RESEARCH ON THE IODIZED OIL

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Abstract: the objectives of this work are researches for obtaining iodized oil that would satisfy the requirements of body in iodine. The sunflower seed oil is a product with the most important value, thus the production of oil fortified with iodine would be a cheap and accessible variant. Production of oil fortified with iodine constitutes a considerable iodine supplement, which, associated to iodine contribution from kitchen salt, would contribute to the eradication of deficiency in iodine.
Key words: iodine, sunflower oil, π type compounds, triglycerides

1. Introduction

At present iodine deficiency is one of main problems that have to be solved. The iodine is an essential oligo-element, whose contents in human body varies from 15 to 23mg, being indispensable for the synthesis of thyroid hormones, which have a primordial importance in the metabolism of cells, especially of cerebral and bony tissue. The deficit of iodine is established in conditions of diminishment of the contribution of this mineral both with food factor, and with drinking water. The deficit of food contribution in iodine has as consequence the deregulation of thyroid function, restraints in physical and psychical development of individual.

The objectives of this work are researches for obtaining iodized oil that would satisfy the requirements of body in iodine. The sunflower seed oil is a product with the most important value, thus the production of oil fortified with iodine would be a cheap and accessible variant. Production of oil fortified with iodine constitutes a considerable iodine supplement, which, associated to iodine contribution from kitchen salt, would contribute to the eradication of deficiency in iodine.

Insufficiency of iodine represents a nutritional problem that severely affects the health of the entire population. The deficit of iodine is an especially actual problem for Moldova as in fine it negatively affects not only the public health but alto the entire social-economic development of the country. It is conditioned by the reduced levels of iodine in the country's natural geographic environment – soil, water, air, plants [1, 2].

Iodine is an essential oligo – element, its content in human organism varies from 15 to 23 mg, it is indispensable for the synthesis of thyroidal hormones (thyroxine – 65%, tri-iodinetrionine – 59%), that are of primordial importance for the cellular metabolism, especially for the cerebral and bone tissues [3, 4].

Sunflower oil is a very common product in Moldova, so the production and consumption of oil enriched with iodine (40 - 50 μg/day), equivalent to the quantity of iodine received with the salt, would allow to reduce the iodine deficiency.

The objective of this work consists in the elaboration of sunflower oil iodination and evaluation of its quality indicators (physical-chemical properties).

2. Preparation of iodinated oil

For the purposes of these investigations we used double refined and deodorized sunflower oil of local production. In order to obtain iodinated oil per one liter of product we added 1g of iodine (I_2) in crystals of type „ХЧ". After the establishment of equilibrium the

oil was further investigated. The iodinated oil had an intensive brown color due to the presence of free iodine. The obtained oil (A) with a total content of iodine of 1mg/ml was diluted in the proportion of 1:100 and so was obtained the product (B) with content of iodine 10μg /ml. From the product (B) by dilution (1:500) was prepared the sample (C) with content of iodine not exceeding 2 μg/ml i.e. much lower than recommended daily rate. The iodinated oils with different content of iodine (A,B,C) served as objects of research for this thesis. All measurements have been done in conformity with the norms STAS – 1129 – 93 [5].

3. Results and discussions

The use of iodinated sunflower oil is an accessible and low cost method. The particular advantage of this method consists in the liposolubility of iodine that facilitates its incorporation in oil. However, it is a very complex phenomenon associated with modifications of physical-chemical properties of the finite product as thereafter discussed in the present work.

Addition of iodine and positioning of double bonds takes place according to a mechanism that implies the formation of compounds of type π, without the breakage of the double bond from the unsaturated fatty acids molecules. There was established that the reaction of formation of π triglycerides-iodine compounds is heat-absorbing reaction. The reaction is described by a kinetic reaction of fist order.

Experimentally it was determined that the iodine index decreases gradually depending on the quantity of iodine added (fig.1).

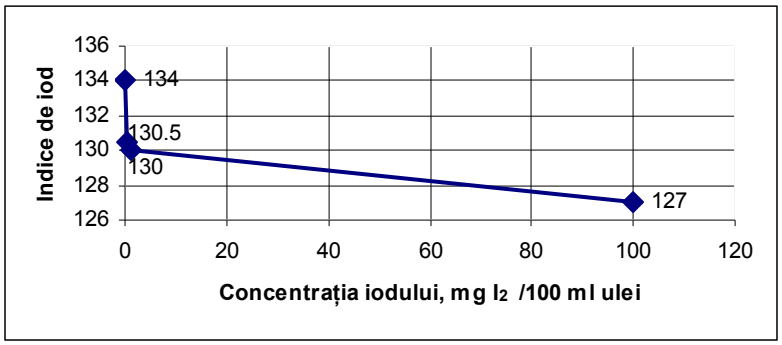

Fig. 1. Evolution of iodine index of oil depending on the quantity of iodine added

The saponification index of iodinated oil doesn't vary considerably compared to the reference sample. This fact demonstrates that the molecular mass of triglyceride doesn't vary during the process of oil iodination. A small increase in the index of saponification for the oil containing 100 mgI_2/100 ml oil (sample A) can be explained by the possible chemical interaction between iodine and hydroxide.

It was determined that the content of free fat acids in the iodinated oil increases for both samples A and B in line with the increase of quantity of iodine added. This fact can be explained by the consumption of certain quantities of KOH for interaction with iodine. The only sample in which the AGL index was exceeded was the sample A that contains 100 mg

I_2/100 ml oil. For iodinated oil containing 0,2 mg I_2/100 ml (sample C) the AGL index doesn't vary compared to the reference sample.

Variation of peroxide index of iodinated oil doesn't vary significantly for oils with small concentration of iodine (samples B and C) compared to the reference sample while for the oil with high content of iodine 100 mg/ 100ml (sample A) it far exceeds the maximum admissible value.

This can be explained by the presence of free iodine in the iodinated oil - sample A.

4. Conclusions

This work demonstrates the possibility of iodination of sunflower oil; iodine doesn't affect the main physical-chemical indices of sunflower oil. Formation of compounds of type π, without the breakage of the double bond from the unsaturated fatty acids molecules assures a high stability of resulting compounds (samples B, C). For this reason the use of iodinated oil for the production of highly accessible foodstuffs (margarine, mayonnaise) represents a particular interest. A small quantity of iodinated oil in foodstuffs doesn't affect the organoleptical and physical-chemical properties of finite products. Use of these products in combination with iodinated salt would allow to prevent the deficit of iodine and the associated incidence of iodine deficiency diseases.

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