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**Farionik T.V.** Candidate of Veterinary Sciences, Associate Professor  
*Vinnitsia National Agrarian University*  
**Boychuck V.M.**, teachers  
**Glavatchuk V.A.**, teachers  
*Technological and Industrial College VNAU*

### ***USE OF CREAM COMPOUNDS (METHYONINE) OF COPPER IN RICE***

*In the complete feeding of animals, including pigs, an important role is given to mineral elements, because they take an active part in the metabolism, provide normal conditions for the work of all internal organs, muscles and nervous system.*

*Mineral substances are used by the body of animals as a structural material, they participate in the enzymatic processes of digestion, absorption, synthesis, decomposition, as well as the allocation of metabolic products from the body. Positively affect the activity of enzymes, hormones, vitamins, stabilize acid-alkaline balance and osmotic pressure. They affect the function of hematopoiesis, endocrine glands, protective reactions of the organism, microflora of the digestive tract, participate in protein biosynthesis, strengthen the permeability of cell membranes, and the like.*

*It was established that the inclusion of pigs in mixed-ligand complex of copper in the composition of the diet positively influences the dynamics of growth of live weight of animals. In particular, it was found that feeding it to subsistence pigs at doses of 18.0g and 20.0g per ton of mixed feed causes a probable increase in average daily increments of 24 and 28g or 10.5 and 12.2%, and has a positive effect on the growth dynamics throughout growing season. The feeding of the supplements has a positive effect on the slaughter indices, in particular, increases the pre-slaughter weight to 7.6% and the slaughter mass - 7.5%. According to the results of the chemical analysis of the muscle tissue feeding the additive does not cause a likely effect on the moisture and dry matter content, but it determines a tendency to decrease the fat content by 7.8% and 5.8%*

**Keywords:** piglets, microelements, chelates, copper

**Tab. 3. Ref. 7.**

**Formulation of the problem.** Intensification of the pig breeding industry requires the breeding of highly productive young, capable of providing high growth energy under the good conditions of its maintenance and full feeding.

Taking into account that full feeding of pigs in most farms of Ukraine is provided with pre-starter mixed fodders of imported production, this leads to an increase in the cost price of pork. In addition, the traditional sources of trace elements in these mixed fodders are mineral salts in the form of sulfate and chloride compounds, whose bioavailability is 12-35%, which leads to pollution of the environment by heavy metals, and the crystallized water contained in sulfate molecules in the premixes destroys vitamins and other biologically active substances [4, 7].

**Analysis of recent research and publications.** The degree of absorption of trace elements is increased by the use of feed additives with trace elements of organic origin, whose representatives are mixed-ligand complexes of trace elements

(chelates). In full feeding of animals, including subsphenomenon pigs, this is important because they are actively involved in metabolism, providing normal conditions for the work of all internal organs, muscles and nervous system.

Taking into account the fact that in the first days of life in subs pigmented piglets there is a lack of iron in the body, which may lead to anemia, it is necessary to add Ferrum supplements to their diet and in sufficient amount of Copper, since the latter catalyzes the inclusion of Ferum in the structure of home and is an indispensable synthesis activator hemoglobin and erythrocyte maturation stimulator. When cooking subs sic pigs with Ferum, Copper, and Cobalt salts or with the injection of ferum-containing drugs, hemoglobin content and the number of red blood cells increase, piglet growth and development improves, and their resistance to diseases improves [1]. Therefore, today the study of the effect of this element in the composition of the mixed-alloy complex in the pre-starter feed is very relevant [3, 5].

**The purpose of our work was** to investigate the effectiveness of feeding different doses of mixed-ligand complex Copper in the composition of feed for subspaces.

**Objects and methods of research.** The research was conducted in the conditions of the farm "Shcherbich" of the Litinsky district. For the experiment, five groups of subspaces of large white breed were selected at three-day age, with 10 heads in each. Determination of the live weight of subspigmented piglets was carried out at 3, 15 and 28 days of age. Outparted piglets at the age of 28 days.

From the third day till the period of weaning the pigs of the first control group were fed pre-starter feed, which included Copper sulfate in the amount of 14.0 g per ton of mixed fodder. For piglets of the 2nd experimental group consisting of feed pre-starter, Copper sulfate was replaced with the mixed-metal complex of this metal in the same amount. In the 3rd experimental group fed full-fodder mixed fodder with mixed-alloy complex of Copper in the amount of 16.0, 4 th – 18.0, and the 5th – 20.0 g/ton combined (Table 1).

