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DETERMINATION OF THE AMOUNT OF VITAMINS IN FISH FOOD

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The need for vitamins in intensive fish farming in ponds and industrial fish farms has already been determined to a large extent. A lack of vitamins in feed during long-term fish farming under high stocking density in ponds, especially in cages and pools, can lead to vitamin deficiency. This causes metabolic disorders, delayed enzyme synthesis, poorer digestibility and the development of fish diseases. As a result, feed costs for growth increase and growth cessation is observed. To prevent vitamin deficiency, it is necessary to provide fish with the appropriate vitamins. Almost all vitamins must be supplied with food in certain quantities, as they are essential for fish nutrition. Fish farmed in closed systems (e.g. salmon, sturgeon, carp) are more sensitive to vitamin deficiency, while fish farmed in ponds are less susceptible to such problems. The experiments were conducted in the laboratory of the State Scientific Center for the Quality and Use of Veterinary Drugs and Food Additives using high-performance liquid chromatography.

$$\text{Vitamin } B_1 = \frac{\text{Spl Area}}{\text{Std Area}} * \frac{\text{Std Wt}}{\text{Spl Wt}} * \frac{50}{10} * \frac{7,5}{50} * \frac{\text{Potency}}{100}, \text{ мг/г}$$

$$\text{Vitamin } B_1 = \frac{692,993}{669,528} * \frac{20,5}{2,0006} * \frac{50}{10} * \frac{7,5}{50} * \frac{99,5}{100} = 7,91 \text{ мг/г}$$

$$\text{Vitamin } B_3 = \frac{\text{Spl Area}}{\text{Std Area}} * \frac{\text{Std Wt}}{\text{Spl Wt}} * \frac{50}{10} * \frac{2,5}{50} * \frac{\text{Potency}}{100}, \text{ мг/г}$$

$$\text{Vitamin } B_3 = \frac{2087,237}{1736,377} * \frac{20,3}{2,0006} * \frac{50}{10} * \frac{2,5}{50} * \frac{99,99}{100} = 3,05 \text{ мг/г}$$

$$\text{Vitamin } B_6 = \frac{\text{Spl Area}}{\text{Std Area}} * \frac{\text{Std Wt}}{\text{Spl Wt}} * \frac{50}{10} * \frac{5}{50} * \frac{\text{Potency}}{100}, \text{ мг/г}$$

$$\text{Vitamin } B_6 = \frac{3443,984}{3359,072} * \frac{20,1}{2,0006} * \frac{50}{10} * \frac{5}{50} * \frac{100}{100} = 5,15 \text{ мг/г}$$

