INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 3, Special Edition ISE, S&P - May 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i3.1989

METABOLISM, PRODUCTIVE PERFORMANCE OF BRIGHT BREEDS OF LACQUER FOR FEEDING IN THE DIET OF AQUACULTURE SUPPLEMENTS

Tetiana Prylipko
State Agrarian and Engineering University in Podilya, Ukraine
E-mail: tprilipko59@gmail.com

Yevhen Dulkay
Podillia State University, Ukraine
E-mail: tprilipko59@gmail.com

Volodymyr Kostash
Podillia State University, Ukraine
E-mail: kostashv@ukr.net

Volodymyr Tkachuk
Zhytomyr National Agroecological University, Ukraine
E-mail: tkachukvp1975@ukr.net

Tetyana Verbelchuk
Polissia National University, Ukraine
E-mail: ver-ba555@ukr.net

Sergii Verbelchuk
Polissia National University, Ukraine
E-mail: verba5551@ukr.net

Submission: 2/23/2022
Revision:4/15/2022
Accept: 4/20/2022

ABSTRACT

The paper examines the search and development of effective ways to reduce the proportion of grain in feed due to non-grain raw materials and partial or complete replacement of such high-value ingredients as animal proteins, fats, phosphatides, macro-and micronutrients and vitamin-mineral premixes through the use of natural resources of the local raw material base. The main nutrients contained in the protein-mineral supplement of the Dniester River indicate its unique, natural multicomponent composition, so it can be widely used, in particular, as a source of protein, amino acids, vitamins, macro-and micronutrients and possibly others. biologically active substances not yet identified by us. It was found that the brightness of the experimental groups in terms of live weight slightly exceeded the animals of the control group. Bright experimental groups made slightly better use of feed nutrients. Feed costs per 1 kg of live weight gain, they were 6.5-8.4% lower. When feeding the bright research groups *aquaculture of the Dniester River, there is a tendency to increase the strength of their wool. The inclusion of aquaculture additives in the feed helped to increase the concentration in the blood of bright experimental groups of hemoglobin by 0.13-0.38 g (P> 0.05) compared with the control, which indicates an increased level of redox processes in the body. Moreover, the highest content of hemoglobin (12.01 vs. 11.63 g%) was observed in the blood of bright IV experimental group, in the diet of which was compound feed with the inclusion of 15 wt.% Additive. However, the difference in this indicator between the animals of the IV experimental and I (control) groups (0.38 g%) is statically unlikely (P> 0.05).*

Keywords: *Animals, Vitamins, Feed Additive, Diet, Aquaculture, Protein, Blood, Hemoglobin*

1. INTRODUCTION

The expediency of the existence of any branch of animal husbandry is determined not only by economic factors, but also by social and household needs. Sheep farming is a livestock industry that has been a source of a variety of products (wool, meat, milk, sheep, smush, as well as lanolin and intestines for the perfume and pharmaceutical industries), but has been in crisis for almost a quarter of a century. There are more than 500 breeds and 200 intra-breed types of sheep in different directions of productivity in the world. However, most breeds specialize in the production of two main types of products - wool and meat.

As people's needs for sheep products increase, the number of sheep increases and their productivity increases (Vdovychenko, Iovenko & Polish, 2017; Industry of Ukraine in 2011-2015, 2016).

2. LITERATURE REVIEW

The main problem of sheep breeding is the high cost of production. The cost of feed, energy, mechanization has reached the world level, and prices for products dictated by the modern market remain meager - for the manufacturer they are 30-40% of the world. The consequence of these problems is the incomplete use of domestic and world genetic potential of sheep of promising (meat, dairy and fertile) areas of productivity; insufficient selection and technological support of the industry; neglect of already developed methods of reproduction, raising healthy young animals and intensive fattening of lambs (Didora, Kluchevych, 2021; Hospes & Meulen, 2019).

The flora and fauna of water bodies can be an important reserve for replenishing the need for high-protein feeds, feed protein and biologically active substances nowadays.

However, animal husbandry is mainly used in animal husbandry at a time when many products of water bodies - algae, planktonic crustaceans, other aquatic organisms - have not yet become one of the arsenals of feed, despite their exceptional biological value (Hevchuk & Christoffers, 2021).

One of these forages, previously used in animal husbandry, is the aquaculture of the Dniester River, which includes microalgae, crustaceans, ciliates, rotifers, cysts, eggs, larvae, pupae, and other forms of zoophytoplankton in the Dniester (Kryvonohova, 2021).

