KOLAVIRON, A GARCINIA KOLA BIFLAVONOID, PREVENTS ENVIRONMENTAL CHEMICAL-INDUCED OXIDATIVE DAMAGE, STEROIDOGENIC DYSFUNCTION AND APOPTOSIS IN TESTES OF RATS

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Abstract: Adverse effects of environmental and/or life style factors have been linked world-wide to the general decline of sperm counts in males. Male factor infertility accounts for up to half of all cases of infertility and affects one man in twenty in the general population. Exposure of humans to environmental chemicals following recent rapid industrialization has been implicated in the observation that 15-20% of couples in industrialized countries compared to 7-8% in the 1960s are in infertile. Induction of oxidative stress in testis accompanied by alteration in the levels of stress proteins such as heat shock proteins (HSP) and clusterin (CLU), steroidogenesis and apoptosis have been shown to results from exposure to environmental and endocrine disrupting compounds. The role of reactive oxygen species (ROS) in testicular damage continues to underpin the search for novel non-toxic antioxidant indications from plant extracts. Our data indicate that kolaviron, a natural antioxidant biflavonoid from the seed of Garcinia kola protects against testicular oxidative damage and improved spermatozoa motility and decreased abnormal spermatozoa induced by di-n-butylphthalate in rats. Ethylene glycol monoethyl (EGEE) exposure alone elicited significant increase in HSP and sCLU levels in rats. The increased expression of active caspases, Fas and Fas-L was accompanied by nuclear factor kappa B (NF-κB) down-regulation and diminution of cytosolic cytochrome c level. Also, the observation from immunofluorescence staining was consistent with the increased TUNEL-positive nuclei in EGEE-treated rats. Kolaviron significantly inhibited induction of stress protein and germ cell apoptosis in EGEE-treated rats. Also, pre-treatment with kolaviron restored the testicular antioxidant status, sialic acid concentration, modulated the activities of 3β Hydroxysteroid dehydrogenase (3β-HSD) and 17β Hydroxysteroid dehydrogenase (17β-HSD) in carbendazim-treated rats. Similarly, testicular caspase 3 and Fas expression was markedly down-regulated with significant decrease in the apoptotic nuclei to near control level by kolaviron. Overall, Kolaviron owing to its intrinsic antioxidant and anti-apoptotic properties is a potential candidate useful in combating reproductive dysfunction and endocrine pathology induced by environmental compounds.