

2010

❖ PHASE VI

✚ Achievement at pilot plant-scale of product *"Cake with dehydrated fruits, fortified with iron"*, within S.C. Morărit Panificație Băneasa S.A. (Partner 2)

✚ As fortification agents, there were used the following iron salts:

- Ferrous sulfate $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
- Ferrous gluconate $\text{Fe}[\text{CH}_2\text{OH}(\text{CHOH})_4\text{COO}]_2$
- Ferrous lactate $\text{Fe}(\text{CH}_3\text{CHOHCOO})_2 \cdot 2\text{H}_2\text{O}$

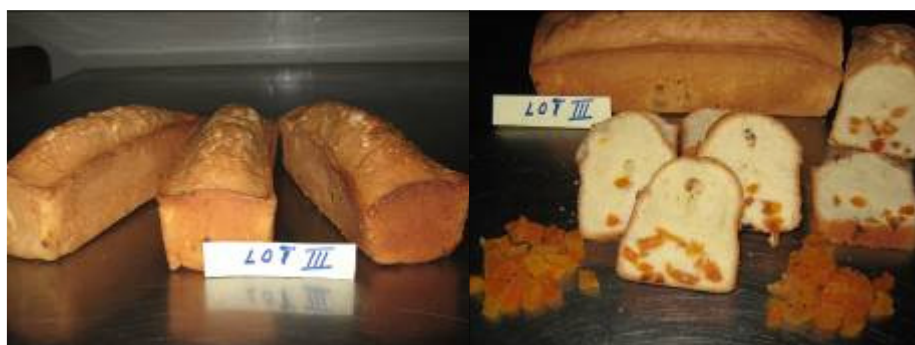
✚ Fortification levels: 40 and 60 mg Fe/kg wheat flour



Cakes with dehydrated fruits, fortified with iron – Batch 1 (40 mg Fe/kg flour, fortification agent – ferrous sulfate)



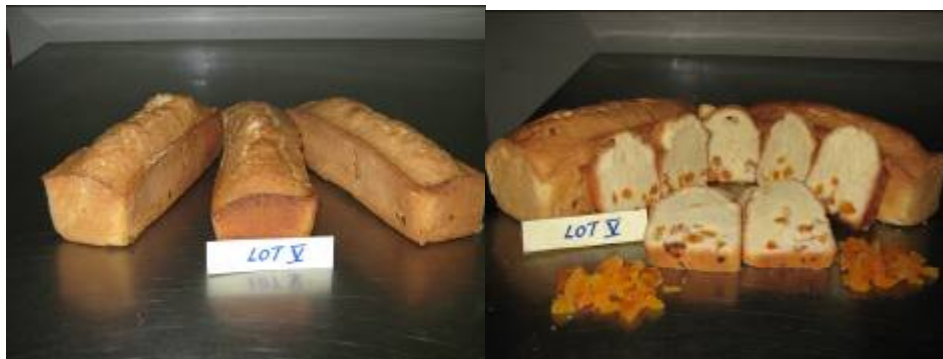
Cakes with dehydrated fruits, fortified with iron – Batch II (60 mg Fe/kg flour, fortification agent – ferrous sulfate)



Cakes with dehydrated fruits, fortified with iron – Batch III (40 mg Fe/kg flour, fortification agent – ferrous gluconate)



**Cakes with dehydrated fruits, fortified with iron – Batch IV
(60 mg Fe/kg flour, fortification agent – ferrous gluconate)**



**Cakes with dehydrated fruits, fortified with iron – Batch V
(40 mg Fe/kg flour, fortification agent – ferrous lactate)**



**Cakes with dehydrated fruits, fortified with iron – Batch VI
(60 mg Fe/kg flour, fortification agent – ferrous lactate)**

✚ Test batches of product **"Cake with dehydrated fruits, fortified with iron"**, achieved at pilot plant scale were analyzed from sensorial, physico-chemical and microbiological point of view.