Given that the natural accumulations of aquaculture provide an opportunity use it for feeding farm animals, there is a need for a comprehensive study of its chemical composition, development of standards and methods of inclusion in the diet, the possibility of replacing grain and other components in the feed, the effectiveness of feeding sheep (Farr, 2019).

The territory of Ukraine has a variety of climatic conditions, feed factors and traditions of sheep breeding of certain breeds. Wool productivity is traditionally considered specific for sheep. However, the sheep industry is potentially rich in the production of human and meat products for human consumption, which are characterized by high nutritional and biological properties. Lacon is a French breed, it has already been partially brought to Ukraine. These sheep have lactation not 305 days, but 150, they have very fat milk (Echols, 2018).

Therefore, the aim of the study was to study the effect of feeding protein-mineral supplements from aquaculture on the productive and slaughter qualities of young sheep of the Lacon breed.

3. RESEARCH PROBLEM

For the scientific and economic experiment, 36 heads of young sheep of the Lakon breed were selected on the farm, which were divided into 3 experimental groups of 12 heads each. Experimental dwarfs of all groups in the comparative period were fed the same basic ration (OR), which consisted of silage of corn, cereal and bean hay, straw and grass pellets with the inclusion of control feed. In the main period of the experiment, the animals of the control group remained on the same basic diet, and the diet of sheep of the 1st experimental group included compound feed containing 3% of aquaculture additives, the 2nd experimental group - 7% (Scales et al. 2000; König et al., 2017).

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 3, Special Edition ISE, S&P - May 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i3.1989

4. DATA AND METHODOLOGY

In order to study the digestibility of feed nutrients, balance of nitrogen and mineral elements (calcium, phosphorus, iron, copper, manganese and others) on the background of scientific and economic experiment conducted physiological (balance) experiment on 3 bright from each group (Broberg, 2020).

The scientific and economic experiment studied the actual amount of feed eaten, the dynamics of live weight and average daily gain, feed costs per unit of growth, the cost of rations, the cost of 1 quintal of growth, wool shearing (natural and washed), wool quality.

The data obtained in the studies were processed biometrically according to generally accepted methods of variation statistics (Prylipko & Sivyk, 1996; Ukraine's foreign trade in goods and services in 2016–2017; Hevchuk & Christoffers, 2021). The difference in performance between animals of different groups was considered probable at $P \leq 0.05$.

5. RESULTS AND DISCUSSIONS

Aquaculture of the Dniester River is a greenish, loose, in the form of small grains mass. At a moisture content of 10-15%, it does not coagulate, quite loose, technological, mixes well with any components intended for the preparation of feed. The study of the chemical composition showed that, in contrast to grain feeds, aquaculture is characterized by a high ash content - 345 g / kg of dry matter, which causes a wide range of mineral elements. Analysis of the obtained data shows that aquaculture is characterized by a high content of crude protein (190-220 g / kg dry matter), including digestible 161-187 g / kg (Dyachenko & Prilipko, 1994; Pașca et al., 2018; Stapay et al., 2013).

Table 1: Chemical composition of hyperhaline aquaculture

Indicator	n	**Content in 1 kg of dry matter**		**Content in 1 kg of natural feed**
		oscillation limit	**average**	
Dry matter, g	21	-	-	850
Zola, g	17	300-450	345±3,50	293±3,1
Organic matter, g	17	700-550	640±4,71	544±4,1
Crude protein, g	17	190-220	206±2,43	175±2,24
Digestible protein, g	17	161-167	170±2,60	144±2,33
Raw fat, g	17	21-23	22±1,30	18,8±0,9
Crude fiber, g	17	20-30	26±1,62	22±1,4
BER,	17	319-437	320±4,22	323±3,9
including: starch	17	11-16	13±1,27	11±1,12
sugar	7	30-40	36±2,31	31±2,16
Table salt, g	15	100-150	124±6,73	105±4,72
Lysine, g	5	5,3-6,5	5,8±0,93	4,9±0,71
Methionine + cystine, g	5	4,7-6,3	5,3±1,12	4,5±0,51
Tryptophan, g	3	4,4-5,1	4,9±0,43	4,2±0,31

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 3, Special Edition ISE, S&P - May 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i3.1989

