

Abstract of the doctoral dissertation of Zuzanna Siudak, M.Sc., entitled:

The use of pumpkin seed cake in rabbit nutrition

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Pumpkin (*Cucurbita L.*) is a plant of the *cucurbitaceae* family, in which the edible part is the flesh at different stages of ripeness and the seeds, which are a valuable source of protein and fat. They also contain B vitamins and vitamin E and are characterised by a high content of polyunsaturated fatty acids, dietary fibre, phytosterols, phosphorus and potassium, as well as iron, selenium and zinc, so they are attributed with health-promoting properties. The bioactivity of pumpkin seeds may offer a sustainable natural alternative in the control of pathogenic organisms and parasites, as well as increasing resistance to disease infections. They contain cucurbitacin, a phytosterol that has a paralysing effect on most food parasites.

A by-product of pumpkin seed oil pressing is pumpkin seed cake, which is an excellent addition to the diet of livestock and fish. Studies have shown that the total protein content of the dry matter of pumpkin seed cake is 59.94%, which is higher than that of post-extraction soybean meal - 47.42%. When used in the feeding of many animal species, pumpkin seed cake, as a high-protein feed, can replace soybean meal in the feeding of rabbits, while also contributing to reducing the use of antiparasitic agents in this livestock.

The purpose of this study was to investigate the effects of 5% and 10% pumpkin seed cake addition to a complete feed mixture fed to rabbits on growth performance, slaughter traits, meat quality and animal health.

Studies on animals were carried out at rabbit farm K-083, belonging to The National Research Institute of Animal Production, in the period from the beginning of January to the end of May 2023. The experimental material was rabbits of the Popielno White breed. The rabbits belonging to the primary herd were kept individually in pens on deep bedding in an unheated, enclosed hall. Growing rabbits were kept in two-level cages (batteries), made of metal mesh,

designed for commercial rabbit rearing, with four animals of one sex per cage. The young animals were reared with their mothers until they were 35 days old and then moved to the two-level cages, 4 rabbits of one sex in each.

Three feeding groups were established: K (control) - fed a complete, pelleted basic feed mix of standard formulation with 13% post-extraction soy bean meal; D1 (experimental 1) - fed a complete, pelleted compound feed with 5% pumpkin seed cake and 6.5% post-extraction soy bean meal; D2 (experimental 2) - fed a complete, pelleted compound feed with 10% pumpkin seed cake and no post-extraction soy bean meal.

The young rabbits were weighed regularly from weaning at 35 days of age to determine growth performance such as body weight and daily gains. At the end of the experimental rearing, 10 rabbits (5 males, 5 females) from each group were randomly selected for slaughter. The body weight of the animals on the day of slaughter was between 2600 and 3300 g. During post-slaughter processing, the slaughter performance of the obtained rabbit carcasses was determined and the biological material was collected to be used for further analyses.

Meat quality analyses were carried out to determine its acidity, colour, texture, amino acid profile, fatty acid profile, chemical composition, cholesterol level and individual muscle fibre content. Morphological and biochemical analysis of blood was carried out, and indicators of redox status were determined. The contents of the gastrointestinal tract were examined for the composition of the intestinal microflora, and faeces were collected for parasitological examination and gas emission determination. Analysis of FADS2 and ACACA genes expression was performed on meat and liver samples. All results obtained were subjected to statistical analysis using the Statistica 13.1 PL statistical software package. A one-way analysis of variance was performed and the significance of differences between group means was estimated using Duncan's multiple range test.

There was no significant effect of the tested nutritional supplement on final body weight, hot and cold slaughter performance, meat quality traits such as chemical composition, cholesterol content and muscle fibre ratio, as well as on rabbit faecal gas emissions. The results obtained were comparable with the control group.

The experiment shows that the pumpkin seed cake tested had a positive effect on rabbit meat quality traits such as colour and acidity.

A positive effect of pumpkin seed cake on the health of the examined rabbits was also demonstrated. With increasing proportions of pumpkin seed cake in the animals' feed ration, the levels of total cholesterol, LDL cholesterol fraction and triglycerides were significantly reduced. The 10 % addition of pumpkin seed cake had a positive effect on the composition of

the rabbits' intestinal microflora by reducing the number of the harmful *E. coli* and *C. perfringens* bacteria. The pumpkin seed cake used had a positive effect on redox status indices, thereby reducing the probability of oxidative stress in the animals.

Increased expression levels of the FADS2 gene and decreased expression of the ACACA gene were shown in the longissimus lumborum muscle with increasing dietary intake of pumpkin seed cake.

The results of the experiment carried out confirm that pumpkin seed cake can be used as a protein feed component in rabbit nutrition without having a negative effect on the production performance and meat quality of rabbits. Furthermore, its positive effects on animal health can contribute to reducing the occurrence of diseases and the use of synthetic pharmaceuticals and coccidiostats on rabbit farms.