

**PHARMACOLOGICAL POTENTIAL OF *Salacia reticulata* PHYTOCHEMICALS IN
MODULATING HEPATIC LIPID HOMEOSTASIS AND INFLAMMATORY PATHWAYS IN
NON-ALCOHOLIC FATTY LIVER DISEASE**

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Non-alcoholic fatty liver disease (NAFLD) is a progressive metabolic disorder characterized by hepatic lipid accumulation, insulin resistance, and chronic inflammation, with limited effective pharmacological treatments. *Salacia reticulata*, a medicinal plant native to Sri Lanka and South Asia, has been traditionally used in Ayurveda for metabolic disorders such as diabetes, obesity, and liver dysfunction. Rich in bioactive compounds including mangiferin and salacinol, *S. reticulata* exhibits lipid-lowering, anti-inflammatory, and antioxidant properties, making it a potential therapeutic strategy for NAFLD. This study systematically reviewed published literature on preclinical and clinical evidence regarding its effects on hepatic lipid metabolism and inflammatory pathways. A comprehensive systematic literature search was conducted from 2005 to 2024 using MEDLINE and ScienceDirect databases due to the limited availability of published scientific literature on this topic. The review adhered to PRISMA-P guidelines and included in vitro, in vivo, and clinical studies. In vitro studies demonstrated that *S. reticulata* extracts inhibit pancreatic lipase activity and adipocyte differentiation, while modulating PPAR- γ and adiponectin expression; suggesting lipid-lowering and insulin-sensitizing effects. In vivo, extracts significantly reduced hepatic triglyceride accumulation, liver enzyme levels (ALT, AST), and lipid peroxidation in animal models of liver injury. Key mechanisms included PPAR- α activation, AMPK modulation, and suppression of fat accumulation. Some studies also reported beneficial regulation of genes linked to glucose and lipid metabolism in liver tissues. Although hepatic-specific anti-inflammatory data remain limited, general anti-inflammatory effects have been demonstrated in preclinical models. Human studies revealed improvements in serum lipid profiles and glycemic control in individuals with pre-diabetes and hyperlipidemia, supporting the systemic metabolic benefits of *S. reticulata*. However, direct evidence in human NAFLD remains limited. *Salacia reticulata* shows promising pharmacological potential in modulating hepatic lipid metabolism and inflammation in NAFLD, particularly through PPAR- α and AMPK pathways. Further clinical validation is warranted. Future research should integrate personalized Ayurveda approaches, artificial intelligence, and advanced drug delivery systems to optimize its therapeutic application within Sri Lanka's healthcare framework.

Keywords: Anti-inflammatory pathways, Hepatic lipid metabolism, Non-alcoholic fatty liver disease, Phytochemicals, *Salacia reticulata*