REVIEW

By Prof. Dr. Zapryanka Nikolaeva Shindarska, Department of Anatomy, Physiology and Animal Sciences, Faculty of Veterinary Medicine, Forestry University - Sofia, retired.

Subject: Dissertation for obtaining the educational and scientific degree "Doctor", field of higher education 6. Agricultural sciences and veterinary medicine, professional direction 6.3. Animal husbandry, Scientific specialty "Breeding of farm animals, biology and biotechnology of reproduction".

on "Effect of feeding broad bean and soybean meal on body condition and meat quality in fattening local Baladi male goats and Awassi male lambs" presented by Rami Yaccoub.

Scientific consultants: Prof. Dr. Andrey Kurtenkov, Forestry University - Sofia, Faculty of Veterinary Medicine and Prof. Dr. Boulos al-Jamal, Lebanese University.

This review is prepared based on my participation in a scientific jury according to order No. ZPS-168/01.04.2024 of the Rector of LTU - Sofia.

1. Brief biographical data

Rami Yaccoub was born on 11.12.1989. in Lebanon. Completed secondary education and various degrees of higher education in: Matriculation Experimental Sciences Series CSC – Gemayze, Master in Agriculture. Engineering Biotechnology in Animal Production and Reproduction - Lebanese University. He works as a manager and holds leadership positions in various companies not only in Lebanon but also in other countries. He has experience as a manager in a vaccination and equipment service in poultry farms. He is skilled in hatchery management, automation and equipment. He currently works as Chief Technical and After Sales Manager at CEVA DESVAC CAMPUS – CEVA ANIMAL HEALTH.

2. Actuality of the developed problem

The problem of providing productive animals with sufficient protein is an old one, but it continues to be relevant. The world's population is growing, and with it the demand for new protein sources. Globally, traditional animal protein sources are projected to decline due to the need to feed humanity. In this regard, the researchers' efforts are focused on researching and testing alternative protein sources to the traditional soybean meal. Among the possible sources of protein are legume grain forage - broad beans, lupins and peas, which in Lebanon have good agronomic conditions for production. Broad beans is one of the most widely grown crops in Lebanon with a crude protein content of 27 to 34%, which is of high biological value. The subject of the research work contained in the dissertation is successfully chosen - a comparative characterization of two protein sources is made: broad beans and the traditional, but expensive soybean meal. Differences in the utilization of nutrients and the influence on meat quality in two meat breeds of small ruminants - Baladi goats and Avasi male lambs - were tracked. In this regard, the topicality of the topic is beyond doubt, as well as the fact that existing protein sources

have a negative impact on the environment and concern for animal and human health, despite the social and economic benefits.

3. Status of the problem and evaluation of the literature review

Candidate Rami Yaccoub's good literary awareness is evident from the Literature Review section. In this section, the author has given enough information about the world scientific research related to the areas covered in the dissertation work. The examined issues are presented in a multifaceted and complete manner, which speaks of the doctoral student's good awareness and skills in working with scientific literature. The dissertation introduces the reader in detail to the studies carried out so far regarding various aspects of the topic, citing leading studies through which it clarifies key issues underlying the dissertation work.

A total of 394 literary sources are cited in the dissertation, for obvious reasons, all in Latin, and more than 90% of the cited literary sources concern research carried out in the last 10 years. All this shows that Rami Yaccoub has thoroughly familiarized himself with the researched problem, which is a solid theoretical preparation. I am impressed by the fact that the PhD student took into account the notes made on this section in the preliminary discussion and, moreover, provided additional information on intermediate energy and protein metabolism.

4. Structure of the dissertation work

The dissertation is written in 135 pages, although 144 pages are marked, nine of these 144 pages are blank pages between individual sections. The scientific work includes: summary (1 page), list of abbreviations (2 pages), table of contents (5 pages), introduction (3 pages), literature review (28 pages), purpose and tasks (1 page), research material and methods (8 pages), results (33 pages), discussion (14 pages), conclusions and recommendations (4 pages), cited literature (27 pages) and appendix (9 pages).

One of the notes and recommendations made by the colleagues participating in the preliminary discussion is to remove the pages between the individual sections and to format the dissertation well, which note is not taken into account, taking into account the fact that the author may not comply. The dissertation is written in comprehensible scientific English, with the note of the chosen font not covering the standard typewritten page (1800 characters).

