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THE IMPORTANCE OF FISH OIL IN THE HUMAN BODY AND METHODS FOR DETERMINING THE QUALITY OF FATS

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Abstract
In this study, we examined the importance of fish oil and fish products in the human body. Fish products are excellent food in terms of protein, vitamin D and micronutrients (even in small amounts, which are very important for the human body). It contains minerals such as phosphorus, sulfur and vanadium that support human growth and tissue development.

Keywords: fish, vitamin, cholesterol, chloroform, chromatograph, galvanometer, calcium oxide, fatty acids.

Introduction

The reason fish is an important source of nutrients is because it provides the body with essential nutrients and reduces the risk of various diseases. For example, it is known that regular consumption of fish, because it contains omega-3, serves as a protective shield for the body, reduces the risk of heart disease and strengthens the immune system [2-8].

On the other hand, fish meat contributes to the formation of healthy teeth and gums, helps to lighten complexion and healthy hair growth, and also provides decent protection against bacterial infections. It is also important in preventing heart attack and has a great effect on keeping your blood cholesterol in rhythm [4-7].

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It also has the ability to energize the body by helping it break down starches and fats. On the other hand, it has a good effect on mental performance. If the required amounts of vitamin D and other minerals in fish are not consumed in the required amounts, diseases such as rickets (bone mortality), diseases of the teeth and gums and thyroid gland can occur [5-11].

Methods for Determination of Fat-Soluble Vitamins A, D, E.

This method uses international standards and current state standards GOST 32043-2012. Based on the requirements of these standards, which will be supplemented and improved by the end of 2018, the amount of vitamins A, D, E contained in agricultural products, food products and livestock will be determined [1-9]

The methods are carried out in accordance with the requirements of the above regulatory documents for scientific research, as well as in the laboratories of oil companies. A more realistic analysis begins when the colorimetric state of the solvents reaches 4-6 green units [3-14].

The concentration of solvents can be restored by mixing with chloroform solution. If necessary, maintain the amount of trichloride by doubling or tripling the amount of the holorimetric solvent. When determining the amount of vitamin A in the amount of A (X1) grams, the amount of 1 g of the product is determined by the following formula:

$$x = \frac{\mathrm{a} \,.\, V \,.20\,.125}{\mathrm{m} \,.\, 1000}$$

Where: a - the number of green units, determined on the basis of colorimetry;

V is the amount of chloroform solution, sm^3;

m - size, g;

20.125} - recalculation of the vitamin A coefficient;

How to calculate the ratio of 1000 milligrams.

The amount of vitamin A (X2) in 1 g of the product in the international unit is determined by the following formula:

$$x = \frac{\mathrm{a} \,.\, V \,.20\,.125}{1000 \,.\, 0{,}3 \,.\, \mathrm{m}}$$

It contains: 0.3 - vitamin A gr. Convert the unit of quantity to the unit of the number of coefficients. The rest of the indicators are determined in the same way.

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Colorimetry on an Electrophotocolorimeter

When determining vitamin A by the electrophotocolorimetric method, the following requirements must be observed:

- Providing measurement (reporting) within 5-10 s;
- To describe good results, correct calculation of the calculated concentration of vitamin A in proportion;
- Providing a maximum permeability of 620 mg from a monochromatic filter;
- Availability of a well-tuned galvanometer, allowing for short retreats;
- Availability of tubes with an inner diameter of 1 cm made of homogeneous (cuvette) colorless glass.

Photoelectric colorimeters such as Shibalov and VNIVI KFE-1 are currently used for analytical work in accordance with the specified requirements. The vitamin A product in the product under analysis is dissolved in chloroform. The content of the specified liquid giving the product to be obtained is 100 in. The unit should be 1 sm^3 of vitamin A. After them, the reports placed on the galvanometer obtained from color reactions formed as a result of 5-6 subsequent divisions should be on a scale of 40-65 on the galvanometer ($\sum$ = 0.22 - 0.45) [6-12].

For the analysis, it is necessary to prepare a solution consisting of three substances, acetonitrile 42: 50: 8, propyl alcohol and distilled water for chromatography and analysis in accordance with the requirements of GOST 32043-2012. Then, 500 sm^3 of propyl alcohol, 450 sm^3 of acitonitrile and 80 sm^3 of distilled water are added to a container (test tube or flask) with a capacity of 1000 sm^3 [10-15]

The solution, stored for one month, is thoroughly mixed for a second analysis, and in order to find a quiet zero point by removing air from it, the mixture is poured into 20-30 free volumes, 2 syringes for a full volume, first a pump chromatograph 50 mm^3 / min, then 100 mm^3 / min will be sent. Continue washing the speaker until we find a quiet zero point. After washing the column, we begin to saturate it with vitamins A and E. To saturate the column, send the working solution from 7-10 concentrated (working) graduated volumes and determine the peak. Until we find the value and difference of 3% [13-16].

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Experimental Part

Preparation of a solution for the extraction of vitamins A, E.

To prepare a two-component extractant (solvent), pipette a mixture of isopropyl alcohol and distilled water in a volume of 97: 3 into a 1000 sm^3 flask using a pipette 30 sm^3 of distilled water and fill the remainder with isopropyl alcohol until it reaches a point. not limited to container.

