Abstract 8

Nano‑curcumin versus curcumin in enhancement of the metabolic disorder in High Fructose- and High-Fat-Fed Male Rats

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Background: The aim of the present study was to investigate the therapeutic effectiveness of Curcumin (CMN) and curcumin encapsulated in chitosan nanoparticles (CMN -NP) at the same dose level on high fructose- and high-fat diet (HFHF)-induced metabolic syndrome in male rats.

Materials and Methods: Male rats were divided into four groups of six each: control group; rats were fed with normal diet, HFHF group; rats were fed with high-fat-high-fructose diet (HFHF) for 10 weeks, HFHF+ CMN and HFHF+ CMN-NP; the rats were fed with a HFHF diet for 10 weeks then supplemented orally with CMN free form (50 mg\kg bw) and CMN loaded nanoparticles' (CMN-NP, 50 mg\kg bw), respectively for 4 weeks. Thereafter, blood samples were collected from all the treatment groups for

detection of biochemical parameters. Qualitative DNA-laddering assay, lysosomal enzyme activities and oxidative stress markers were determined in liver samples.

Results: Rats fed HFHF diet showed elevated serum levels of glucose, triglycerides, low density lipoprotein and decreased serum levels of high density lipoprotein. Furthermore, increased lysosomal enzyme activities, apoptotic DNA fragmentation and hepatic MDA level along with declined GSH level were observed in HFHF treated group compared to control value. Treatment of rats with both free CMN and CMN-NP succeeded to attenuate all these alterations induced by HFHF due to its antioxidant, antihyperglycemic, anti-hypercholesterolemic effects The results indicated that CMN-NP caused better amelioration than free CMN at the same dose level.

Conclusion: Encapsulation of CMN in chitosan nanoparticles could be an effective strategy to improve its bioavailability and reduce the dose required for its protective effect against HFHF-induced metabolic syndrome in rats.

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