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MIKORNA-POŚREDNICZONA MODULACJA FENOTYPOWA W WĄTROBIE ŚWINI: HEPATOPROTEKCYJNY EFEKT EKSTRAKTÓW ZIOŁOWYCH PRZECIWKO HEPATOTOKSYCZNOŚCI WYWOŁANEJ AFLATOKSYNĄ B1.

MICRORNA-MEDIATED PHENOTYPIC MODULATION IN PORCINE LIVER: HEPATOPROTECTIVE EFFECT OF MEDICINAL HERB EXTRACTS AGAINST AFLATOXIN B1-INDUCED HEPATOTOXICITY.

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BACKGROUND

MicroRNAs (miRNAs) are small non-coding RNA molecules involved in the post-transcriptional regulation of specific mRNA targets, thus possibly controlling many biological processes. The miRNA profiling analysis can contribute to understanding several signaling pathways, as biomarkers for molecular diagnostics, as well as the potential to be used as therapeutic targets. MicroRNAs (miRNAs) are small RNAs that post-transcriptionally regulate the expression of thousands of genes in a broad range of organisms in both normal physiological contexts and in disease contexts. miRNA expression profiling is gaining popularity because miRNAs, as key regulators in gene expression networks, can influence many biological processes and show promise as biomarkers for disease. Technological advances have spawned a multitude of platforms for miRNA profiling, and an understanding of the strengths and pitfalls of different approaches can aid in their effective use.

MATERIALS AND METHODS

The feeding experiment was conducted on the experimental herd at the Kortowo-III campus, UWM, Olsztyn. To date, the feeding experiment has been completed on 154 weaned piglets, aged 5-6 weeks. The feeding experiment was conducted in a uniform environment using experimental diets. Experimental pigs were kept in 10 per pen. Young pigs, after weaning at age of 35 days, were subject to the following three stages: **I stage** - pilot study for establishing proper doses of AFB1 per kg body weight (BW) of pigs (low – 30 µg, middle – 60 µg, high – 120 µg AFB1, and control group; each group consisted n=6) and the **II-stage** were examined the influence of pure herbals extract (low and high dose of each of herbs; *AP*- 10 and 30 mg/kg of BW, *SM* - 30 and 120 mg/kg of BW, and *CL* – 30 and 120 mg/kg of BW respectively, and control group, each group n = 10) and the **III stage** major experiment examined the hepatoprotective action of herbs against toxic influence of AFB1(120µg AFB1 and high dose of each specific herb, each group n = 10). In the proposed project, the research materials will be utilized by the five research entities from Poland and a research entity from FBN Dummerstorf, Germany.

RESULTS AND DISCUSSION

Phenotypic assessments, including liver function tests, haematological and biochemical parameters, and fatty acid profiling, were conducted to correlate molecular changes with physiological responses. Principal component analysis of normalized expression data demonstrated distinct clustering by treatment, confirming experimental group-driven variation and supporting downstream differential expression analysis. DEG identified miRNAs linked to hepatoprotection, notably ssc-miR-1271-5p and ssc-miR-34a, commonly differentially expressed across all groups, indicating a shared regulatory role in response to AFB1. Additional group-specific miRNAs were also detected. This integrative approach links key miRNAs with protective effects against AFB1 hepatotoxicity in porcine liver.

CONCLUDING REMARKS

This project underscores the hepatoprotective efficacy of *Andrographis paniculata*, Silymarin, and Curcumin against aflatoxin B1-induced liver toxicity, demonstrating their potential as viable therapeutic agents. The observed molecular and phenotypic outcomes validate the porcine model's translational applicability for investigating hepatic injury and intervention strategies. These findings provide a foundation for further exploration of herbal compounds as preventive measures in food safety and clinical management of liver diseases, highlighting their role in mitigating toxin-induced hepatic damage through modulation of key molecular pathways.

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