

SS APPLICATION AS A FEED ADDITIVE IN ANIMAL HUSBANDRY

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From the standpoint of the principles of "dynamic technology" we are developing, it is important that a simple way to utilize the entire stock of raw materials be found. This path may be less efficient than potentially possible, but it does not require significant investments in research and development.

From the very first steps of the introduction of new natural raw materials, silkworm secretions are not the only waste of sericulture. When feeding caterpillars of the silkworm, mulberry branches, veins and remains of leaves also remain in a significant amount. Previously, these wastes were used as fuel. However, due to the widespread gasification of the villages of the Central Asian region, these wastes began to find less and less use.

Studies have previously been reported on the possibility of using SS for livestock feed. This chapter presents the concrete results of these studies.

The composition of SS, both in terms of elemental composition and organic matter content, is given in the first chapter. In this section, it is advisable to provide data on the composition of SS in terms of feed components for farm animals. The chemical composition of SS as a potential feed is given in Table-1

Table-1 Chemical composition of SS as a potential feed (according to the Bukhara Zonal Agrochemical Laboratory)

| Nº | Component name | Content |
|-----|------------------|---------|
| 1. | Humidity, % | 8,43 |
| 2. | Nitrogen, % | 2,14 |
| 3. | Crude protein, % | 13,35 |
| 4. | Calcium, г/кг | 28,1 |
| 5. | Phosphorus, г/кг | 3,7 |
| 6. | Carotene, мг/кг | 101,50 |
| 7. | Cellulose, % | 13,31 |
| 8. | Bet, % | 18,28 |
| 9. | NES, % | 42,92 |
| 10. | Fat, % | 3,71 |

From these data, it can be seen that the content of protein, fat, carotene in SS is much higher than in conventional concentrated feeds. At the same time, as noted in the first chapter, silkworm secretions contain an excess amount of calcium and is in short supply

compared to the amount needed for a balanced diet. Nevertheless, the feeding value of SS is quite high and, according to our estimates, is 0.58 feed units per kilogram of animal weight.

Experiments on feeding SS were carried out on 30 Karakul rams at the age of 1 year, divided into 5 groups of 6 animals each. The rams of the first group received 800 g of concentrated feed and 200 g of SS per head per day, the second group - 600 and 400, respectively, the third - 400 and 600, and the fourth - 1000 and 200 g. The experiment lasted for 60 days. The dynamics of the live weight of experimental sheep that received different amounts of SS during this period is presented in Table-2. At the beginning of the experiment, the live weight of the experimental and control sheep was approximately the same. Two months after the start of fattening, the animals of the first group, in the diet of which 20% of concentrated feed was replaced by SS, gave 8.7 kg of live weight gain, while the average daily weight gain was 145 g. Animals of this group gave a weight gain of 1.7 kg more than the control group.

Table-2 The effect of feeding SS on the live weight of karakul rams

| Group number and SS content in the diet, % | Live weight of rams, kg | | | Total weight gain, kg | Average daily weight gain, g |
|--|------------------------------------|---------------|---------------|-----------------------|------------------------------|
| | At the beginning of the experience | After 30 days | After 60 days | | |
| I. 800g conc. Feed + 200g SS (20%) | 22,3 | 28,0 | 31,0 | 8,7 | 145 |
| II. 600g conc. feed + 400g SS (40%) | 21,6 | 27,6 | 29,2 | 7,6 | 126 |
| III. 400g conc. feed + 600g SS (60%) | 22,7 | 27,6 | 31,1 | 8,4 | 139 |
| IV. 1000g conc. feed+200g SS (16.6%) | 22,1 | 28,9 | 30,1 | 8,0 | 133 |
| V. 1000g conc. feed(control) | 22,5 | 28,5 | 29,9 | 7,0 | 116 |

The live weight of the animals of the second group, in which 40% of the concentrated feed of the diet were replaced with SS, increased by 7.6 kg at the end of fattening, with an average daily gain of 126 g. Animals of this group gave 0.6 kg more weight gain than control sheep.