Calcium, g	9	30-33	32,1±1,30	27,2±1,12
Phosphorus, g	9	15-20	18±0,45	15,3±0,39
Sulfur, g	7	23-30	26,8±1,74	22,8±1,68
Iron, mg	6	3200-3500	3387±13,71	2879±10,1
Copper, mg	6	12-15	13,7±0,92	11,6±0,87
Zinc, mg	7	38-45	42,0±3,30	35,7±3,1
Cobalt, mg	5	1,05-1,50	1,37±0,12	1,16±0,17
Iodine, mg	5	4,5-5,2	4,9±0,33	4,2±0,31
Selenium, mg	5	0,08-0,09	0,084±0,001	0,71±0,001

According to these indicators, it is almost equal to peas (218 and 192 g / kg).

Along with the chemical composition of the additive from aquaculture, it was important to study its productive effect when fed in the diet of young animals. This circumstance was exacerbated by the fact that the supplement was not only included in the diet as a component, but it was supposed to replace the proportion of wheat and table salt in the feed.

During the main period of scientific and economic experiment, with a duration of 211 days, 1012.8 kg of compound feed was fed to the bright spots of each group (12 heads), which amounted to 0.400 kg / goal / day.

In the composition of the compound feed, fed to the brightness of the II experimental group, the amount of additives from aquaculture was 50.34 kg, III experimental - 101.3 kg, IV - 151.9 kg, and V experimental group -202.6 kg instead of equivalent amount of wheat.

The total nutritional value of the diets of the bright experimental groups according to the actual food consumed did not differ significantly. If the diet of control animals contained 1.19 feed units, then in the bright 2-5 experimental groups only 0.02-0.05 feed units, or 1.70 - 4.2% less.

At the same time, bright experimental groups consumed more by 0.8-5.6% of crude protein, and 1.4-7.6 digestible protein, 6.6-29.2 calcium, and 1.4-2 , 5 times more sodium, I, 3-1.6 times sulfur and 1.6-9.9% more potassium, iodine by 14.0-61.4%, iron - 1.3-2.0 times.

The results of studies indicate that the brightness of the experimental groups in live weight slightly exceeded the animals of the control group. P> 5), IV - by 10.1 (P <0.05) and V - by 2.4% (P> 0.05). Moreover, the largest increase in live weight (103.2 g / day) had a bright IV experimental group, and in the compound feed whose share of aquaculture additives was 15% (by weight). With an increase in the share of aquaculture of the Dniester River in feed over 15% (experimental group V), there was a decrease in the increase in live weight brightly, compared with this indicator in animals of experimental group IV.

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 3, Special Edition ISE, S&P - May 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i3.1989

Bright experimental groups made slightly better use of feed nutrients. Feed costs per 1 kg of live weight gain were 6.5-8.4% lower.

Table 2: Dynamics of live mass of experimental bright (n = 12; M ± m)

Indicator	Groups				
	Control	II	III	IV	V
Live weight 1 bright, kg at the beginning of the experiment at the end of the experiment	28,38±0,53 48,25±0,57	28,41±0,47 49,12±0,54	28,47±2,56 49,38±0,61	28,53±0,73 50,41±2,9	28,44±0,61 48,8±0,95
Regarding control,%	100	+1,97	+2,55	+4,88	+1,24
Absolute gain, kg	19,87	20,71	20,91	21,88	20,36
The average daily gain for the entire period of the experiment, g	93,7±6,2	97,7±4,1	98,6±7,5	103,2±7,9	96,0±6,3
Regarding control,%	-	+4,3	+5,2	+10,1	+2,4
Feed costs per 1 kg of live weight gain, feed. units	5,82	5,38	5,36	5,33	5,44
Regarding control,%	100	92,4	92,1	91,6	93,9

Feeding the bright experimental groups of a new feed additive - aquaculture as part of the feed had a positive effect not only on live weight gain, but also on wool productivity. By shearing the washed wool, the brightness of the II - V experimental groups exceeded the control animals by 10-220 g, or 0.3-6.3% (P> 0.05).