For a full-fledged experiment, it is necessary to prepare a solution of absolute alcohol. To prepare it, add 500 sm^3 of lysine (30 +/-) g of calcium oxide, 250 sm^3 of ethanol and boil, refrigerate for 6-8 hours. Then the ethanol is boiled (distilled) at a temperature of 64.70 °C.

Determination of a copy of the mass standards for the concentration of vitamin A.

From a standard copy of vitamin A (0.100 +/- 0.002) G. By measuring, we prepare a mixture of absolute alcohol in a flask with a capacity of 50 sm^3. Pour a mixture of absolute alcohol at the indicated point of the flask. 1-2 sm^3 of the resulting mixture into a flask with a capacity of 50 sm^3, fill a part of the flask to the indicated point with absolute alcohol and measure the optical density [17-20].

A solution in a spectrophotometer with a wavelength of 326 nm with a layer thickness of 1 cm.A, X g / sm^3, we determine the amount of vitamin in concentration according to the following formula.

$$x = \frac{D.V.V.p}{\text{m.v.}100.1550}$$

Where: D is the optical density of vitamin A, e.o. in solution;
V1 is the initial volume of vitamin A in the mixture of standard samples cm^3;
V2 is the final volume of vitamin A in the mixture of standard samples cm^3;
P is the density of vitamin A in a standard sample, g / cm^3;
m is the mass of a standard sample of vitamin A g;
V is the volume of vitamin A used in the preparation of the solution, cm^3;
100 - conversion factor;

1550 is the amount of E14 in absolute alcohol in 100% vitamin A solution with an absorption capacity of 326 nm.

The amount of vitamin A in 1 cm3 according to GOST 32043-2012: 0.0310-0.0378g (90000-110000 IU); 0.0619-0.0757g (180000-220000 ME); 0.0774-0.0946 g (225000-

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275000 IU). The results are used to calculate the amount of vitamin A in the standard solution.

Preparing Liquid Chromatography for Processing

Preparation for chromatography is carried out on the basis of regulatory documents for the equipment intended for use. Before starting work, the chromatogram is heated for 15 minutes. Before starting work, the pump is filled with a solution (eluent). As a moving phase, a specific ratio of a mixture of hexane and ethanol of 99.5: 0.5 is determined. This is done with a 289 nm filter. The chart is removed by straightening the drawing tape to 0.3-0.6 cm / min. The column should show a stable zero line after flushing the mix.

To increase the sensitivity and accuracy of each chromatograph, the optimal mode is selected for each chromatography. To fill the columns, it is necessary to add the solution prepared at the request of the standard by 7-10 times and determine its peak. After determining the constant point, work can begin: from 3 to 20 mm3 of the analyzed liquid and a standard solution of vitamins A and E are sequentially introduced into the column. We obtain a chromatogram of a photometric detector with a wavelength of 289 nm.

Then we install a light filter with a working wavelength of 254 nm, in this case we obtain a chromatogram of a standard solution of vitamin D2 and the analyzed solution, the distance between the peaks is shown by the line. The high value of the analyzed vitamins is used to determine the amount of standard samples of vitamins A, D in units of optical density or in millimeters.

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Fish Oil Analysis Results

Samples: No. 1 - Unrefined fish oil

No. 2 - Purified fish oil

Table 1. The composition of fatty acids, determined by gas-liquid chromatography, is presented in the following table

№	Fatty acid		Content, %	
			№1	№2
1.	Lauric	**12:0**	0,24	**0,06**
2.	Myristic	**14:0**	3,96	**1,53**
3.	Myristoleic	**14:1**	0,25	**0,08**
4.	Pentadecane	**15:0**	0,95	**0,25**
5.	Pentade price	15: 1	0,19	**0,23**
6.	Palmitic	16: 0	25,78	**23,46**
7.	Palmitoleic	16: 1	16,74	**10,17**
8.	Margarinovaya	17: 0	0,81	**0,33**
9.	Stearic	18: 0	3,58	**4,05**
10.	Oleic	18: 1 ω9	41,66	**49,55**
11.	Linoleic acid	18: 2 ω6	3,10	**9,27**
12.	Linolenic	18: 3 ω3	1,36	**0,76**
13.	Stearidonic	18: 4 ω3	0,68	**0,12**
14.	Arachidic	20: 0	0,25	**0,10**
15.	Eicosenic	20: 1	0,45	**0,04**
	∑saturated LCD		**35,57**	**29,78**
	∑monoenic residential complexes		**59,29**	**60,07**
	∑polyene LC ω3 and ω6 with 18 carbon atoms		**5,14**	**10,15**

The obtained results on the composition of fatty acids indicate that the presented samples of fish oil contain essential (vital) fatty acids in the range of 5.14 - 10.15% of the total fatty acids.

Conclusion

Fish products are excellent food in terms of protein, vitamin D and micronutrients (even in small amounts, which are very important for the human body). The minerals it contains, such as phosphorus, sulfur and vanadium, support human growth and tissue development.

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