Introduction

The introduction presents the issues of the dissertation in a synthesized form and directs attention to the relevance of the problem and some of the ways to solve it. I have a remark about it related to citation of authors, which should be included in the literature reference.

Literature review

As I have already indicated, this section is comprehensive and provides up-to-date and detailed information on the various issues in the Dissertation. I express the following recommendation to the section - to strive for greater consistency of the submitted information in future citations. At the same time, I consider it necessary to note my good impression of the

brief summary of the literature review, which motivates the need to carry out the research and the set goals.

Purpose and tasks

The purpose of the study is related to evaluation, characterization, efficiency and influence on meat quality of grain broad beans as a source of protein in participating in the rations of lambs of the Awasi breed and yeanlings of the local Baladi breed in different ratios with soybean meal. The tasks are clearly formulated, respond to current scientific research and correspond to the set goals.

Material and methods

Two experiments are conducted: first with weaned male lambs for fattening from the Avasi breed and second - with weaned male yeanlings from the local Baladi breed. The duration of the experiment is two months (8 weeks). In each experiment, 15 animals were included, divided into 5 subgroups (minimum number for statistical processing). The difference between the individual subgroups is based on a different percentage of replacement of soybean meal with the protein source - grain broad beans. Animal feeding is optional. Regardless of the fact that the doctoral student complied with a large part of the recommendations and notes made during the approbation to the best of his ability, I consider it necessary to note the following omissions:

1. The number of animals in the individual subgroups is minimal (3 animals), regardless of that statistically proven statements are outlined in the results section. With a higher number of animals in a group, on the basis of modern statistical methods, additional up-to-date interactions can be outlined in the investigated indicators of the eco-technical chain "forage-animal production".

2. Why was this age chosen for weaning lambs and yeanlings for fattening (4^{th} monthly) and is this a practice in Lebanon?

3. It has been established that only the concentrate part of the ration is controlled, without

the basic ration (including roughage) is taken into account. I cannot agree that roughage taken ad libitum leads to the same consumption when the concentrate ration has different energy and protein values for the individual subgroups.

Research methods are modern and provide a good basis for reliable and correct results and a correct interpretation of the obtained results. When evaluating the effectiveness of rations with different percentages of replacing soybean meal with pods, classical methods and formulas were used to calculate consumption, weight development and utilization of the rations and the nutrients contained in them.

A slaughter analysis performed at the end of the experiment included evaluation of the carcass and physicochemical composition of the meat after 24 hours of standing and seven days in the freezer. The doctoral candidate described in detail the used apparatus and methods for slaughterhouse and physicochemical analysis of the meat. The results of the conducted research

have been processed statistically and are presented in tables (appendices). The following interrelationships were monitored: effect of rations with different participation of forage on live weight, weight development and growth in lambs and yeanlings; effect of rations on energy and nutrient utilization; effect of test rations on carcass analysis; effect of rations on the physicochemical analysis of meat after 24 hours of storage and 7 days of storage after freezing. The materials and methods used are relevant to the tasks and purpose of the study.

Results

The data in this section are presented in 7 tables and 23 figures, which clearly and comprehensibly reflect the obtained results. The interpretation of the results is done correctly and objectively. Tracked and presented in dynamics is live weight, avg. days of growth, the consumption and utilization of the experimental rations and the energy and nutrients contained in them in both types of animals - lambs and yeanlings. The results obtained from the slaughterhouse and physicochemical analysis of the meat and lambs and yeanlings were expertly interpreted. The main parameters characterizing the meat were tracked and analyzed in two regimes - after 24 hours of storage and after 7 days of freezing. I take into account the fact that all analyzes were performed on three numbers of animals - lambs and yeanlings, which is the minimum for one statistical processing. The dissertation work would benefit from a more detailed interpretation and comparison of the results obtained in both types of animals. It is true that there is a summary after the discussion, but this does not change the weight of the comparative assessment of the rations for the two types of animals - lambs and yeanlings.

Discussion

The section logically follows the set tasks and presented results. All indicators and growth factors are discussed, and the results obtained by the doctoral student are supported by those of other authors. The discussion is done in detail, with expertise, which supports my opinion that the PhD student has acquired the knowledge and skills to investigate and interpret the obtained results.

