



# Gallic Acid Reduces Inflammation and Histopathological Changes of Liver Tissue Following Biliary Cirrhosis Caused By Bile Duct Ligation Model

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## ABSTRACT

**Introduction:** Impaired bile secretion leads to cholestatic liver disease, in which bile substances cannot leave the liver. Biliary atresia, infections, hormones, medications, common bile duct stones, choledochal cysts, and tumors may cause biliary obstruction and biliary cirrhosis. Gallic acid (GA), a natural antioxidant, is mainly found in black and green teas, apples, grapes, strawberries, and pineapples. GA has anticancer, antimicrobial, and anti-inflammatory properties that can treat diseases associated with inflammation in the intestine, liver, and kidney. The present study was designed to evaluate the effect of GA on liver damage caused by cholestasis.

**Methods and Materials:** Rats were randomly divided into four groups, each consisting of eight subjects: Sham, BDL, BDL + 20 mg/kg of GA, and BDL + 30 mg/kg of GA. The rats were anesthetized 28 days after the BDL, followed by collecting their blood and excising their liver.

**Results:** Serum levels of liver enzymes, total bilirubin, expression of IL-6 and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), necrosis of hepatocytes, bile duct proliferation, lymphocytic infiltration, and liver fibrosis showed an increase in the BDL group compared to the sham group ( $p = 0.05$ ). The groups receiving GA indicated a decrease in liver enzymes, total bilirubin, the expression of IL-6 and TNF- $\alpha$ , and a reduction in liver tissue damage compared to the BDL group ( $p = 0.05$ ).

**Conclusion and Discussion:** GA, with antioxidant properties, was able to reduce inflammation and necrosis of hepatocytes and fibrosis of liver tissue following the accumulation of bile acids in the liver and improve liver function.

**Keywords:** Biliary liver cirrhosis, Gallic acid, Inflammation