CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3368089

Available online at: http://www.iajps.com *Research Article*

EFFECTIVE BEEF PRODUCTION METHODS

Arkady Natyrov[1], Oksana Konieva[1], Sergey Shlykov[2], Ruslan Omarov[2], Dmitry Fedotov[3]
[1]Kalmyk State University, Elista, Russia, [2]Stavropol State Agrarian University, Stavropol, Russia, [3]Vitebsk State Academy of Veterinary Medicine, Vitebsk, Republic of Belarus.

Article Received: June 2019 **Accepted:** July 2019 **Published:** August 2019

Abstract:
The goal of this three-year project is to study three alternative methods of raising cattle, accelerated, medium and long and their impact on the productive qualities of animals, carcass indicators and beef quality indicators, as well as determining the economic efficiency for each production method.
Conducting research according to the scheme of a three-factor experiment 3 × 2 with the study of growth dynamics for heifers and gobies. The total number of animals will be 72 individuals of the Kalmyk breed (12 gobies and 12 heifers) for each of the three groups and with an age of 12 months at the beginning of the experiment.
Key words: *productive, beef, Kalmyk breed,*

Corresponding author:
Arkady Natyrov,
Kalmyk State University, Elista, Russia.

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Please cite this article in press Arkady Natyrov et al., ***Effective Beef Production Methods.,*** *Indo Am. J. P. Sci, 2019; 06(08).*

INTRODUCTION:

AHDB Beef & Lamb (AHDB B & L) has recently identified a high value for the relationship between growth dynamics (which depends on the production system) and beef quality and their environmental impact in terms of greenhouse gas emissions and profitability. One of the key aspects of these complex relationships, which require detailed study in a properly balanced experiment, is the relationship between the growth dynamics associated with alternative production systems and the effect of these variable growth patterns on consumers' perceptions of beef quality. Recent changes in the B & L AHDB quality standard mean that both gobies and heifers up to 36 months of age can receive a quality mark for beef. However, some debate continues to relate to the effect that alternative growth models may have during the life of the animal on the frame and meat quality parameters.

In order to obtain additional information about this theory, a study was planned using 36 gobies and 36 heifers of comparable status and known genetics, who managed to achieve different growth paths followed by a wide range during slaughter, but using production systems typical of commercial practice on farms in Great Britain. As well as growth dynamics over all periods of growing and finishing fattening of animals by alternative production systems, this study will also provide information on the characteristics of the frame and the quality of beef.

MATERIALS AND METHODS:

The construction of a comprehensive research project on a three-factor, continuous 3 × 2 experiment, studying three alternative "breeding systems" of animals of two sexes of the Kalmyk breed. The experiment was created and conducted at the SRUC Throat Research Center, south of Edinburgh in the spring of 2013, and lasted until the last animals were killed in March 2015. Three alternative "growing systems" were characterized mainly by the duration of the cultivation. Slaughter of animals according to the "Accelerated" system at the age of 12 to 16 months; The "average" system is between the ages of 18 and 24 months, and the "long" system is between the ages of 28 and 36 months. The diets, grazing modes, and management of each of these systems are described below.

All heifers and gobies of Kalmyk breed. Both bulls and heifers were chosen for alternative breeding systems, given the dominance, so that no animal dominates in any one group, neither for bulls nor for heifers. In order to prevent confusion in growing systems and growth dynamics.

RESULTS AND DISCUSSION:

Accelerated rearing system - all animals remained indoors from a trial run on May 5, 2016 on straw courts and were fed "beef barley," a highly concentrated diet until sent to slaughter. The diet (TMR total mixed rations) contained barley (BAR), rapeseed flour (RSM), straw (STR), molasses (MOL) and minerals (MIN), as shown below. Gobies and heifers were sent to slaughter by three groups in June, July and August.