At the end of the 28-day-old test of supplements, the animals started feeding the main diet and continued to hold in groups until they reached a 100 kg dead weight. At the end of the scientific and economic experiment, a control slaughter of animals was performed on four heads of the group, during which the pre-slaughter weight, slaughter mass, slaughter output, content in the muscle tissue of moisture and dry matter were determined.

**Research results.** One of the main indicators characterizing the state of metabolic processes and their anabolic orientation is the average daily gain and live weight of animals when introducing the mixed-ligand complex of Copper.

According to the results of studies of feed feeding to piglets in full-fodder feed of the mixed-liqueur complex of Kuprum in the amount of 14 and 16 g/t did not have a significant impact on the productivity of piglets, in which productivity increased by 1.7% and 5.2%, respectively.

Table 1

Scheme of experiment

Group	Number of animals	Investigated factor
I control	10	Full-time feed with Copper sulfate 14,0 g/t
II experimental	10	Full-time feed with mixed alligand complex Copper 14,0 g/t
III experimental	10	Full-time feed with mixed alligand complex Copper 16,0 г/т
IV experimental	10	Full-time feed with mixed alligand complex Copper 18,0 г/т
V experimental	10	Full-time feed with mixed alligand complex Copper 20,0 г/т

With an increase in the number of additives, daily average increments increased. So the best effect from feeding the feed supplement was evident in the fourth and fifth experimental groups (at doses of the mixed-liqueur complex of Kuprum 18.0 g and 20.0 g per ton of feed), where there was a probable increase in average daily increments of 24 and 28 g or 10, 5 and 12.2%

The dynamics of live weight of chicken piglets is given in table 2.

Table 2

Dynamics of live weight of piglets, M±m, n=10

Group	Age of pigs, days		
	3	15	28
1 control	1,40±0,01	4,1±0,04	7,1±0,09
2 experimental	1,5±0,01	4,0±0,04	7,3±0,09
3 experimental	1,4±0,1	4,2±0,30	7,4±0,03
4 experimental	1,5±0,04	4,0±0,03**	7,8±0,13**
5 experimental	1,5±0,07	4,5±0,03**	7,9±0,04****

Observations on the intensity of growth of animals during growing and fattening indicate that experimental animals fed a mixed-aligand complex of Kuprum during the subsistence period had better growth dynamics and, respectively, higher live weight during the slaughter period.

As can be seen from the data given in Table 3 in pigs of the fifth experimental group, the live weight was the highest and exceeded the weight of piglets of the 1st control group by 7.6%. It should be noted that the pigs of the 2nd and 3rd experimental groups reached a live weight of 100 kg at the age of 170 and 169 days, the 4th – 167 and the 5th – 165 days, while the piglets of the 1st control group in age 173 days. In the animals of the fourth and fifth experimental groups, the probable increase in slaughter mass was noted at 5.8 and 7.5%, while the probable difference was not found in the mortality rate. The difference in the mass of internal fat, weight of the head and skin between control and experimental animals was a characteristic trend.

According to the results of the chemical analysis, no significant changes were found between the moisture and dry matter components in the muscle tissue.

Only the tendency to decrease the fat content in dry matter is noted at 7.8 and 5.8% (table 3).

Table 3

Indicators of slaughter and the chemical composition of muscle tissue,  $M \pm m$ ,  $n=4$

Indicator	Animal Groups				
	1control	2experimental	3experimental	4experimental	5experimental
Pre-slaughtered live weight, kg	102,1±1,49	103,3±1,84	107,5±2,07	108,5±1,80	109,9±1,00*
Slaughter mass, kg	70,0±0,81	71,4±1,104	71,1±1,29	74,1±1,00*	75,3±1,22**
Slaughterhouse Entrance, %	67,2±0,30	67,3±0,62	67,4±1,03	67,7±0,82	67,6±0,91
Content in moisture, %	72,9±0,20	73,1±0,26	73,1±0,27	73,2±0,56	73,3±0,28
Dry substances, %	27,1±0,31	26,9±0,31	26,9±0,27	26,8±0,34	26,7±0,32
protein, %	20,1±0,25	20,1±0,31	20,4±0,32	20,4±0,28	20,3±0,42
fat, %	5,1±0,12	5,2±0,124	4,9±0,14	4,7±0,03	4,8±0,114
ash, %	1,9±0,017	2,00±0,33	1,8±0,09	2,00±0,16	1,9±0,09

**Conclusions 1.** Feeding of subsistence pigs in full-feed compound of mixed-ligand complex Copper in doses of 14 and 16 g/t does not cause a probable effect on the productivity of piglets, but increases daily average increments by 1,7 and 5,2%, respectively.

