

DETERMINING FERUM IN RAW MATERIALS AND READY MADE FOODS

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Ferum(Fe), as a microelement, is present in the organisms of all plants and animals. The main biological function of Ferum is participation in transportation of oxygen and oxidizing processes.

Human daily need for Ferum makes up 10-30 mg. This dosage is supplied with the daily food regimen owing to animal and vegetable products. Major sources of Ferum are grains, liver and meat.

People with the excess of Ferum suffer physical weakness, lose weight, are ill more often. At the same time to get rid of the excess of Ferum is much more difficult than to fill up its deficit. The toxical dosage for a human being is 200 mg, and lethal makes up 7-35 g.

Because of shortage of Ferum in the organism Ferum deficient anaemia (ischemia) develops. Fatigue is the first symptom of Ferum deficiency and anaemia caused with it.

The aim of this work was to determine the presence of Ferum in vegetables, fruit and juices.

During the preparatory stage the most often used techniques of determining Ferum with chemical (gravimetry, redox reaction) and physical-chemical methods (photocolorimetry, potencymetric redox reaction) have been studied.

The preference has been given to the method of photocolorimetry with the use of graduated diagram. The advantages of this method are high sensitivity, accuracy and speed.

Photometric determining of Ferum means that dyad ions of iron interacting with 1,10-orthophenanthroline make up an orange-red complex. Previously the whole of Ferum in the sample has been reduced to Fe(II) with hydroxylamine hydrochloride. The on-stream length of the wave is 490 nm.

The main stages of the conduction of the experiment:

- preparation of original standard and booster solutions;
- the choice of on-stream length of the complex under investigation;
- preparation of a range of standard solutions, measuring their absorbance with the help of photocolorimeter CPhC – 2MP, creating a graduated diagram;

- preparation of probes of the samples under investigation and determining the presence of Ferum(II) in vegetables, fruit and juices.

The results of determining Ferum(II), received while photometric examination of food products of vegetative origin are as the following:

Food product	The presence of Ferum(II) mg/100mg
potato	1,30
carrot	0,83
kiwi-fruit	0,63
honey	0,52
tomato	0,48
apricot	0,47

Food product	The presence of Ferum(II) mg/100mg
orange	0,33
lemon	0,31
apple	0,21
raspberry	0,18
apple juice	0,10
apple-grapes juice	0,12

It should be reminded that Ferum assimilation from the food products makes up about 10%.

So, according to the results of the conducted investigation, the following conclusions can be made:

- 1) The technique of photocolormetric determining of Ferum with 1,10-orthophenanthroline in the foods of vegetative origin is not difficult to perform in the laboratory conditions and can be used for laboratory practice and for further going investigations.
- 2) The disadvantage of this very determination is long lasting preparation of probes of the samples under investigation(vegetables and fruit). To get some transparent juice it's necessary to get it filtered for many times. Moreover, if red or dark coloured juices are to be analyzed it's necessary to get them decolourized (to work them up with the solution of hydroxylamine hydrochloride and boil on a waterbath).

In future it is planned to go on the investigation connected with the seasonal differences of Ferum maintenance in vegetative food products.