Medium growing system - all animals were transferred to grass on May 18 due to cold weather in late spring 2016, delaying grass growth. Typically, cattle would be on the grass just 6 weeks earlier than the weather would be more typical. Grass food was a two-year-old ryegrass that was well established and had good grazing quality (see Figures below). Grass was fertilized 3 times during the summer of 2016, for a total of 116 kg of nitrogen / ha. Grass availability (kg DM / ha) was evaluated every two weeks using a rising plate meter (Jenquip, 2009), and harvesting speed was adjusted at periodic intervals to ensure that at least 1,500 kg / ha of DM grass was available to animals. Harvest speeds were adjusted by changing the area of grass available to the animals. Medium-term animals were housed on October 16, 2016 and offered by TMR on a feed basis using the ad libitum system (meals as desired) before being sent to slaughter in three batches during November 2016, January 2017 and April 2017, respectively. All animals of the middle group were placed on the same straw litter, and TMR consisted of whole grains of barley (WCB), grass silage (SIL), BAR, RSM, MOL and MIN, as shown below.

Long growing system - all animals were transferred to grass on May 16, 2016 during their first grazing period, as for the middle group, except that they grazed on an old unimproved pasture, which in the spring received only 45 kg / ha of nitrogen fertilizer and was rated as poor grazing quality (see figures below). Grass availability was assessed as for the middle group, and grass availability was maintained above 1500 kg / ha DM grass at all times. The control of pasture load was again changed when necessary, changing the area of similar pasture available to animals. The animals were housed on October 9, 2016 during their first period of winter storage and remained on the same straw bedding but the following spring on April 2, 2017. In winter storage, two TMR diets were proposed. The first of them consisted of SIL, STR and MIN and was offered in November-January, and the 2nd TMR consisted of WCB, SIL, BAR, RSM and MIN and was offered from February to April 2017. When animals switched

to their second summer on grass in the same zone of unimprovable pastures, which were managed the same way as before October 15, 2017. Animals of a long growing system were placed together on one straw litter and offered TMR through the ad libitum system before being sent to slaughter in three lots during November 2017, January 2018 and March 2018, respectively. TMR consisted of whole barley (WCB), grass silage (SIL), BAR, RSM, MOL and MIN, as shown below.

CONCLUSION:

The average number of days in the study was 86, 286 and 622 (P <0.001) for animals using accelerated technology, an average and long production period, respectively, and with an average slaughter age of 15.1, 21.8 and 32.9 (P <0.001) months. Similarly, the average weight after slaughter was 528, 624 and 671 kg (P <0.001), and the average daily gain was 1.58, 0.96 and 0.54 kg / day (P <0.001). The average carcass weight was 298, 356 and 378 kg (P <0.001) with an average cutting force of 10.8, 10.4 and 11.9 kg (P <0.05) for an accelerated medium-long and long-term growing technology, indicating that beef of a long production period has a more rigid structure. The proportional content of connective tissue in the loin portion of the samples was also significantly higher in beef for a long growing period with values of 1.63, 1.62 and 1.96% of the long back muscle, respectively. Assessment of the taste of beef also revealed an increased level of rigidity (38.7, 42.5 and 46.9, P <0.05) between the short, medium and long periods of production. Despite these differences, beef from a long-term production system provides beef quality parameters that are acceptable in the human food chain.

From a financial point of view, the average profit ($ / head) was 301, 523 and 570 (P <0.001) for an accelerated, medium and long feeding system. However, despite this, when these values were expressed in daily profit, the average values were 3.72, 1.86 and 0.91 ($ / head / day) in the same three systems. After the variable costs were subtracted, gross margins were 36, 86 and 65 pounds / head, while further subtraction of fixed estimated costs reduced net margins to -27, -34 and -209 $ / head for accelerated , medium and long systems. The total variable costs were £ 265, 437 and 505 / head, while the estimated fixed costs were $ 63, 120 and $ 274 / head for accelerated, medium and long systems. A study of the quadratic relations between profit and costs incurred either here or from industry estimates showed that the greatest potential for profit could be found when animals were slaughtered at a younger age. It is concluded that for commercial production of beef it is recommended to adopt effective, accelerated and medium-sized feeding systems (12-20 months) that provide high-quality beef for the human food chain, offering producers the greatest opportunity for commercial benefits.

ACKNOWLEDGMENTS:

This work was financially supported by Kalmyk State University as part of a research project in priority research areas No. 1091

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