2. It was found that feed in the mixed fodder of mixed-ligand complex Copper in the subsistence period at doses of 18.0 g and 20.0 g per ton of mixed feed causes a probable increase in average daily increments of 24 and 28 g or 10.5 and 12.2%.

3. The consumption of the subsistence pigs in the mixed-liqueur complex of Copper in doses of 14 g, 16 g, 18 g and 20 g per ton of mixed fodder has a positive effect on the growth dynamics throughout the growing season, and reduces the age of achieving live weight in animals at 100 kg at 3, 4, 7 and 8 days respectively.

4. The feed in the composition of the mixed fodder of subsistence pigs of the mixed-ligand complex Copper in doses of 18.0 g and 20.0 g increases pre-slaughter live weight of pigs by 5.8 and 7.5%.

5. The introduction of an additive in the composition of feed for young pigs in a dose of 20.0 g per ton of compound feed increases the mortality by 7.5%, but does not cause a significant effect on the slaughter output.

6. The feed in the composition of mixed pigs of subsistence piglets of mixed-ligand complex Copper in doses of 18.0 g and 20.0 g per ton of feed does not cause a probable effect on the moisture and dry matter content of muscle tissue, however, it tends to reduce the fat content of dry matter on 7.8 and 5.8%.

**Prospects for further research.** Further research will focus on the effects of feeding the mixed-aligand complex of Kuprum on the productivity of pigs throughout the growing and fattening period and the effect of this additive on the digestibility of feed nutrients in animals of this species.

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**АНОТАЦІЯ**  
**ВИКОРИСТАННЯ У РАЦІОНАХ ПОРОСЯТ ХЕЛАТНИХ КОМПЛЕКСІВ**  
**(МЕТИОНАТІВ) КУПРУМУ**

**Фаріонік Т.В.**, кандидат ветеринарних наук, доцент  
Вінницький національний аграрний університет  
**Бойчук В.М.**, викладач  
**Главатчук В.А.**, викладач  
Технологічно-промисловий коледж ВНАУ

У повноцінній годівлі тварин, у тому числі й поросят-сисунів, важлива роль відводиться мінеральним елементам, тому що вони беруть активну участь в обміні речовин, забезпечують нормальні умови для роботи всіх внутрішніх органів, м'язів і нервової системи.

Мінеральні речовини використовуються організмом тварин як структурний матеріал, вони беруть участь у ферментативних процесах травлення, всмоктування, синтезу, розпаду, а також виділення продуктів обміну з організму. Позитивно впливають на активність ферментів, гормонів, вітамінів, стабілізують кислотно-лужну рівновагу і осмотичний тиск. Вони впливають на функції кровотворення, ендокринних залоз, захисні реакції організму, мікрофлору травного тракту, беруть участь у біосинтезі білка, зміцнюють проникність клітинних мембран тощо.

Встановлено, що включення до складу раціону свиней поросят змішанолігандного комплексу Купруму позитивно впливає на динаміку росту живої маси тварин. Зокрема виявлено, що згодовування його підсисним поросяткам у дозах 18,0 г і 20,0 г на тонну комбікорму викликає вірогідне підвищення середньодобових приростів на 24 та 28 г або 10,5 та 12,2 % та має позитивний вплив на динаміку росту впродовж усього періоду вирощування. Згодовування добавки позитивно впливає на показники забою, зокрема підвищує передзабійну масу до 7,6% та забійну масу – 7,5%. За результатами хімічного аналізу м'язової тканини згодовування добавки не викликає вірогідного впливу на вміст вологи та сухої речовини, проте зумовлює тенденцію до зменшення вмісту жиру на 7,8 та 5,8%