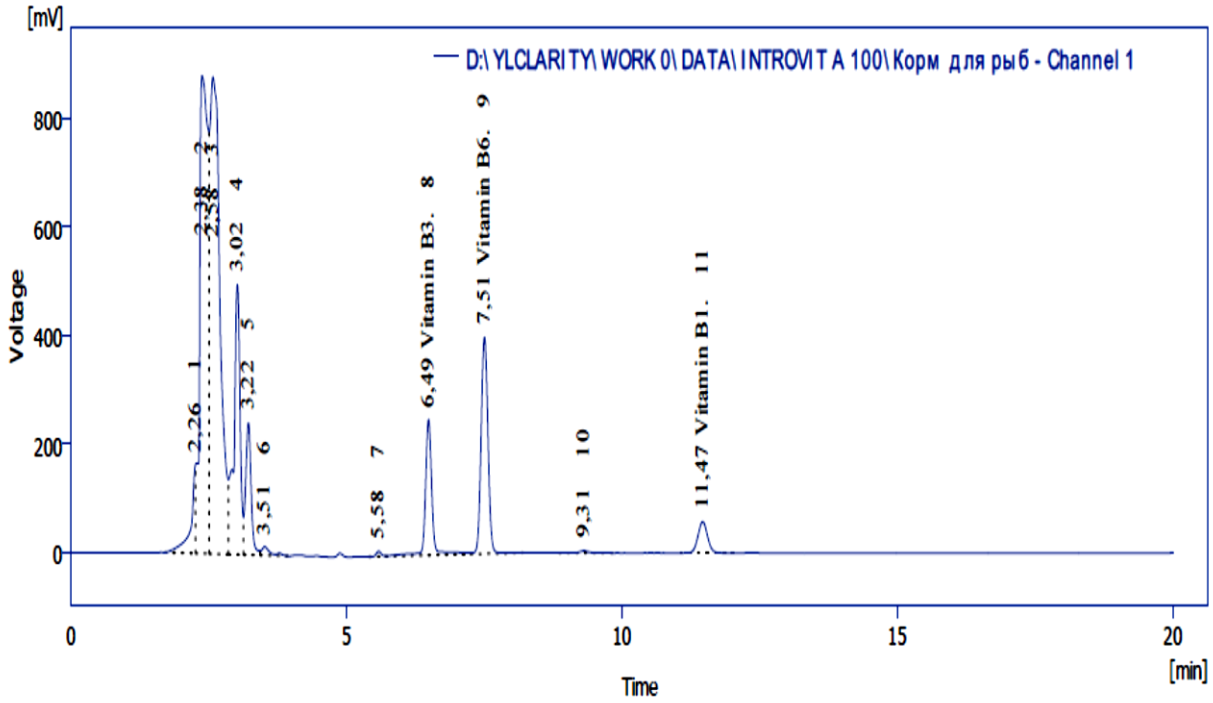

Fig. 1. Diagram showing the amount of B vitamins

Table 1 Amount of B vitamins

№	Vitamins	Spl Area	Std Area	Std Wt	Spl Wt	Potency	Result, *mg/g*
1	B_1	2087,237	20,3	50	2,5	99,99	
		1736,377	2,0006	10	50	100	3,05
2	B_3	3443,984	20,1	50	5	100	
		3359,072	2,0006	10	50	100	5,15
3	B_6	692,993	20,5	50	7,5	99,5	
		669,528	2,0006	10	50	100	7,91

The amount of vitamins of group B in feeds was determined by high-performance liquid chromatography and depicted as a chromatogram in Figure 2. In Table 1 B_1 = 7.91 *mg/g*, which is part of the B vitamins; B_3 = 3.05 *mg/g*; The amounts of B_6 = 5.15 *mg/g* are given.

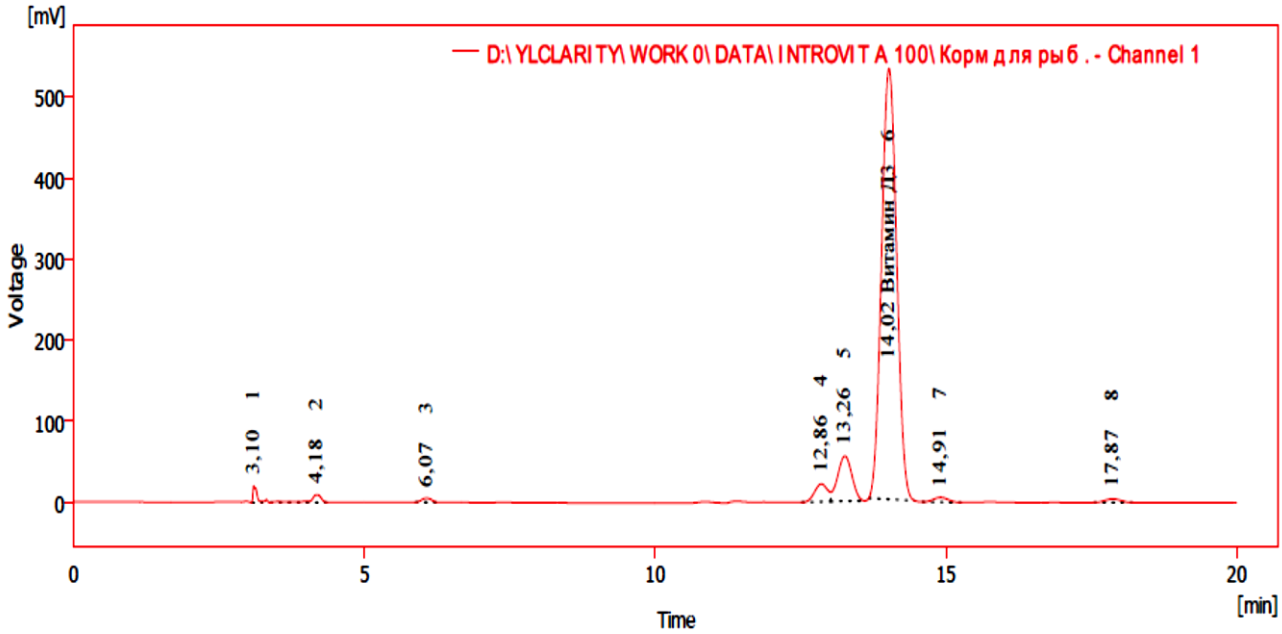

Figure 2. Chart showing vitamin D_3 levels

Table 2

Vitamin D_3 content

№	Vitamins	Spl Area	Std Area	Std Wt	Spl Wt	Potency	Result, *ME/g*
1	D_3(according to the formula)	9582,353	10,3	25	2,5	39920	
	Standard sample	9309,970	5,0004	10	25	100	21158,6

