



## Reno- and Hepato-Protective Effects of Garlic Against Glycerol-Induced Renal and Hepatic Injury in Rats: Role of Inflammation, Apoptosis and Tubular Injury

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**SUMMARY.** Garlic is used in folk medicine. Thirty rats were allocated into 5 groups. Group 1 served as normal group. Groups 2-5 received 25% glycerol on the 15<sup>th</sup> day. Group 3 received vitamin C (200 mg/kg) and groups 4 and 5 received garlic (100 and 200 mg/kg) respectively. All rats were investigated for the serum levels of creatinine, urea, AST & ALT and renal and hepatic contents of TNF- $\alpha$ . Renal tissue levels of tubular injury markers; Kidney Injury Molecule-1 (KIM-1) and Neutrophil Gelatinase Associated Lipocalin (NGAL) were assessed. Histopathological and immunohistochemical examination of caspase-3 were conducted. Garlic improved renal and hepatic functions and histopathological features. Tubular injury was ameliorated as evidenced by decreased KIM-1 and NGAL levels. Garlic protected against glycerol-induced renal injury via amelioration of tubular injury, anti-inflammatory and anti-apoptotic effects. The study demonstrates a novel injurious effect of glycerol on hepatic tissue and proves the hepato-protective effects of garlic.

**RESUMEN.** El ajo se usa en medicina popular. Treinta ratas fueron divididas en 5 grupos. El grupo 1 sirvió como grupo normal. Los grupos 2-5 recibieron 25% de glicerol en el día 15. El grupo 3 recibió vitamina C (200 mg/kg) y los grupos 4 y 5 recibieron ajo (100 y 200 mg/kg) respectivamente. Se investigaron todas las ratas para determinar los niveles séricos de creatinina, urea, AST y ALT y los contenidos renal y hepático de TNF- $\alpha$ . Niveles de tejido renal de marcadores de lesión tubular; se evaluaron la molécula 1 de lesión renal (KIM-1) y la lipocalina asociada a gelatinasa de neutrófilos (NGAL). Se realizó un examen histopatológico e inmunohistoquímico de caspasa-3. El ajo mejoró las funciones renales y hepáticas y las características histopatológicas. La lesión tubular se mejoró como lo demuestran los niveles disminuidos de KIM-1 y NGAL. El Ajo protegió contra la lesión renal inducida por glicerol a través de la mejora de la lesión tubular, con efectos antiinflamatorios y antiapoptóticos. El estudio demuestra un nuevo efecto perjudicial del glicerol sobre el tejido hepático y los efectos hepatoprotectores del ajo.

**KEY WORDS:** garlic, glycerol, kidney, liver, rats, tubular injury.

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