

Determining the Optimal Ration for Sheep, Using a Mathematical Model

KRISTINA PAVLOVA, ELISAVETA TRICHKOVA-KASHAMOVA,
ELENA PAUNOVA-HUBENOVA
Institute Of Information and Communication Technologies,
Bulgarian Academy of Sciences
BULGARIA

Abstract: The primary economic sector includes the industry of livestock farming, which is dedicated to the breeding, care, and production of farm animals. The development of information systems is essential for optimizing the variables in livestock production due to rising costs for power, heat, and fuel in recent years, as well as growing technological needs and the need to reduce production costs. One of these factors is feed, which plays a key role in the care of animals and their overall health. There are specific guidelines for the preparation of high-quality animal feed in animal husbandry. This calls for formulating a specific volume of feed combination that contains a specific proportion of ingredients. Following the blending of various amounts in varied ratios, these conditions are satisfied.

Keywords: mathematical model, ration, animal feed.

Received: June 13, 2021. Revised: October 29, 2022. Accepted: November 19, 2022. Published: December 30, 2022.

1. Introduction

Feeding ruminants can be described as an art, because when preparing a ration, there must be a balance and synchrony between quantity and quality. Some farmers neglect this balance and do not pay attention to quality, do not combine the different feeds properly, which is the reason why the synchrony is broken. [2]

To expect good results, we need to have a balanced diet. This means that the ration we set must be balanced with the more necessary nutrients, namely: crude protein, energy, crude fiber, crude fat, protein digestible in the intestine, micro- and macro elements and vitamins. A large percentage of the above nutrients are neglected, resulting in low productivity and poor health. It should be known that each of the above nutrients has its specific role in animal growth, performance and metabolism. [3]

1. Energy provides the body with the ability to "work," which includes growth, lactation, reproduction, digestion, movement, etc. It is required in the greatest quantities.

2. Protein is the basic building block of the body, which is composed of amino acids. The quality of protein in the ration is important for maintaining growth, milk production and reproduction.

3. Minerals are important for animal growth, bone, reproduction, etc., and their quantity is affected by the type and quality of feed. In most cases they are in insufficient quantities in the feed, necessitating their addition to the ration of the animals.

4. Vitamins are important for growth and reproduction, with attention to vitamin A, D and E. [9]

A proportion of farmers work with nutritionists who work out the best ration for their animals. Another part prepare their own rations and another feeds what is available on the farm. Some of the most common mistakes, which will be looked at individually over the next week, are:

- Improper feed combining;
- Including more than 2 types of protein sources in rations;
- Neglecting feeding norms;

The essence of making a complete ration is a combination of several feeds, minerals and vitamins that are well homogenized so that the animals have no selectivity. In its preparation, the main share is given to roughages (silages, haylage and hay), which take up to 70 %, followed by cereal and protein forages, minerals and vitamins, taking up to 30 %.