Table 3: Wool productivity and wool quality of experimental animals

Indicator	Groups				
	I	II	III	IV	V
Shearing of original wool, kg	5,55±0,25	5,53±0,27	5,64±0,48	5,62±0,66	5,85±0,23
± to control, g %	- -	20 99,6	90 101,6	170 101,3	300 105,4
The output of the washed fiber	62,50±1,12	63,00±1,50	65,35±1,30	65,58±1,62	62,95±1,45
Shearing wool in washed fiber, kg	3,47±0,21	3,48±0,34	3,69±0,22	3,69±0,38	3,68±0,42
± to control, g %	- -	10 100,30	220 106,3	220 106,3	210 106,0
Wool length, cm at the beginning of the experiment at the end of the experiment	7,12±0,55 12,96±1,2	7,16±0,44 12,94±0,86	7,40±0,56 12,58±0,92	7,20±0,48 13,28±0,86	7,40±0,54 13,42±0,95
The increase in wool length for the experiment, see	5,84	5,78	6,18	6,08	6,02
In% to control	100	98,90	105,0	102,4	103,1
Tensile strength of wool, kg	7,06±0,27	8,16±0,33	7,73±0,37	7,66±0,34	7,70±0,36
Fiber thickness (average) μm	20,96±0,41	20,89±0,71	21,63±0,86	21,56±0,66	21,60±0,88
Fat content,%	31,27	30,28	29,54	28,88	28,43
Sweat content,%	27,65	29,13	28,66	28,79	28,64

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 3, Special Edition ISE, S&P - May 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i3.1989

Regarding the yield of washed fiber, in bright III and IV experimental groups it was higher than the control by 2.65 and 3.06%. In the bright II and V experimental groups, this indicator outperformed the control by only 0.50 and 0.49%.

The length of the fibers in the bright experimental groups with the exception of the second experimental group exceeded the control by 0.32-0.62 cm (table 3).

According to the optimal data, the fiber thickness in the bright II of the experimental group was at the level of control, and in the animals of the III and V experimental groups did not exceed the control by 0.6-0.67 μm, respectively.

When feeding the bright research groups aquaculture of the Dniester River, there is a tendency to increase the strength of their wool.

In the study of mineral metabolism, it was noted that in the body of bright II, III, IV and V experimental groups were deposited by 0.24; 0.65; 0.94; And, 25 g of calcium more than in control animals.

Regarding phosphorus metabolism, the animals of the experimental groups differed from the control by 0.01-0.1 g more excretion of phosphorus in the urine. As a result, 0.03-0.05 g less phosphorus was deposited in the body of bright II and III experimental groups than in the control.

Animals in the experimental groups differed from controls with high sulfur balance. In particular, in bright II, III, IV and V experimental groups in the body was postponed by 0.07; 0.16; 0.38; 0.31 g of sulfur more than in control animals.

Given the fact that aquaculture supplements are characterized by a high concentration of iron, in the balance experiment on the bright studied the nature of its metabolism in the body. The iron balance was positive in all subjects - 40.6 - 77.5 mg.

The study of copper metabolism in the body of the experimental subjects showed that the balance of copper in the brightness of all experimental groups was positive and amounted to 4.73-5.13 mg. However, it should be noted that in the body of animals of the experimental groups deposited copper by 0.27-0.40 mg or 1.1% more than in the control.

The balance of other mineral elements (potassium, sodium, magnesium, manganese, cobalt) in the brightness of all experimental groups was positive and there was no significant change between the group differences.

As is known (Prylipko, et al., 2019; Prylipko et al., 2021), minor deviations in animal feeding cannot have a significant effect on their homeostasis. However, analyzing blood parameters, it is still possible to trace the nature of changes in metabolism depending on the studied factor.