Animals, in the diet of which 60% of concentrated feed was replaced by silkworm secretions, gave an increase in live weight by 8.36 kg, and the average daily gain was 139 g per head. In animals of the fourth group, which received 200 g of SS daily as an additive to the main diet, the increase in live weight was 1 kg more than in control sheep, but significantly lower than in animals in whose diet 20% of concentrated feed was replaced with silkworm secretions. . Therefore, the most effective replacement of 20% of the main feed SS.

The results of the study of the digestibility of nutrients, carried out on rams, show that the coefficient of digestibility of nutrients SS is: fiber - 52%, fat - 49%, nitrogen-free extractive substances (NES) - 41%, protein - 77%. These results testify to the high nutritional value of SS.

To establish the safety of SS, experiments were carried out on rabbits and rats according to generally accepted methods of veterinary toxicology. In this case, the drug was administered to the animals inside and the skin test method was used. Experimental sheep treated with SS of various concentrations were subjected to clinical, hematological and biochemical studies. At the same time, the general condition, the ratio of food and water, reactions to various stimuli (tactile, sound), the frequency and quality of the pulse and respiration, and the body temperature of the experimental animals were recorded. The results of physiological studies of clinical indicators of experimental sheep, which received SS in the amount indicated in Table-2 as part of the diet, are shown in Table-3. It follows from the data obtained that the body temperature of the experimental animals did not change significantly over the entire period of the experiment and was within the physiological norm.

A slight decrease in heart rate in all experimental sheep, apparently not associated with the receipt of SS food supplement, because a similar slowing of the pulse was observed in the control group of sheep and can be attributed to a change in external temperature conditions. The respiratory rate of the experimental sheep did not change significantly. These data allow us to conclude that long-term feeding of SS does not affect the body temperature, pulse rate, and respiration rate of Karakul sheep.

Table-3 Dynamics of clinical indicators of experimental karakul rams fed SS as part of the feed

| №groups of animals | Temperature | | | Пульс в минуту | | | Дыхание в минуту | | |
|--------------------|-------------------|---------------|---------------|-------------------|---------------|---------------|-------------------|---------------|---------------|
| | Before experience | After 30 days | After 60 days | Before experience | After 30 days | After 60 days | Before experience | After 30 days | After 60 days |
| I | 39,3 | 39,2 | 39,3 | 116 | 112 | 100 | 37 | 32 | 31 |
| II | 39,7 | 39,5 | 39,4 | 118 | 104 | 97 | 34 | 34 | 35 |
| III | 39,7 | 39,5 | 39,2 | 126 | 106 | 98 | 30 | 28 | 28 |
| IV | 39,5 | 39,5 | 39,3 | 108 | 98 | 97 | 29 | 31 | 28 |
| V | 39,8 | 39,4 | 39,3 | 112 | 108 | 96 | 35 | 34 | 33 |

The number of erythrocytes and leukocytes was determined by the test tube method of N.M. Nikolaev, hemoglobin concentration in g% using a GS-3 hemometer. The activity of acetylcholinesterase was determined by the method of A.A. Pokrovsky. The

nutritional value of the fed secretions of the silkworm was determined by conducting a balance experiment on Karakul sheep.

Studies of the dynamics of the number of erythrocytes, leukocytes, hemoglobin in the blood of experimental animals treated with SS did not show significant differences from the control (Table 4)

