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Effects of novel water soluble nanocurcumin on arsenic-induced genotoxicity in rats

P Sankar and **K Ramya**
Tamil Nadu Veterinary and Animal Sciences University, India

Curcumin loaded PLGA nanoparticles (CUR-NP) were synthesized to explore whether nanoformulation of curcumin can cause better protective effect than free curcumin against arsenic-induced genotoxicity in rat model. The CUR-NP prepared by emulsion technique was spherical in shape with particle size of 130.8 nm and 86.5% entrapment efficiency. The CUR-NP showed biphasic release pattern and it was dissolved in water easily. Rats were randomly divided into five groups of six each. Group I was kept as the control. In Group II, rats were exposed to sodium arsenite (25 ppm) daily through drinking water for 42 days. Groups III, IV and V were treated with arsenic as in Group II, however, they were administered empty nanoparticle, curcumin (100 mg/kg bw) and CUR-NP (100 mg/kg bw), respectively, by oral gavage during the last 14 days of arsenic exposure. At term, bone marrow cells were collected. The result indicated that arsenic significantly increased the formation of chromosomal aberrations, micronuclei and DNA damage in rat bone marrow cells. Free curcumin and CUR-NP treatment significantly attenuated these arsenic-mediated genotoxicity. However, the magnitude of the effects indicates that CUR-NP has better protective effect than free curcumin at the equivalent dose level for preventing arsenic-induced toxicity.

Biography

P Sankar is currently working as an Assistant Professor in the Department of Veterinary Pharmacology and Toxicology, Veterinary College and Research Institute, under TamilNadu Veterinary and Animal Sciences University (TANUVAS), Chennai. He has obtained his BVSc in Veterinary Science at TANUVAS in the year 2005, MVSc and Doctoral degree in Veterinary Pharmacology and Toxicology in the year 2008 and 2012 respectively at Indian Veterinary Research Institute, Deemed University, India, where he worked as a Scientist for four years in the area of Toxicology and Nanoparticle Drug Delivery. He was awarded with ICAR Junior Research Fellowship for pursing his Master's degree and Senior Research Fellowship for Doctoral Program. Currently his research focuses on the nanoparticle drug delivery system to improve the drug efficiency of existing drugs in markets. In addition, he has completed three research projects in the area of nanoparticle drug delivery and toxicology and has published research papers in the peer reviewed international journals with good impact factor.

drpsankarster@gmail.com

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