A detailed and competent discussion is also made of the results obtained from the slaughter analysis and the physicochemical parameters of the meat in lambs and kids after a 24-hour stay and a 7-day stay in a freezer (frozen meat). In the process of the discussion, the dissertation expert skillfully supports his results with those of other authors. It makes a good impression that the cited literature in this section is from the last 5-10 years, which confirms the relevance of the dissertation work. I also appreciate the summary of the obtained results.

It would be good to end the discussion with a brief summary to motivate what has been done conclusions.

Conclusions

10 conclusions have been made that reflect the results of the dissertation work. They have been refined, as the dissertation student has complied with the recommendations made in

the preliminary examination. The main results are summarized in the conclusions, correctly without going into specifics.

Contributions and recommendations

PhD student Rami Yaccoub with his dissertation formulated 6 contributions, which I define as scientifically applied and two recommendations for practice. I believe that the contributions that are made are important for Lebanon, i.e. of regional importance, some of them are significant and with elements of originality, as they add to the global database of information on the effect of the grain broad bean. With the contributions, an analysis is made of the effect of partial and complete replacement of soybean meal with grain broad bean in rations for fattening male lambs and yeanlings of local breeds of sheep (Awasi) and local goats (Baladi) on

- weight development and growth
- feed efficiency and utilization
- some basic indicators of meat quality after 24 hours and after 7 days of deep freezing.
- the economic efficiency related to a comparative analysis of prices of the main protein components included in different percentages in the rations.

I consider it necessary to motivate my statement about the local relevance of the studies with the fact that similar studies related to different protein sources with lambs of the Awasi breed and with other animal species have been done, but in other geographical areas of the world. Such studies with regional significance, and in the case of small ruminants, I dare say that they are almost non-existent, especially since the current studies also cover a wider spectrum - quality indicators of the meat.

Recommendations for practice are derived from the overall analysis of the results. They are up-to-date and applicable in practice and would contribute to a partial solution to the main problem - the protein problem, and especially for the grain broad bean growing area.

Scientific publications and abstract of the dissertation work

4 publications are presented, two of which have been published in their entirety in proceedings of International Scientific Conferences and two in a journal referenced in a number of global databases. In the two articles published in the journal, the doctoral student is an independent author. Material from the dissertation is included in the presented and published scientific articles and reports.

The content of the abstract corresponds to the material presented in the dissertation and includes all sections in an abbreviated form. It is written on 41 pages.

Notes and recommendations

The doctoral student complied with a large part of the recommendations made during the preliminary examination of the dissertation work by an extended departmental council. The notes I have at the moment are of a technical nature and I have reflected them in the individual sections of the dissertation work. I recommend the PhD student to expand his research activities

in the future by including in his research new protein sources to solve the main problem - the protein one, as well as to publish his research in scientific journals with IF and SJR.

Evaluation of the personal participation of the doctoral student in writing the dissertation

Rami Yaccoub is a part-time doctoral student. I had the opportunity to gain personal impressions already during his enrollment, and subsequently also when taking the exams for the doctoral minimum. Even then, he made a good impression on me with his good theoretical training in matters related to the scientific direction and specialty. From the presented dissertation work and its accompanying documentation, I got an overall impression. It is clear to me that he is active and with leading participation during all stages of the development of the dissertation work. Publications related to the dissertation indicate that the doctoral student has developed qualities of initiative, independence and, at the same time, good teamwork skills. The quick reaction for corrections and additions after the preliminary discussion of the dissertation work before the Extended Departmental Council (EKC) confirms my claim that the research on the dissertation is primarily the personal work of the dissertation student.

CONCLUSION

The presented dissertation examines a current topic, with an innovative approach and significance for Lebanon. It is sufficient in volume, as the research work meets the requirements for a dissertation work. The obtained results are of great practical value and enrich the world information with new data on protein forages. The goals and the set tasks have been fulfilled and the merits of the dissertation work stand out. Writing style, technical skill speak of a very well prepared, intelligent young scientist.

All this gives me the reason to vote positive and to recommend to the respected scientific jury to award the educational and scientific degree "PhD" to Rami Yaccoub in the scientific specialty " Breeding of farm animals, biology and biotechnology of reproduction" in professional direction 6. Livestock breeding and field of higher education 6. Agricultural Sciences and Veterinary Medicine.

05/09/2024 Reviewer: [redacted]

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