

Effects of Supplementation with Annatto (Bixa Orellana)-Derived δ -Tocotrienol on the Nicotine-Induced Reduction in Body Weight and 8-Cell Preimplantation Embryonic Development in Mice

Authors : M. H. Rajikin, S. M. M. Syairah, A. R. Sharaniza

Abstract : Effects of nicotine on pre-partum body weight and preimplantation embryonic development has been reported previously. Present study was conducted to determine the effects of annatto (Bixa orellana)-derived delta-tocotrienol (TCT) (with presence of 10% gamma-TCT isomer) on the nicotine-induced reduction in body weight and 8-cell embryonic growth in mice. Twenty four 6-8 weeks old (23-25g) female balb/c mice were randomly divided into four groups (G1-G4; n=6). Those groups were subjected to the following treatments for 7 consecutive days: G1 (control) were gavaged with 0.1 ml tocopherol stripped corn oil, G2 was subcutaneously (s.c.) injected with 3 mg/kg/day of nicotine, G3 received concurrent treatment of nicotine (3 mg/kg/day) and 60 mg/kg/day of δ -TCT mixture (contains 90% delta & 10% gamma isomers) and G4 was given 60 mg/kg/day of δ -TCT mixture alone. Body weights were recorded daily during the treatment. On Day 8, females were superovulated with 5 IU Pregnant Mare's Serum Gonadotropin (PMSG) for 48 hours followed with 5 IU human Chorionic Gonadotropin (hCG) before mated with males at the ratio of 1:1. Females were sacrificed by cervical dislocation for embryo collection 48 hours post-coitum. Collected embryos were cultured in vitro. Results showed that throughout Day 1 to Day 7, the body weight of nicotine treated group (G2) was significantly lower ($p < 0.05$) than that of G1, G3 and G4. Intervention with δ -TCT mixture (G3) managed to increase the body weight close to the control group. This is also observed in the group treated with δ -TCT mixture alone (G4). The development of 8-cell embryos following in vitro culture (IVC) was totally inhibited in G2. Intervention with δ -TCT mixture (G3) resulted in the production of 8-cell embryos, although it was not up to that of the control group. Treatment with δ -TCT mixture alone (G4) caused significant increase in the average number of produced 8-cell embryo compared to G1. Present data indicated that δ -TCT mixture was able to reverse the body weight loss in nicotine treated mice and the development of 8-cell embryos was also improved.

Keywords : δ -tocotrienol, body weight, nicotine, preimplantation embryonic development

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