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Hepatoprotective effects of ethanolic stem extract of *Tinospora cordifolia* against high-fat diet-induced NAFLD in albino Wistar rats

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ABSTRACT

Background: One of the most common chronic liver diseases in the world, non-alcoholic fatty liver disease (NAFLD) is closely related to metabolic syndrome, obesity and insulin resistance. There is a need for safer and more effective substitutes because there are still few therapeutic options available for liver disease. A common medicinal plant in traditional medicine, *Tinospora cordifolia* is known to have hepatoprotective, anti-inflammatory and antioxidant.

Keywords: Non-Alcoholic Fatty Liver Disease, NAFLD, *Tinospora cordifolia*, Hepatoprotection, Oxidative Stress, Wister Rats, High-Fat Diet

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Introduction

About 25–30% of population around world suffer from non-alcoholic fatty liver disease (NAFLD) which has become the most prevalent chronic liver disease. Excessive triglyceride accumulation in hepatocytes without alcohol intake is the hallmark of the illness. NAFLD broad spectrum of ranging from simple steatosis to non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis and hepatocellular carcinoma

Insulin resistance, oxidative stress, chronic inflammation, mitochondrial dysfunction and abnormalities in lipid metabolism are all part of the pathophysiology of NAFLD. Overproduction of free fatty acids encourages the production of reactive oxygen species (ROS), which causes hepatocellular damage and triggers inflammatory pathways [1].

Due to their reduced side effects and multi-targeted pharmacological activities medicinal plants are becoming more and more popular as alternative therapeutic agents. Alkaloids, flavonoids, glycosides, diterpenoid and phenolic compounds are among the physiologically active substances found in Tinospora cordifolia (Giloy) a well-known medicinal plant. Its antioxidant, anti-inflammatory, immunomodulatory, antidiabetic and hepatoprotective qualities have been described in earlier research [2].

The goal of the study was to check the hepatoprotective potential of Tinospora cordifolia ethanolic stem extract against NAFLD caused by a high-fat diet.

Therapeutic Significance of Tinospora cordifolia

Tinospora cordifolia is a major medicinal plant used in Ayurvedic medicine. The plant has a variety of phytochemicals with antioxidant and anti-inflammatory activities. These compounds help neutralize reactive oxygen species, decrease inflammatory responses and increase metabolic regulation making the plant a promising candidate for liver protection [3-4].

Role in the Management of NAFLD

Research shows that *Tinospora cordifolia* help to reduce the buildup of lipids in the liver improve the liver enzyme level and restore the normal liver architecture. Its bioactive ingredients help in improving insulin sensitivity and lowering oxidative damage, both of which are critical in managing NAFLD progression. Therefore, the plant can be used as a supportive natural therapy in the management of fatty liver disease [5-6].

Future Directions

The current results are promising but more experimental and clinical studies are needed to find out the optimal dose, long-term safety and mechanisms of action. Standardized investigations could further sure its use as a therapeutic option for NAFLD.

Conclusion

Tinospora cordifolia has good potential for hepatoprotection due to its antioxidant and anti-inflammatory activities. Current evidence shows its role in the prevention and treatment of non-alcoholic fatty liver disease by improving hepatic function and relieving hepatic damage. There are need of further stuff to confirm its clinical efficacy and therapeutic use.

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