**Ключові слова:** поросята, мікроелементи, хелати, купрум  
**Табл.3. Літ. 7.**

**АННОТАЦИЯ**  
**ИСПОЛЬЗОВАНИЕ В РАЦИОНЕ ПОРОСЯТ ХЕЛАТНЫХ КОМПЛЕКСОВ**  
**(МЕТИОНАТОВ) МЕДИ**

**Фарионик Т.В.**, кандидат ветеринарных наук, доцент  
Винницкий национальный аграрный университет  
**Бойчук В.Н.**, преподаватель  
**Главатчук В.А.**, преподаватель  
Технологически-промышленный колледж ВНАУ

В полноценном кормлении животных, в том числе и поросят-сосунков, важная роль отводится минеральным элементам, так как они активно участвуют в обмене веществ,

обеспечивают нормальные условия для работы всех внутренних органов, мышц и нервной системы.

Минеральные элементы используются организмом животных как структурный материал, они участвуют в ферментативных процессах пищеварения, всасывания, синтеза, распада, а также выделения продуктов обмена из организма. Минеральные вещества положительно влияют на активность ферментов, гормонов, витаминов, стабилизируют кислотно-щелочное равновесие и осмотическое давление. Они влияют на функции кроветворения, эндокринных желез, защитные реакции организма, микрофлору пищеварительного тракта, участвуют в биосинтезе белка, укрепляют проницаемость клеточных мембран и т.д.

Отсутствие или недостаток отдельных минеральных элементов, а также нарушение их соотношения приводит к снижению эффективности использования питательных веществ рациона и, как следствие, – к снижению продуктивности животных.

Минеральными веществами приходится 4-5% массы тела животных, из них на макроэлементы – 99,6%, а на микроэлементы – 0,4%.

Основной источник минеральных элементов для животных – это корма. Однако минеральный состав последних зависит от биогеохимической зоны, типа почв, климатических условий, вида растений, агрохимических мероприятий, технологии сбора, хранения, подготовки к скармливанию и других факторов.

**Ключевые слова:** поросята, микроэлементы, хелаты, медь

**Табл. 3. Лит. 7.**

#### **Інформація про авторів**

**ФАРІОНІК Тарас Володимирович**, кандидат ветеринарних наук, доцент, доцент кафедри харчових технологій та мікробіології Вінницького національного аграрного університету (21008, м. Вінниця, вул. Сонячна, 3; e-mail: farionik@vsau.vin.ua)

**БОЙЧУК Вячеслав Миколайович**, викладач Технологічно-промислового коледжу ВНАУ (21018, м. Вінниця, пр. Юності, 8; e-mail: farionik@vsau.vin.ua)

**ГЛАВАТЧУК Віталіна Анатоліївна**, викладач Технологічно-промислового коледжу ВНАУ (21018, м. Вінниця, пр. Юності, 8; e-mail: farionik@vsau.vin.ua)

**ФАРИОНИК Тарас Владимирович**, кандидат ветеринарных наук, доцент, доцент кафедры пищевых технологий и микробиологии Винницкого национального аграрного университета (21008, г. Винница, ул. Солнечная, 3; e-mail: farionik@vsau.vin.ua)

**БОЙЧУК Вячеслав Николаевич**, преподаватель Технологически-промышленного колледжа ВНАУ (21018, г. Винница, пр. Юности, 8; e-mail: farionik@vsau.vin.ua)

**ГЛАВАТЧУК Виталина Анатольевна**, преподаватель Технологически-промышленного колледжа ВНАУ (21018, г. Винница, пр. Юности, 8; e-mail: farionik@vsau.vin.ua)

**FARIONIK Taras**, Candidate of Veterinary Sciences, Associate Professor, Associate Professor of the Department of Food Technologies and Microbiology, Vinnytsia National Agrarian University; (21008, 3, Soniachna Str., Vinnytsia; e-mail: farionik@vsau.vin.ua)

**BOYCHUCK Vyacheslav**, teachers Technological and Industrial College VNAU (21018, 8, pr. Yunosti, Vinnytsia; e-mail: farionik@vsau.vin.ua)

**GLAVATCHUK Vitalina**, teachers Technological and Industrial College VNAU (21018, 8, pr. Yunosti, Vinnytsia; e-mail: farionik@vsau.vin.ua)