

Dietary floury aliments enriched with iron

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Abstract

Iron fortifying products are designated for peoples with special alimentary needs, especially for old people and babies. So, an important role it has chemical composition of fortifying products, so that to satisfy the protein, lipid and carbohydrates need of these people categories.

In this study we have been realized 3 types of flours fortifying with iron, using: semolina, lentil and apricots. The 3 types of flour were: flour with semolina and dry apricots in different concentrations, flour with semolina and lentil in different proportions, flour with semolina (70%), dry apricots (15%) and lentil (15%). Has been determined the humidity, mineral substances (ash), protein content and iron of these flours.

Keywords: floury aliments, iron, lentil, apricot, semolina

1. Introduction

Nutritive flours has the advantage that food composition is more enriched in trofin, while maintaining the feature offered by flour to be preserved because of low humidity. Technology for obtaining nutritional flours are based either on the introduction of vitamins and protein in the classic flour or the mixture of different flours and nutrient additions followed by some heat treatment.

Iron is an essential microelement which exists in all organism cells. The iron average in human organisms is 3.5 g to man and 2.3 g to woman. The iron deficiency in alimentation lead to disease named *Feripriv anaemia* (iron deficiency anaemia) (Niculescu, 2000). In Romania, the incidence is higher to babies and little children, reporting in 1991 by *National Nutrition Study and National Program of Children Nutrition Supervision*, that 50% from children with age between 10-14 months suffers by *feripriv anaemia* deficiency, with possible implication over

velocity increase. Iron deficiency, so as another nutritional deficiency, are in a large way consequence of poorness.

In developing countries iron deficiency affect a significant part of population, especially and long term strategies. Her primordial objective is improvement and maintenance of iron infusion to people, through inclusion in every day diet of aliments enriched in iron. The main natural iron resources are: integral cereals, bean, spinach, beef, yolk. Cereals are one of the main iron resources in every day diet (Costin,1999).

A portion of 30 g cereals has 8 mg iron – the necessary recommended for children with ages between 9 and 13 years. High quantities (harder assimilated) contain parsley root, plums, dry apricot, nettle, potato boil in his parings, almond, lentil (Alexa, 2004).

Researches relived that anaemia caused by iron deficiency is an all world nutritional problem. The experts recommended the

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consumption of iron enriched aliments every day, such as cereals (Hurgoiu, 2004).

Iron is a mineral substance with multiple rolls in organisms, the most important role being the oxygen transportation, through blood. Is an antioxidant and assures the oxygen transport in organism. Also, interfere in the following processes that happen in organisms:

- Interfere in energy production process;
- Adjust the oxygen deficiency to high altitude or for persons with lung affections;
- Helps to DNA synthesis;
- Is involved in vital function for organism, including growing, reproduction and immunity function.

Dried apricot is a good source of vitamin A, alimentary and potassium fibre, having a low content of saturated fats, cholesterol and sodium. Apricot is one of the most important beta-carotene sources, essential element in children growing period. So, this fruits should not be absent from children alimentation (Schwartz, 2000).

Lentil is a vegetable cultivated from along time ago in the whole world, available in all seasons. Is an aliment rich in proteins, minerals and poor in fats. Lentil is appreciated by nutritionists because of their qualities which solidify the organisms. Lentil contains some minerals such as potassium, phosphorus, molibdenum, calcium, zinc and iron.

The most world wise spread form is iron fortification of wheat flour. But the iron incorporation in a complex system, foods, confront with different problems such as oxidation and precipitation. Also, the presence of anti-nutritional factors (phytate) has a negative impact on iron availability, which during thermic process, is unavailable. So, the iron supply come from vegetal aliments (lentil and dry apricots) represent a natural and nutritional method of micro-elements improvement.

2. Materials and Method

Recipe elaboration of iron fortifying flours has been realized from literature studies base and taking count of calorie and nutritional efficiency of flouring aliments and vegetable and fruits products.

Have been chosen as raw materials: semolina, dry apricotm red lentil. Also, it was introduced as additives:antioxidants (ascorbic acid) and thicken agents (starch). Raw material selection with high iron content was based on literature studies, which indicates that the two vegetal products (lentil and dry apricots) as one of the most important regarding iron content.

Have been realized 3 types of flours fortifying with iron:

- A. Flouring product enriched with iron having in composition semolina and dry apricots in different concentrations: 10, 20, 30%, Ascorbic acid – 50 mg/100 g product, Starch – 2%.
- B. Flouring product enriched with iron having in composition semolina and lentil in different proportions: 10, 20, 30%, ascorbic acid – 50 mg/100 g product, Starch – 2%.
- C. Flouring product enriched with iron having in composition semolina (70%), dry apricots (15%) and lentil (15%), Ascorbic acid – 50 mg/100 g product, Starch – 2%.