Table-4. Hematological parameters in karakul rams fed SS as part of the feed

| N ^o of group | Hemoglobin (g %) | | | Erythrocytes, thousand | | | Leukocytes, thousand | | |
|-------------------------|------------------------------------|---------------------|----------------------|------------------------------------|------------------|----------------------|------------------------------------|------------------|-------------------|
| | Beginni ng of experie nce | After 30 days | After 60 days. | Beginni ng of experie nce | After 30 days | After 60 days. | Beginni ng of experie nce | After 30 days | After 60 days. |
| I | 8.5 | 8.4 | 8.7 | 8.1 | 8.1 | 8.5 | 7.7 | 7.6 | 7.4 |
| II | 8.5 | 8.9 | 9.0 | 8.4 | 9.2 | 10.1 | 8.1 | 9.8 | 10.1 |
| III | 8.4 | 8.5 | 8.8 | 8.2 | 8.5 | 8.7 | 8.7 | 10.0 | 8.7 |
| IV | 8.3 | 9.0 | 9.4 | 8.4 | 8.9 | 9.3 | 6.5 | 9.6 | 10.1 |
| V | 7.0 | 9.5 | 9.3 | 8.7 | 9.2 | 9.4 | 6.4 | 8.3 | 8.6 |

In animals of all groups, three studied parameters were within the physiological norm, which indicates the safety of SS when used as feed for sheep.

They also indicate the absence of any negative effect of SS on the organism of animals, especially in the first group, where the number of leukocytes is lower than in animals of other experimental groups and in control.

This is also evidenced by the study of the activity of blood enzymes - acetylcholinesterase and aminotransferases. In the same way, no definite effect of SS additives to feed on the activity of the cholinesterase enzyme in the blood, the determination of the activity of which is of the greatest clinical interest for diagnosing etchings with organophosphorus poisonous substances and insecticides, has not been revealed.

At the end of the experiment, 2 animals from each group were slaughtered for macroscopic characteristics, determination of organoleptic and biochemical parameters of meat (fatness, degree of bloodlessness of meat, benzidine, color-oxidative, formal samples, acidity-oxidation coefficient). The conducted studies did not reveal any pathomorphological changes in the body of animals treated with SS. The veterinary and sanitary indicators of the meat of experimental animals differed little from the control and fluctuated within: pH 5.75-5.82, which indicates the normal maturation of the meat. The benzidine test was positive in all cases, which indicates the absence of toxic substances in the meat. Formol and color oxidative reactions were negative and indicated the absence of decay products in the meat.

Thus, the results of experiments on sheep have shown that the use of SS as a feed additive for two months only has a positive effect on the animal organism and does not impair the quality of meat.

In order to find out whether the stimulating effect of SS is specific for rams or whether their additives are useful for other animal species, experiments were carried out on feeding SS to cattle, carried out on 10 2-year-old bulls for 30 days. At the same time, the animals of the experimental group received up to 3 kg SS daily. No visible changes were found in the experimental animals during the observation period. At the same time, the average daily weight gain of the experimental animals was: in the first decade 500, in the II and III - 800 g against 350.420 and 550 g in the control that did not receive SS. The diet of the animals throughout the experiment consisted of alfalfa hay (10 kg), corn silage (10 kg), mixed feed (2 kg).

The experiments carried out thus made it possible to conclude that SS can be used as feed and feed additives for sheep and cattle, and that feeding SS to these types of farm animals significantly increases their average daily weight gain without adversely affecting their health and quality of meat products.

The use of SS containing significant amounts of porphyrins as a feed additive for farm animals has an overall positive effect. Based on the well-known role of natural porphyrins in the work of enzymes that oxidize biosubstrates, it can be assumed that the positive effect achieved in the development and weight gain of animals from the use of SS is associated with the activation of oxidative processes by porphyrins, because the positive effect cannot be explained only by the nutritional value of the additive. Of course, this assumption follows from the total body of knowledge obtained in this area. At the same time, experiments with farm animals justify the use of a porphyrin-containing product - SS as a stimulating feed additive in order to increase the average daily weight gain and increase the resistance of animals to diseases.

From the point of view of "dynamic technology" it is significant that the field of application of raw materials-SS has been found - capable of assimilating this raw material in its entirety. However, it is clear that this assimilation is not ideal. Therefore, it does not close the way to deep processing of SS, but, on the contrary, contains additional incentives for the development of works of this kind.

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