

ASPECTS OF DEVELOPING EXTRUDATES BASED ON OIL-FAT INDUSTRY BY-PRODUCTS

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By-products of oil-fat production, particularly sunflower and soybean meal, are valuable sources of protein and minerals, making them promising for producing extruded animal feed. The study aimed to determine the optimal component ratio to obtain a product with high nutritional value and technological properties.

The investigated samples (sunflower meal, soybean meal, and oat groats) comply with regulatory requirements (DSTU 4638, DSTU 4230, DSTU 7698). Sunflower meal contains 39.8 % protein, soybean meal – 43.1 %, while oat groats are rich in carbohydrates (59 %), contributing to the formation of a porous structure. Amino acid analysis revealed that sunflower meal protein has limiting amino acids – lysine (13.4 %) and leucine (18.5 %), whereas in soybean meal, the limiting factor is methionine+cystine (37.8 %). Combining these components allows balancing the amino acid profile of the final product.

Regression analysis established the dependence of porosity on the component ratio. Oat groats provide the highest porosity (85 %), while sunflower meal reduces this parameter to 60 %. The optimal ratio range ensuring 70 – 75 % porosity includes: 0.35 – 0.50 parts sunflower meal, 0.25 – 0.80 parts soybean meal, and 0.20 – 0.45 parts oat groats. Considering cost indicators and protein content, the rational composition was selected: 40 % sunflower meal, 25 % soybean meal, and 35 % oat groats.

The developed extruded feed significantly outperforms commercial analogs (extruded grain mixtures) in protein content (31.1 % vs. 9.6 %) and amino acid composition (9971 mg/100 g vs. 3454 mg/100 g), while remaining cost-competitive (285 UAH/t vs. 273 UAH/t). At the same time, porosity (72 % vs. 76 %) and moisture content (3.9 % vs. 4.1 %) are nearly identical.

Thus, oil-fat industry by-products are effective raw materials for extrusion due to their high protein content and balanced mineral composition. The optimal component ratio (40 % sunflower meal, 25 % soybean meal, 35 % oat groats) ensures high nutritional value and technological characteristics of the product. The developed feed surpasses commercial analogs in protein quality at comparable production costs, justifying its feasibility.

References:

1. Петік, І., Щербак, О., Хареба, О., Мироненко, Л., Боровкова, В., & Кібенко, Н. (2024). Розроблення екструдованого корму для тварин на основі відходів олієжирового виробництва. *Вісник аграрної науки*, 102(9).