INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563
eISSN 2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 11, issue 02 (2024)

INFLUENCE OF LYSINE ON METABOLISM AND THE CONTENT OF FREE AMINO ACIDS IN ORGANS AND TISSUE OF WHITE RATS

Madaminova Gulassal Abdurauf kizi

Andijan State Medical Institute

Abstract: The effect of lysine deficiency on metabolism and the content of free amino acids in the most important organs and tissues of white rats was studied. It has been shown that lysine deficiency is accompanied by high activity of alanine aminotransferase in the liver.

Keywords: Lysine, protein, method, treatment, aminoacids, aminotransferases.

INTRODUCTION

As is known, the main sources of protein (protein) for monogastric animals (pig, poultry) are cereal grains. At the same time, cereal crops (barley, wheat, corn) are characterized by insufficient protein content and, moreover, low quality, which is due to the low level of essential amino acids - lysine, methionine, threonine, tryptophan and isoleucine [3]. Effective use of grain is possible provided it is enriched with complete protein concentrates (soybeans, fish meal, yeast, etc.) or preparations of missing amino acids.

MATERIALS AND METHODS

For all cereal crops, the first limiting amino acid (according to the degree of deficiency) is lysine, the second is threonine, and the third is methionine in barley and wheat grains, respectively. In corn grain, the second limiting amino acid is tryptophan. The study of the effectiveness of synthetic preparations of amino acids (lysine, threonine, methionine) in nutrition and metabolism, the development of norms for the needs of monogastric animals is of theoretical and practical importance [2].

The biological value of protein is determined by the degree of its balance in essential amino acids and their ratio relative to the needs of humans and animals.

RESULTS AND DISCUSSION

The rats ate the basal grain diet poorly and grew poorly. In case of severe lysine deficiency (62%), the addition of a mixture of amino acids without lysine did not cause a negative effect. On the contrary, in group 2, feed consumption, although not much, nevertheless increased by 12%, and average daily gains by 39% ($P < 0.05$).

Analysis of the data obtained shows that, in all likelihood, animals can cope with a lack of lysine for a certain time with an ideal balance of other essential amino acids.

It is also known that lysine, released during basal metabolism, has a high ability to be reutilized. Apparently, this can explain some of the improvements in feed intake and growth in group 2. The results of this experiment indicate that the deficiency of the first limiting essential amino acid, even a very acute one, is more easily overcome by animals when the remaining amino acids are contained in quantities corresponding to the norms of requirement.

The highest fat content (7.1%) was observed in the carcass of animals with lysine deficiency, on the basic diet - 6.5%, on an adjusted diet - 6.6%.

Analysis of the liver for protein and fat content revealed approximately the same trend as in the analysis of the carcass. The highest percentage of fat was in the liver of rats of group 2 (lysine deficiency).

In rats with lysine imbalance, endogenous nitrogen losses were lower than in other groups.

The best use of nitrogen was in animals on the adjusted diet. A decrease in this indicator was observed in animals of groups 1 and 2, where it was 38.2% and 27.6% lower than on the adjusted diet. These data indicate that a lack of limiting amino acids (lysine, methionine, threonine and isoleucine) in the diet reduces its biological value. Evidence of this is a decrease in protein utilization rates (PUR).

The lowest AF value was observed on an unbalanced diet (39.1) with lysine imbalance (45.8), as evidenced by the lowest average daily gain. A high rate of protein utilization was observed in animals on the adjusted diet (57.2), where the increase was the highest.

The most common disorders of amino acid metabolism in the liver and other tissues with a deficiency of any essential amino acid is a change in the rate of deamination and transamination of amino acids.

Our studies showed that there was no significant difference in AST activity in the blood of the experimental groups, although in rats receiving the basal diet (group 1), there was a tendency for higher activity in relation to that in animals on the adjusted diet (3 group). At the same time, ALT activity in animals of the first group is noticeably lower than its activity in the blood of animals on an adjusted diet.

The activity of AST and ALT in the liver of rats manifests itself differently. Thus, on the adjusted diet it was lower than with lysine deficiency ($P < 0.05$). Apparently, this is due to an increase in the amount of free, non-limiting amino acids in the liver and the need to enhance metabolic processes in the body. High catalytic activity of ALT is characteristic of lysine deficiency (second group) and on an adjusted diet (third group), and low - on a basic diet (first group).

As is known, ALT activity may depend on protein quality [3]. It is possible that the low activity of transamination enzymes in the liver of animals on a basic diet, where there is a deficiency of several amino acids, manifests itself similarly to protein deficiency, as a result of which growth slows down and protein concentration in organs decreases.

CONCLUSION

Thus, analysis of the data obtained once again confirms the fact that even with an acute deficiency of lysine, but a good balance of other amino acids, biosynthetic processes in the animal body are intensified. Apparently, there is a homeostatic mechanism in the body that plays an important role in maintaining the required level of lysine to eliminate negative consequences.

REFERENCES

1. Aleinikova, T. L. Guide to laboratory classes in biological chemistry / T. L. Aleinikova, G. V. Rubtsova. – M.: Higher School, 2012. – 238 p.

2. Golovko, E. N. The need of piglets for lysine / E. N. Golovko, S. O. Osmanova // Materials of the All-Russian. scientific-practical conf. “Scientific support of the agro-industrial complex.” - KubSAU. – Krasnodar, 2019. – pp. 54–57.

3. Golovko, E. N. Availability of cereal amino acids in feeding pigs / E. N. Golovko, M. V. Kashirina, S. O. Osmanova // Materials of the III All-Russian. scientific-practical conf. young scientists "Scientific support of the agro-industrial complex" 11/18–20/2019 – KubSAU. - Krasnodar. – pp. 20–22.

4. Draganov I. F. Feeding animals / I. F. Draganov, N. G. Makartsev, V. V. Kalashnikov. – M.: Publishing house RGAU – Moscow Agricultural Academy named after. K. A. Timiryazeva, 2010. – T. 1. 341 p. ; T. 2. 565 p.