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Effect of Safflower Oil on Liver Enzyme Activity in Experimental Toxic Hepatitis

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Relevance: Liver enzyme activity is a key diagnostic tool for assessing hepatocellular injury and functional state of the liver. Toxic hepatitis typically leads to significant increases in ALT, AST, alkaline phosphatase, and GGT due to hepatocyte necrosis and membrane disruption. Correction of these changes is one of the most important criteria for evaluating hepatoprotective agents. Natural oils are of particular interest because they can modulate enzymatic activity through both antioxidant and anti-inflammatory mechanisms. Safflower oil, enriched with polyunsaturated fatty acids, may support normalization of hepatic enzymes. Comparative evaluation with cottonseed oil provides insights into the therapeutic superiority of natural oils.

Aim of the study: To investigate the effect of safflower oil on ALT, AST, alkaline phosphatase, and GGT in experimental toxic hepatitis compared to cottonseed oil.

Materials and Methods: Forty male rats were randomized into four groups: intact, control, safflower oil, and cottonseed oil (n=5 each). Toxic hepatitis was induced by paracetamol (1000 mg/kg). From the third day, rats received daily oral safflower or cottonseed oil at 10 ml/kg for 14 days. Serum ALT, AST, alkaline phosphatase, and GGT levels were measured using commercial kits. Statistical differences were analyzed with Student's t-test ($p < 0.05$).

Results: In the control group, ALT and AST increased 1.22–1.35-fold compared with intact animals, indicating hepatocyte injury. Treatment with safflower oil reduced ALT by 1.17 times and AST by 1.48 times versus control, bringing values closer to normal. Cottonseed oil showed no significant reduction in ALT and only a 1.23-fold decrease in AST compared to control ($p < 0.05$). Alkaline phosphatase activity, elevated 1.43-fold in the control group, normalized under safflower oil but increased further under cottonseed oil ($p < 0.05$). GGT activity decreased 1.23-fold with safflower oil, reflecting hepatoprotection, whereas cottonseed oil had a weaker effect, maintaining values near control levels. The superior normalization of enzymatic activity under safflower oil demonstrates its effectiveness in reducing cytolysis and preserving hepatocyte integrity.

Conclusions: Safflower oil exerts a significant corrective influence on liver enzymes in toxic hepatitis. It reduced ALT and AST more effectively than cottonseed oil, normalized alkaline phosphatase, and stabilized GGT activity. These results highlight its hepatoprotective potential and ability to restore functional enzymatic balance. Cottonseed oil exhibited weaker protective effects and potential risks of enzyme imbalance. Safflower oil may be recommended as a natural hepatoprotective agent in conditions of oxidative liver injury.

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