, proteins, lipids, glucose, fructose, saccharose, cellulose, organic acids, phenols, vitamins (B,C) minerals (potassium, sodium, phosphorus, calcium, magnesium, boron, iron, manganese). The root is used for fitotherapeutic purposes. (Albu A. 2007. Bojor O. 2005). The plant is used in gastronomy for salads, raw or boiled, in various combinations with other vegetables.

For internal use it is used in hypertension, anemia, gout, influenza, leukemia, bronchitis, constipation – the raw root is consumed as a juice. As a result of boiling, some of these components are lost, sometimes even half of their initial concentration.(Bowler Rmeo al.2006, Cuciureanu R, 2005)
Calcium plays an essential role in many cell functions:intracellularly in muscle contraction andglycogen metabolism, extracellularly, in bone mineralization, inblood coagulation and in transmission of nerve impulses.Calcium is present in plasma in three forms: free, bound toproteins or complexed with anions as phosphate, citrate and bicarbonate. Decreased total calcium levels can be associated with diseases of the bone apparatus (especially osteoporosis), kidney diseases (especially under dialysis), defective intestinal absorption and hypoparathyroidism. Increased total calcium can be measured in hyperparathyroidism, malignant diseases with metastases and sarcoidosis.

The magnesium is the fourth most abundant cation in the human organism. It acts as an essential factor of enzymes related to cellular respiration, glycolysis and cross-membrane transportation of other cations as calcium and sodium. The magnesium is essential for the preservation of

the molecular structures of DNA, RNA and Ribosomes. One third of the serum magnesium is bound to protein, mainly albumin, while the other two thirds exists as free ions and a little percentage as anion complexes. The ingested magnesium is absorbed by ntestine and excreted in urine. The dosage is useful in hydroeletrolitic disturbances evaluation. Its serum levels are normal even when there is a body depletion of 20% of magnesium. Low levels of magnesium are more significant and frequent than its excess and symptoms of this depletion do not occur in serum levels higher than 1.0 mg/dL. Several decrease events are related to neuromuscular function as tetany, convulsions, weakness, irritability and delirium. Low levels of magnesium, after myocardium infarction, may indicate a bad prognostic. (Jenab, M et al.2004 ,K. Zih-Perényi 2005, K. Zih-Perényi et al.2005, Son EW et al. 2007, Stan N. et al.2001, Yanik M, et al 2004, Takeda A et a. 2003)

MATERIAL AND METHOD

The dosage of the ions of calcium, iron and magnesium was carried out with the help of a differential pulse voltammetric method using a glassy carbon electrode as working electrode, the electrode of Ag / AgCl (in a KCl 3M solution) as reference electrode and a Pt wire as counter electrode.
Prior to the use, the indicator electrode was polished with 0.3 mm alumina powder, washed in deionized water and then sonicated for 15 minutes in order to remove the residual alumina particles.

The supporting electrolyte was Britton-Robinson buffer of pH = 2.5.

The dosage of the ions of calcium, iron and magnesium was achieved by preparing three standard solutions individually, recording the differential pulse voltammograms and representing the applied current intensity in another graphic according to the concentration of the solution in order to obtain a calibration line by means of which, through interpolation, one can determine the amounts of metal in the red beet juice.

Photometric test using cresolphthalein complexone (CPC)
Principle
Cresolphthalein complexone reacts with calcium ions in alkaline medium forming a red-violet color. Interference by
magnesium is eliminated by addition of 8-hydroxyquinoline.
Reagents
Components and Concentrations
R1: Ethanolamine pH 10.7 750 mmol/L
R2: 2-Cresolphthalein complexone 0.13 mmol/L
8-Hydroxyquinoline 35 mmol/L
Hydrochloric acid pH 1.1 100 mmol/L
Standard: 10 mg/dL (2.5 mmol/L)

Principle of the method
The magnesium from sample bind to the Xylidil blue I (Magon Sulfonate) in alkaline medium forming a colored complex with maximum absorption in 510 nm.
Reagent composition
Potassium bicarbonate 120 mmol/L pH 11.50, EGTA 40 mmol/L, Magon Sulfonate (Xylidil Blue I) 0.18 mmol/L; Dimethylsulfoxide 5% and sodium azide 0.09% w/v. Sodium azide 0.09% w/v; Magnesium chloride (the concentration is stated on the label).
The concentration of this standard was determined using the NIST 3131a nternational Standard
Additional equipment
□□Spectrophotometer able to read at 505 nm (490 - 520).
□□Pipettes and micropipettes.
Assay tubes.
Component - Concentrations:
Reagent R1: Acetat buffer pH 4.5 - 50 mmol/I
Reagent R1a: ascorbique acide - 30 mmol/l
Reagent R2: FerroZine - 5 mmol/I

RESULTS AND DISSCUSIONS

More exactly, we prepared a stock solution of ions of Ca^{2+} de 25 mg Ca^{2+}/100 mL in double-distilled water from which, by successive dilutions, we obtained five concentrations of 2,4,8,16, and 32mg/100 mL calcium ions. We recorded the differential pulse voltammogram of these solutions showing a reduction to -54mV with different intensities proportional to their concentration, the intensity of the applied current being 21.43 μA which corresponds to an amount of 12.46 mg Ca^{2+}/100 mL of boiled juice.