$$\text{Vitamin } D_3 = \frac{\text{Spl Area}}{\text{Std Area}} * \frac{\text{Std Wt}}{\text{Spl Wt}} * \frac{25}{10} * \frac{2,5}{50} * Potency, \; ME/g$$

$$\text{Vitamin } D_3 = \frac{9582,353}{9309,97} * \frac{10,3}{5,0004} * \frac{25}{10} * \frac{2,5}{50} * 39920 = 21158,6 \; ME/g$$

As can be seen from Table 2, the amount of vitamin D_3 in the feed was 21158.6 IU/g. These changes are also confirmed by the chromatograms presented in Figure 2.

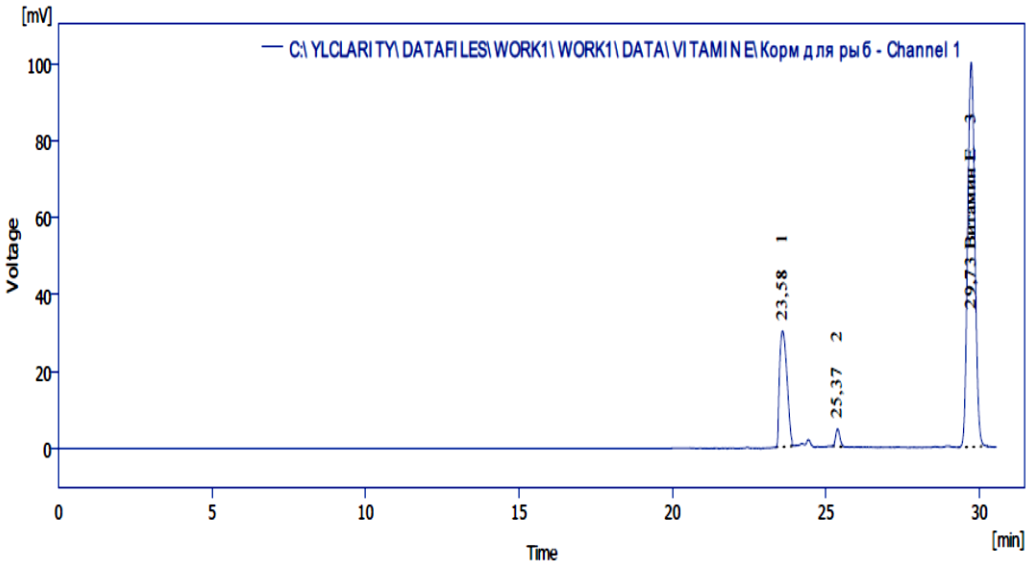

Fig. 3. Diagram showing the amount of vitamin E

Table 3
Vitamin E content

№	Vitamins	Spl Area	Std Area	Std Wt	Spl Wt	Potency	Result, *мг/г*
1	E	1632,126	40,3	25	5	97,5	
		1627,884	1,0008	10	25	100	19,68

$$\text{Vitamin E} = \frac{\text{Spl Area}}{\text{Std Area}} * \frac{\text{Std Wt}}{\text{Spl Wt}} * \frac{25}{10} * \frac{5}{25} * \frac{\text{Potency}}{100}, \text{ мг/г}$$

$$\text{Vitamin E} = \frac{1632,126}{1627,884} * \frac{40,3}{1,0008} * \frac{25}{10} * \frac{5}{50} * \frac{97,5}{100} = 19,68 \text{ мг/г}$$

Table 3 shows that the amount of vitamin E in the feed was 19.68 *mg/g*. These changes are also confirmed by the chromatograms shown in Figure 3. Note: Spl Area is the area of the peak formed from the feed sample; Std Area is the area of the peak obtained from the standard sample; Std Wt is the amount of weighed standard sample, mg; Spl Mass. amount of feed sample, g; Potential purity of the obtained standard sample, % (ME); ME is the international division.

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