Crushed raw material has been dosed according with the recipe from above and homogenized using laboratory mill GM 200. Obtained flours were analyzed in laboratory, was determined humidity, mineral substances, protein and iron content. The chemical composition of nutritive flours has been analysed according the standard methods. Iron content in flours has been determined spectrophotometric using Varian SpectrAA 220, protein content using KJELDAHL method according STAS 6283/4-84, mineral substances (ash determination) according STAS 10668-76 and humidity according SR ISO 712.

3. Results and Discussion

The obtained flours present a content of iron between 20.15 – 45.57 ppm. Minimum iron content was found in semolina (19.05 ppm), and maximum content in flours with addition of 30% lentil.

Lentil is catalogued as A degree nutritional aliment, because of the high content of iron (35.2 ppm) and protein and low content of fats. Addition of lentil in nutritive flours lead to the increase of iron content directly proportional with the iron content added. Dry apricot contain 22.4 ppm iron, apricot addition in proportion of 30% in nutritive flours lead to increase of iron content to 35,5% Nutritive mixture flour containing 70% semolina, 15% apricot and 15% lentil gives a content of 40.09 ppm respectively 4 mg/100 g nutritive products. The daily iron need of a child is between 8-10 mg/day, result that 200 mg floury mixture is enough for the organism need of iron.

The mineral substances determined as ash content are given in figure 1.

Ash content of studied nutritive flours, which gives also the mineral substances content is between 0.66-4.2%, with higher values in dry fruits addition case.

Dry apricots give a high mineral substances contribution, the total content of 600 mg minerals/100 g of fruit put the apricots right after bananas and before grapes or oranges in the top of the fruits the most enriched in minerals.

Protein content of analyzed samples is showed in figure 2.

Protein content of the obtained products was realized according kjeldahl method and is between 8.2% for semolina product with 30 % addition of dry apricots and 9.3 % for product with semolina and 30% lentil.

Lentil introduction in alimentation assures a high protein contribution, concomitant with a low fat diet, being an excellent substitute for meat and recommended for peoples with diabetes, because of their low carbohydrates content, with low glycemic index.

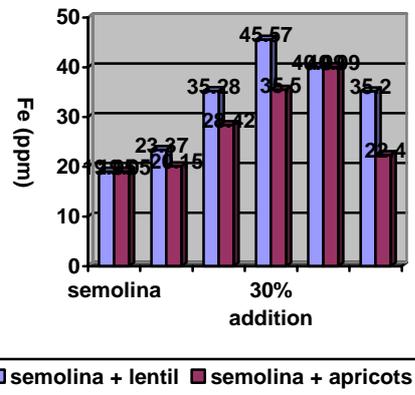


Figure 1. Nutritive flours Fe content.

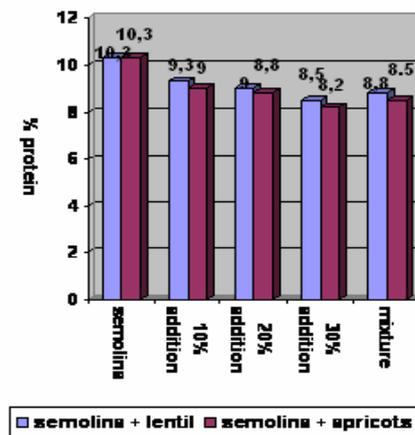


Figure 2. Nutritive flours protein

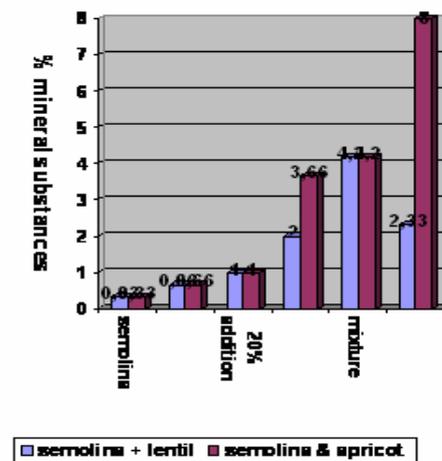


Figure 3. Mineral substances content of nutritive flours.

4. Conclusion

1. Supplementary iron proceed from vegetal products (lentil and dry apricots) represents a natural and nutritional method enriched in micro-elements.
2. Lentil and dry apricots introduction in nutritive flours does not influence the energetic value of product, but increase his biological value, assures a high protein content concurrent with a low fat diet.
3. Addition of 10, 20 and 30% lentil and apricots in semolina assure a rational alimentation accountable to mineral substances and lead to iron content increment
4. Floury product obtained from semolina in proportion of 70%, lentil 15% and dry apricots 15%, bring together the

nutritional values of alimentary matrix used, representing a valuable product in anaemia feripriv treatment

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