PP – 03

Protective effect of nanomicelles containing curcuminoids against diazinon-induced oxidative damage

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Objective: Diazinon (DZ) is an organophosphate pesticide that induces oxidative damage in different organs. The aim of this study was to compare the effectiveness of nanomicelles containing curcuminoids (NCUR) and natural curcumin (CUR) in attenuating the oxidative damage induced by DZ in male rats.

Methods: After a single intraperitoneal (ip) injection of DZ (100 mg/kg), the rats were administered either CUR or NCUR (25 and 60 mg/kg, ip). Biomarkers of cell damage including, alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase (ALP), creatinine (Cr), urea, lactate dehydrogenase (LDH), creatine kinase-MB isoenzyme (CK-MB) and troponin I, were quantified in the serum. Lipid peroxidation (LPO) and glutathione (GSH) content in the liver, kidney, and heart tissues were determined.

Results: DZ administration increased the serum levels of ALT, AST, ALP, Cr, urea, LDH, CK-MB, and troponin I; however, the levels significantly ($P<0.001$) decreased in the CUR- and NCUR-treated groups compared to those in the DZ group. NCUR significantly decreased LPO ($P<0.05$) and increased GSH ($P<0.05$) in the heart, kidney, and liver tissues at all doses (especially, at 60 mg/kg) compared with CUR.

Conclusion: Our findings suggest that NCUR treatment counters DZ-induced oxidative tissue damage to a greater extent than CUR.