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Protective effects of vitamins A and E against diesel fuel-induced hepatotoxicity in rats

Friday E. Uboh, Saviour Ufot, Eve Mboso and Patrick E. Ebong
University of Calabar, Nigeria

Diesel fuel has been reported to cause hepatotoxicity in experimental animal models. This study assessed the protective effect of vitamins A and E against diesel fuel-induced hepatotoxicity in rats. Vitamins A (retinol) and E (α -tocopherol), at prophylactic dosage (400 and 200 IU/kg/day, respectively) were orally administered, separately and as combined therapy, to rats orally exposed to 4.0 ml/kg body weight of diesel fuel, once daily for 30 days. Serum lipid profile, including cholesterol, triglycerides, low density lipoproteins (LDL), very low density lipoproteins (VLDL) and high density lipoproteins (HDL); serum liver enzymes, including alanine and aspartate aminotransferases (ALT and AST), alkaline phosphatase (ALP) and gamma glutamyltransferase (GGT) activities; and liver tissue oxidative stress bioindicators, including malondialdehyde, catalase and superoxide dismutase (SOD) activities, were estimated using standard methods. A significant ($p < 0.05$) increase in serum cholesterol, LDL, triglycerides, VLDL, liver tissue malondialdehyde levels, serum ALT, AST, ALP and GGT activities; and a significant decrease in serum HDL level, liver tissue catalase and SOD activities were recorded for rats orally exposed to diesel fuel, compared to control. Concomitant administration of vitamins A and E, respectively, to rats exposed to diesel fuel produced a significant ($p < 0.05$) increase in serum HDL level, liver tissue catalase and SOD activities; decrease in serum cholesterol, triglycerides, LDL, VLDL, liver tissue malondialdehyde levels, serum ALT, AST, ALP and GGT activities; with vitamin E showing a higher potency than vitamin A. However, the effect of combined therapy of vitamins A and E was not significantly different ($p > 0.05$) from that recorded for individual vitamins. The results of this study indicated that vitamins A and E provide protection against diesel fuel-induced hepatotoxicity; and that vitamin E is a more potent antioxidant than vitamin A in rats.

Biography

Friday E Uboh holds BSc, MSc and Ph.D. degrees in Biochemistry (Clinical Biochemistry & Biochemical/Environmental Toxicology) from University of Calabar, Calabar, Nigeria. He is a Senior Lecturer in the Department of Biochemistry, University of Calabar, Calabar, Nigeria. He teaches several Biochemistry courses (including Enzymology, Clinical Biochemistry, Biochemical Toxicology, Tissue Biochemistry Biochemical Methods/Techniques) at the University and supervises a number of graduate and undergraduate students at different departments of the University. He has served in the department as an Examination Officer for 5 years, member of the Departmental Academic Board and Graduate Committee. At present, he is the acting head of the department. His research focus includes several issues on biochemical and environmental toxicology, clinical biochemistry and medicinal plants. He is a member of Nigerian Society for Biochemistry and Molecular Biology (NSBMB) and Institute of Public Analysts of Nigeria (IPAN). He is very prolific in writing and has published many research articles in many reputable scientific journals. He is also a reviewer and member of editorial board in many national and international journals.

fridayuboh@unical.edu.ng