Contribution ID: 2

Type: not specified

Development of an innovative approach to identify biological determinantsinvolved in the between-animal variation in feed efficiencyin sheep farming

This cooperation project (lzp-2021/1-0489) is interdisciplinary research related to economic activity in agriculture and biotechnology, implemented by the University of Latvia in collaboration with the Latvian University of Life Sciences and Technologies. The purpose of this study is to determine genetic and molecular markers to identify individual animals in sheep herds with the maximum predisposition to feed digestibility or efficiency (FE) and weight gain, with the aim of their introduction into breeding. Feed accounts for 65-70% of the cost in the sheep industry, and thus, improving feed efficiency is important for the economy and the environment. FE is a major indicator of the efficiency of feed utilization. A low FE has a negative impact on the environment and increases production costs. The proposed project aims to better understand the mechanisms that affect animal-to-animal variation around the average feed efficiency observed in lambs reared in similar conditions, to gain knowledge to develop putative biomarkers, could be used to analyse live lambs, as a cost-effective and rapid tool for genetic selection or management decisions. To achieve the project goal, selection of lambs from meat-type Latvian breeds and from Latvian dark head breed, feeding trial, ranking animals by groups based on feed efficiency will be conducted. Pre-grouped animals will be assessed for phenotypic parameters, potential genetic markers (using next-generation sequencing), molecular markers for metabolic efficiency, and product quality (body weight, height, fat content). Chemical and biochemical analysis of biological samples (blood, serum, stool samples) will be performed. Based on the obtained data, biostatistical methods will be used to develop algorithms for predictive models of various parameters, which will be tested in secondary lamb collection to ensure accuracy. We are planning to develop a cheap, simple and easily reproducible methodology of genetic and molecular FA markers in blood of live lambs for selection and/or for breeders.

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