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Cissampelos capensis Rhizome Extract Induces Intracellular ROS Production, Capacitation, and DNA Fragmentation in Human Spermatozoa

Authors : S. Shalaweh, P. Bouic, F. Weitz, R. Henkel

Abstract : More than 3000 plants of notable phyto-therapeutic value grow in South Africa; these include Cissampelos capensis, commonly known in Afrikaans as dawidjie or dawidjiewortel. C. capensis is the most significant and popular medicinal plant used by the Khoisan as well as other rural groups in the Western region of South Africa. Its rhizomes are traditionally used to treat male fertility problems. Yet, no studies have investigated the effects of this plant or its extracts on human spermatozoa. Therefore, this study aimed at investigating the effects of C. capensis rhizome extract (CRE) fractions on ejaculated human spermatozoa in vitro. Spermatozoa from a total of 77 semen samples were washed with human tubular fluid medium supplemented with bovine serum albumin (HTF-BSA) and incubated for 2 hourswith 20 µg/ml progesterone (P4) followed by incubation with different concentrations (0, 0.05, 0.5, 5, 50, 200 µg/ml) of fractionated CRE (F1=0% MeOH, F2=30% MeOH, F3=60% MeOH and F4=100% MeOH) for 1.5 hours at 37°C. A sample without addition of CRE fractions served as control. Samples were analyzed for sperm motility, reactive oxygen species (ROS), DNA-fragmentation, acrosome reaction and capacitation. Results showed that F1 resulted in significantly higher values for ROS, capacitation and hyper-activation compared to F2, F3, and F4 with P4-stimulated samples generally having higher values. No significant effect was found for the other parameters. In conclusion, alkaloids present in F1 of CRE appear to have triggered sperm intrinsic ROS production leading to sperm capacitation and acrosome reaction induced by P4.

Keywords : capacitaion, acrosome reaction, DNA fragmentation, ROS
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