In Vitro Assessment of Di(2-Ethylhexyl) Phthalate Induced Alterations in Epididymal Semen Quality and Sperm-Oviduct Binding Efficiency in Dromedary Camels (Camelus dromedarius)

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Abstract

Dromedary camels **(***Camelus dromedarius***)** play a vital role in the lives of countless communities across arid and semi-arid regions, providing both economic sustenance and cultural significance. Unfortunately, Camelus dromedarius frequently face infertility challenges due to various known and unknown factors. Among these potential threats, endocrine disruptors like di(2-ethylhexyl) phthalate (DEHP) have emerged as a growing concern. DEHP is a ubiquitous environmental contaminant known to negatively impact reproductive parameters in diverse species, including humans. This study aimed to investigate the potential reproductive toxicity of DEHP on Camelus dromedarius, specifically focusing on its effects on epididymal semen quality and sperm-oviduct binding efficiency. Epididymal semen samples were collected from freshly slaughtered adult camels and exposed to varying DEHP concentrations (0, 10, 25, and 50 micromolar) for 60 minutes in vitro. Subsequently, sperm from each treatment group were co-incubated with oviductal explants for an additional 60 minutes. We meticulously evaluated the impact of DEHP on various epididymal sperm parameters, including viability, morphology, and DNA integrity. Additionally, their binding affinity to the oviductal explants was assessed. Our findings revealed significant alterations in epididymal sperm viability, morphology, and DNA integrity following DEHP exposure, with statistically significant differences observed at a p-value of less than 0.05. Notably, the sperm-oviduct binding index displayed a significant reduction in groups treated with 25 and 50 micromolar DEHP concentrations compared to the other groups. Interestingly, no significant difference was observed between the 25 and 50 micromolar groups. These compelling findings

demonstrate that DEHP exposure can negatively impact crucial Camelus dromedarius sperm parameters, including their ability to bind to the oviduct. Given the significant role of Camelus dromedarius in arid and semi-arid regions, further research is warranted to elucidate the underlying mechanisms of DEHP toxicity and develop mitigation strategies to safeguard Camelus dromedarius reproductive health and contribute to sustainable camel husbandry practices.