SENSORIAL ANALYSIS

✚ In the sensorial analysis of **"Cake with dehydrated fruits, fortified with iron"** product, it was found that the used fortification agents (ferrous sulfate, ferrous lactate, ferrous gluconate) do not lead to changes of sensorial characteristics (appearance, color, taste and smell), in comparison with control lot (cakes without adding of dehydrated apricots and non-fortified with iron).

✚ In order to assess sensorial quality, "**Cake with dehydrated fruits, fortified with iron**" product was tested by a panel team with 10 members, using "**Comparison method with unitary score scales**". „*Cake with dehydrated fruits, fortified with iron*" product received qualifying "**very good**".

PHYSIC-CHEMICAL ANALYSIS

✓ "**Cake with dehydrated fruits, fortified with iron**" product, achieved in six test batches, has a high energy value, excelling by glucides (71.13 – 71.44% d.m.), lipides (19.39 – 19.65% d.m.) and proteins (7.96 – 8.14% d.m.) content.

✓ Iron content of "**Cake with dehydrated fruits, fortified with iron**" product, ranged between 2.59–3.23 mg/100g.

MICROBIOLOGICAL ANALYSIS

✓ In microbiological analysis it was found that "**Cake with dehydrated fruits, fortified with iron**" product is from microbiological point of view in the limits of legislation in force.

✚ There were achieved *Standard and Technological instruction*, for the following iron fortified products:

- ✓ **Cake with dehydrated fruits, fortified with iron**
- ✓ **Fruit-based concentrated products, fortified with iron**

✚ There were achieved HACCP case studies, on the technological flow of food products fortified with iron (iron fortified bread products, iron fortified pastry products, iron fortified fruit-based concentrated products).

✚ Iron fortified products, achieved within project, there were clinical tested. For diet-therapy there were chosen products fortified with ferrous sulfate, this compound being considered etalon in valuation of bioavailability of iron salts:

- ✓ *Iron fortified bread*
- ✓ *Cake with dehydrated fruits, fortified with iron*
- ✓ *Plums jam fortified with iron*

These products were included in the daily diet of 30 children (22 boys and 10 girls), 3-12 years old, who presented iron deficiencies.

Clinical testing of the iron fortified products lead to the following conclusions:

- Iron fortified products shown appropriate sensorial properties, being very well

accepted by majority of children.

- Diet-therapy with iron fortified products has influence significant positive statistically on circulating iron values in condition of compliance keeping, suggesting as possible beneficiary interventional measure iron fortification of food products, within communities with high prevalence of iron deficiency.

- There are necessary further studies in order to assess capacity to maintain the compliance in case of constant consumption of iron fortified products and to establish the interventional potential at population level.

✚ It was achieved the transfer of technology for obtaining of bread products and pastry products fortified with iron, at industrial level, within S.C. Morărit Panificație Bănesa S.A. (economical agent, beneficiary of project results and project co-financer). Thus, within S.C. Morărit Panificație Bănesa S.A., there were achieved test batches of the following iron fortified products:

- **Iron fortified bread**
- **Rolls with sun flower and sesame seeds, fortified with iron**
- **Poppy sticks fortified with iron**
- **Cake with dehydrated fruits, fortified with iron**

✚ Test batches of bread products and pastry products fortified with iron, there were analyzed from sensorial, physic-chemical and microbiological point of view.

✚ There were submitted to **OSIM**, *Patent Applications*, for the following food products fortified with iron:

- ✓ **BREAD PRODUCTS FORTIFIED WITH IRON** (Patent Application – A/01187 on 25.11.2010)

- ✓ **CAKE WITH DEHYDRATED FRUITS, FORTIFIED WITH IRON** (Patent Application - A/01188 on 25.11.2010)

- ✓ **FRUIT-BASED CONCENTRATED PRODUCTS, FORTIFIED WITH IRON** (Patent Application - A/01189 on 25.11.2010)

- ✓ **IRON FORTIFIED GLUTEN-FREE BREAD** (Patent Application - A/01190 on 25.11.2010)