Table nr.1

Conc Ca^{2+} (mg/100 mL)	I (μA)
2	13.12
4	14.69
8	19.06
16	24.68
32	35.00

We prepared a stock solution of ions of Mg^{2+} de 100 mg Mg^{2+}/100 mL in double distilled water from which, by successive dilutions, we obtained five solutions of concentrations of 5, 10, 20, 40, 60 mg / 100 mL magnesium ions. We recorded the differential pulse voltammogram of these solutions showing a reduction to -310 mV with different intensities proportional to their concentration.

Table nr.2

Conc Mg^{2+} (mg/100 mL)	I (μA)
5	4.14
10	5.70
20	7.88
40	12.04
60	15.60

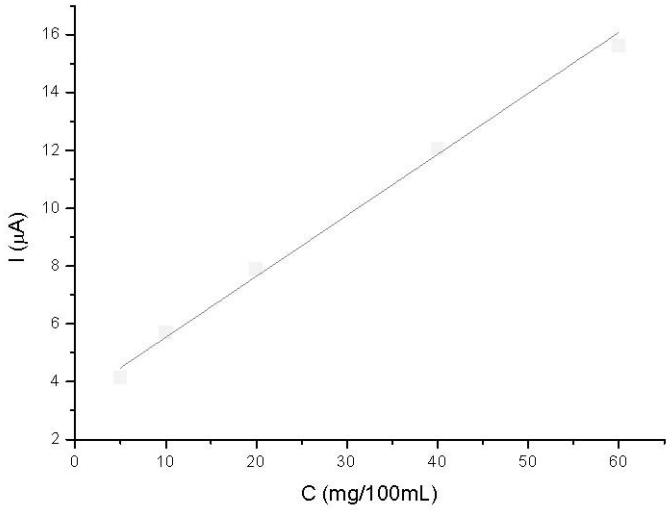

Fig. nr. 1

For the boiled beet juice, we took a certain amount for which we recorded its voltammogram, the intensity of the applied current being of 8.23 μA which corresponds to an amount of 22.94 mg Mg^{2+}/100 mL of boiled juice.

We prepared a stock solution of ions of 10 mg Fe^{3+}/100 mL of which we prepared the dilutions with double distilled water of 0.2: 0.4; 0.8; 1.6 and 3.2mg / 100 ml of iron ions.

The reduction peak for $Fe^{3+\ the}$ was observed at -940 mV, the intensity of the applied current being 0.56 μA which corresponds to the amount of 0.78 mg Fe^{3+}/100 mL of boiled juice.

Table nr.3

Conc Fe^{3+} (mg/100 mL)	I (μA)
0.2	0.35
0.4	0.44
0.8	0.56
1.6	0.80
3.2	1.23

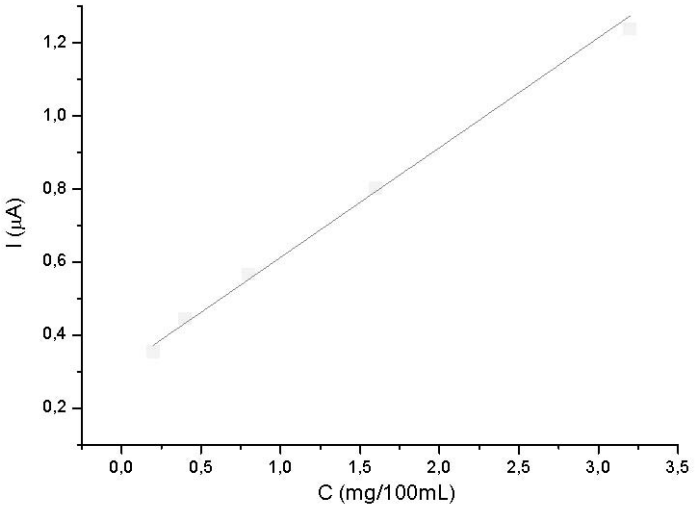

Fig. nr. 2

Calculation.

With standard or calibrator

Calcium [mg/dL] = Sample/Std /Cal x Conc.Std / Cal [mg/dL]

Conversion factor

Calcium [mg/dL] x 0.2495 = Calcium [mmol/L]

The test has been developed to determine calcium concentrations within a measuring range from 0.2 –20 mg/dL (0.05 – 5.0 mmol/L). When values exceed this range samples should be diluted 1+1with NaCl solution (9 g/L) and the result multiplied by 2.,The lower limit of detection is 0.2 mg/dL (0.05 mmol/L).

Calculation

$$\text{Magnesium (mg/dL)} = \frac{\text{Sample Absorbance}}{\text{STD Absorbance}} \times \text{STD Concentration (mg/dL)}$$

Linearity: 4.5 mg/dL.

For values higher than 4.5 mg/dL, dilute the sample with NaCl (0.9%) solution, repeat the assay and multiply the obtained result by the dilution fac

Performance characteristics

Intra-Assay

The realization of 20 determinations of the same sample at the same day showed a Coefficient of Variation of 1.83%.

Inter-Assay

The realization of 10 determinations of the same sample at different days showed a Coefficient of Variation of 2.48%.

Analytical Specificity

A comparison with a reference method showed a correlation coefficient (r) of 0.902 obtained from ambulatory samples. The result equation of the linear regression is Y = 0.996 X +0.038.

Results of photometric method: calcium: 5,95 mg/dl, magnesium: 9,76mg/dl, iron: 7microgram/dl

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CONCLUSIONS

The red beet is a good source of calcium, magnesium and iron which are important for health.

The concentrations obtained using photometric test were much lower , which proves that thermal processing has negative effects on the chemical composition, causing a decrease in the concentration of the ions of calcium, magnesium and iron.

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