Table 4: Biochemical parameters of the blood of the test subjects

Indicator	Group				
	Control	research			
	I	II	III	IV	V
Hemoglobin, g%	11,63±0,30	11,76±0,18	11,90±0,20	12,01±0,36	12,17±0,16
Erythrocytes, million / mm3	12,00±0,20	12,20±0,14	12,42±0,12	12,76±0,29	12,17±0,16
Leukocytes, thousand / mm3	6,05±0,26	6,15±1,00	6,73±0,30	6,83±0,25	6,21±0,18
Total protein, g%	7,60±0,08	7,83±0,04	8,10±0,16	8,09±0,13	8,12±0,10
Albumins, g%	3,74±0,08	3,76±0,15	3,84±0,13	3,87±0,10	3,85±0,08
α - globulins, g%	0,91±0,25	0,96±0,04	1,07±0,08	1,07±0,07	1,05±0,08
β - globulins, g%	0,91±0,06	0,97±0,03	0,96±0,10	1,05±0,10	0,98±0,04
γ - globulins, g%	2,05±0,17	2,15±0,16	2,28±0,33	2,10±0,25	2,23±0,14
Reserve alkalinity	597±13,24	596±14,39	603±3,79	593±6,28	609±5,12
about% CO2	5,62±0,16	5,84±0,20	5,99±0,18	6,13±0,06	6,03±0,07
Inorganic phosphorus, mg%	12,99±0,38	12,87±0,18	13,73±1,93	14,01±0,10	13,69±0,37
Calcium, mg%	22,02±0,16	22,05±0,15	22,60±0,30	23,14±0,14	22,90±0,13
Sugar, mg%	74,80±1,75	75,93±2,20	75,57±2,06	76,60±2,35	77,00±1,54
Sulfur, mg%	1,42±0,10	1,49±0,07	1,63±0,10	1,67±0,04	1,76±0,10
Catalase, od. H2 O2	16,33±0,91	16,00±0,28	17,33±0,92	18,67±0,62	18,67±0,22
Peroxidase, sec	5,65±0,19	5,93±0,04	6,09±0,05	6,15±0,10	5,98±0,10

The inclusion of aquaculture additives in the feed helped to increase the concentration in the blood of bright experimental groups of hemoglobin by 0.13-0.38 g (P> 0.05) compared with the control, which indicates an increased level of redox processes in the body.

Moreover, the highest content of hemoglobin (12.01 vs. 11.63 g%) was observed in the blood of bright IV experimental group, in the diet of which was compound feed with the inclusion of 15 wt.% Additives from aquaculture. However, the difference in this indicator between the animals of the IV experimental and I (control) groups (0.38 g%) is statically unlikely (P> 0.05).

The blood of bright experimental groups was characterized by a higher content of erythrocytes. In particular, in the blood of animals of II, III, IV, V experimental groups there were more of them compared to the control by 0.20 (P> 0.05), 0.42 (P> 0.05), 0.76 (P <0). , 05) and 0.17 million / mm3 (P> 0.05).

Feeding the bright research groups of aquaculture supplements improved the enzymatic activity of the blood.

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 3, Special Edition ISE, S&P - May 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i3.1989

Characterizing the studied blood parameters of the subjects as a whole, it can be noted that they were all within the physiological norm.

6. CONCLUSIONS AND RECOMMENDATIONS

1) The basic nutrients contained in the protein-mineral supplement indicate its unique, natural multicomponent composition, so it can be widely used, in particular, as a source of protein, amino acids, vitamins, macro-and micronutrients and possibly other, as yet unidentified us biologically active substances.

2) Aquaculture, which includes microalgae, crustaceans, ciliates, rotifers, pupae and other forms of zoophytoplacton, the protein content (190-220 g / kg) and crude ash 300 - 400 g / kg can be classified as a protein-mineral supplement and can be used , as a new tool for partial replacement of grain components, in particular wheat, in compound feeds (15-20% by weight) for young sheep.

3) Protein-mineral supplement from aquaculture when used in feeding sheep does not adversely affect the digestibility of nutrients. Regardless of the content of additives in animal feed, there is a tendency to increase the digestibility of protein, crude fat and BER. The digestibility of fat at 15% of the additive in the feed increases significantly by 8.2% ($P < 0,05$).

REFERENCES

Broberg, M. (2020). Transforming the European community regulation of food safety. **Swedish Institute for European Policy Studies, Stockholm,** 10(3), 70-75.

Craig, P. (2002). The evolution of the single market. **The law of the single European market: Unpacking the premises**. 34-39.

Didora, V., & Kluchevych, M. (2021). Soybean productivity depending on the elements of organic cultivation technology in the short-term crop rotation of Ukrainian Polissia. **Scientific Horizons,** 24(2), 77-83.

Dyachenko, L., & Prylipko T. (1994). The use of hyperhaline aquaculture of the Azov region in the rations of sheep. **Tr. Inst. of Animal Husbandry of the Steppe Areas of UAAS,** 66, 113-115.

Echols, M. (2018). Food safety regulation in the European Union and the United States: Different cultures, different laws. **Columbia Journal of European Law**, 4(3), 1203-1210.

Farr, S. (2019.) Harmonization of technical standards in the EU. **Chancery Law Publishing, London.** 17, 23-29

Hevchuk, A. V., & Christoffers, B. (2021). Methodological support for the analysis of debt security in agribusiness and measures to improve its level. **Scientific Bulletin of Mukachevo State University. Series “Economics**, 8(3), 18-30.

