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HEPATOPROTECTIVE EFFECT OF SILYMARIN HERB IN PREVENTION OF LIVER DYSFUNCTION

WPLYW HEPATOPROTEKCYJNY SYLMARYNY W ZAPOBIEGANIU DYSFUNKCJI WĄTROBY

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BACKGROUND

Aflatoxin B1 (AFB1)-induced liver dysfunction represents a critical health challenge affecting both humans and animals, necessitating the identification of safe and efficacious hepatoprotective agents. *Silybum marianum* (milk thistle) is a well-established medicinal herb renowned for its antioxidant, anti-inflammatory, antifibrotic, and hepatoprotective properties. The primary active constituents of *S. marianum* are flavonolignans collectively known as *silymarin*, which are extracted from the seeds of the plant. Silymarin has been traditionally utilized to treat various liver disorders and is a key component in multiple pharmaceuticals and dietary supplements targeting liver injury. Its hepatoprotective effects are largely attributed to its capacity to scavenge free radicals, enhance hepatic glutathione synthesis by increasing cysteine availability, and modulate inflammatory and fibrotic pathways. Additionally, silymarin contributes to the prevention of chemically induced liver injuries and supports liver function through antioxidative and cytoprotective mechanisms. Due to its multifaceted pharmacological activities, silymarin remains extensively investigated as a therapeutic agent for liver diseases, including viral hepatitis and toxin-induced hepatotoxicity. However, definitive clinical efficacy in certain contexts requires further validation.

MATERIALS AND METHODS

The feeding experiment was conducted on the experimental herd at the Kortowo-III campus, University of Warmia and Mazury (UWM), Olsztyn, and enrolled 154 weaned piglets aged 5–6 weeks maintained under uniform housing and dietary conditions, with 10 pigs per pen. Following weaning at 35 days, the protocol comprised three stages: (i) pilot dosing of aflatoxin B1 (AFB1) at 30, 60, and 120 µg/kg body weight (BW) versus control (n=6 per group); (ii) evaluation of purified herbal extracts—*Andrographis paniculata* (AP; 10, 30 mg/kg BW), silymarin (SM; 30, 120 mg/kg BW), and curcumin (CL; 30, 120 mg/kg BW)—plus control (n=10 per group); and (iii) the main trial assessing hepatoprotection against 120 µg/kg BW AFB1 with high-dose herb supplementation (n=10 per group). Research materials generated will be shared among five Polish institutions and a partner at FBN Dummerstorf, Germany, to enable collaborative analyses and dissemination.

RESULTS AND DISCUSSION

Initial analyses demonstrate that herbal supplementation significantly enhances overall body weight and modulates various haematological and biochemical parameters. Preliminary transcriptomic data further reveal the upregulation of genes associated with oxidative stress responses and xenobiotic metabolism under both in vivo and in vitro conditions, suggesting a mechanistic basis for the observed physiological improvements.

CONCLUDING REMARKS

This study highlights the potent hepatoprotective capacity of silymarin against aflatoxin B1-induced liver toxicity. The integration of phenotypic improvements and transcriptomic changes underscores silymarin's role in enhancing antioxidative defences and xenobiotic clearance, validating its therapeutic potential. Moreover, the porcine model proves valuable for translational research aimed at developing targeted interventions for liver diseases.

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