

Effects of *Ganoderma lucidum* polysaccharides and ganoderic acid on coagulation time and lipid profile in diabetic mice

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Abstract

Biological polymers from edible-medicinal mushrooms have beneficial effects on blood parameters. This study investigates the anticoagulant, cholesterol-lowering, and antimicrobial effects of bioactive compounds from *Ganoderma lucidum*. Polysaccharides were extracted and purified from *Ganoderma* using DEAE-52 Sephadex column chromatography, and ganoderic acid was obtained from Sigma-Aldrich. Antimicrobial activity was assessed by the Kirby-Bauer method. In the in vivo section, 20 Balb/c mice were divided into normal and diabetic groups (induced by streptozotocin injection at 200 mg/kg). Half of the mice received 5 g of liquid oil per 100 g body weight. Daily treatments included *Lactobacillus plantarum* (5.5×10^8 cfu/kg), prebiotic ganoderic acid (0.04 mg/kg), and *Ganoderma* polysaccharide (0.2 mg/kg) for two weeks. Blood samples were then collected to measure cholesterol levels and coagulation time. Results showed that the MIC of polysaccharides was 40% against *Escherichia coli* and 20% against *Staphylococcus aureus*, while ganoderic acid had an MIC of 20% for both bacteria. Consumption of a high-fat diet significantly increased body weight, which was reduced by polysaccharide treatment, especially in groups receiving both polysaccharides and ganoderic acid ($P_v \leq 0.05$). In diabetic mice, total cholesterol, triglycerides, and LDL levels significantly decreased, and HDL increased in groups treated with polysaccharides and ganoderic acid ($P_v \leq 0.05$). Coagulation time significantly increased in groups receiving the combination of polysaccharides and ganoderic acid compared to the high-fat control group ($P_v < 0.05$). The cholesterol-lowering effect of the extracted polysaccharides was greater than that of ganoderic acid. dietary supplementation with *Ganoderma lucidum*, through its prebiotic effects, improves blood coagulation time and reduces cholesterol levels in diabetic mice, indicating its potential in ameliorating metabolic complications of diabetes.

Keywords: Anticoagulant, Antidiabete, Polysaccharide, Ganoderic acid, *Ganoderma lucidum*.