Hospes, O., & van der Meulen, B. (2019). Fed up with the right to food? **The Netherlands' policies and practices regarding the human right to adequate** food. https://www.wur.nl/nl/Publicatie-details.htm?publicationId=publication-way-333739313736.

Industry of Ukraine in 2011-2015. 2016. (2016). **Statistical collection**. Pp. 183-222.

König, E. Z., Ojango J. & Audho J. (2017). Live weight, conformation, carcass traits and economic values of ram lambs of Red Maasai and Dorper sheep and their crosses. **Tropical Animal Health and Production,** 49,121–129. DOI: 10.1007/s11250-016-1168-5.

Kryvonohova, I. H. (2021). Conceptual approaches to the development of a strategy for innovation and investment activity in a food enterprise. **Scientific Bulletin of Mukachevo State University. Series "Economics**", 8(3), 60-66.

Most Popular 'Sheep Breeds' Raised For Meat And Wool. The Self Sufficient Living. URL: http://theselfsufficientliving.com/breeds-of-woolmeat-and-dairysheep/-12-01-2018

Pankratova, V. (2021). General principles of law as a source of European Union law. **Legal Horizons**, 14(2), 111-117.

Pașca, I., Cîmpean, A., & Pusta, D. (2018). Carcass Characteristics of Purebred Tsurcana Lambs and F1 Crossbreds (Tsurcana ×Vendeen). **Bulletin of University of agricultural sciences and veterinary medicine,** 75, 87–91. DOI: 10.15835/ buasvmcn-vm:005717

Prylipko, T. (1996.) Hyperhaline aquaculture - an effective substitute for grain in feed for sheep . **Sheep breeding. РеСП. Interdepartmental thematic scientific collection,** 29, 39-44.

Prylipko, T., & Sivyk, T. (1996). Influence of feeding of hyperhalic aquaculture on productivity of repair ditches**. Proceedings of the international conference dedicated to the 125th anniversary of the birth of MF Ivano**v, 144-145.

Prylipko, T., Koval, T., Kostash, V., Shuliar, A., Tkachuk, V., & Shuliar, A. (2021). Adaptive changes in the ornithine cycle and amino acid synthesis in sheep liver with different meat productivity. **Independent Journal of Management & Production**, 12(6), 632-S645. DOI: https://doi.org/10.14807/ijmp.v12i6.1751

Prylipko, T., Suprovych, T, & Shutyak, O. (2019). The effect of feeding protein-mineral supplements from aquaculture on productivity and metabolism in the bright. - **Tavriya Scientific Bulletin, TSATU**. 107, 56-63

Scales, G., Bray, A., Baird, D. (2000). Effect of sire breed on growth, carcass, and wool characteristics of lambs born to Merino ewes in New Zealand. **New Zealand of Agricultural Research,** 43, 93–100. DOI: 10.1080/00288233.2000.9513412

Sivyk, T. (2003). Experimental justification of the efficiency of use in feeding of agricultural animals of protein-mineral supplements from hypergalene zoophytoplankton. Author's abstract. **DIS. ... DocT. S.-G. Sciences: 06.02.02 - Feeding of animals and feed technology**.

Stapay, P, Paranyak, N., & Tkachuk V. (2013). Physico-chemical properties of wool and fat of ewes under conditions of use in diets of different levels of iodine. **Bulletin of Agrarian Science of the Black Sea Coast,** 4 (76), 150–154.

Szajkowska, A. (2012). Regulating food law: Risk analysis and the precautionary principle as general principles of EU food law.. https://research.wur.nl/en/publications/regulating-food-law-risk-analysis-and-the-precautionary-principle.

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 3, Special Edition ISE, S&P - May 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i3.1989

Ukraine's foreign trade in goods and services in 2016. 2017. (2017). 55.

Vdovichenko, Y., Iovenko V., &, Zharuk P. (2016). The state and scientific support of the sheep industry in Ukraine. **Scientific journal "AskaniaNova**", 9, 3–16.

Vdovychenko, Y., Iovenko, V., & Polish, A. (2017). Sheep breeding of Ukraine. **Agrarian Science,** 46–264.

Yakovchuk, V. (2012). New technology of intensive fattening of young sheep. Scientific **Bulletin "Askania-Nova**", 5(1), 215–223.