Full Length Research Paper

Effects of nicotine and Gelam honey on testis parameters and sperm qualities of juvenile rats

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Accepted 18 October, 2011

The present study aimed to elucidate the effects of nicotine and Gelam honey on testis parameters and sperm qualities of rats. Sprague Dawley rats (4 to 5 weeks old) were divided into 4 groups with 7 rats for each group. Rats of the honey (H) and honey-control (HC) groups were force-fed daily with 1.0 ml/100 g body weight of Gelam honey and normal saline (0.9%), respectively. Rats in the nicotine (N) group were intraperitoneally (i.p.) injected with 5.0 mg/kg body weight of nicotine whilst the nicotine-control (NC) group received normal saline (0.9%) injection (i.p.) in similar doses as in the N group. After 60 days of treatments, the rats were sacrificed. Testicular parameters and sperm qualities were assessed for motility, vitality and morphology. There were no significant differences in weight, length and width gain of testis among the groups. The H group showed significantly higher sperm motility (18.85 ± 5.89 × 10⁵/ml) and normal morphology of sperm (193.73 ± 1.03) than the HC group (p<0.05). However, for the N group, lower sperm motility (17.80 ± 5.45 × 10⁵/ml), lesser sperm with normal morphology (119.59 ± 5.70) and live sperm (156.80 ± 8.91) were observed as compared to the NC group (p<0.05). This study suggested that i.p. injection of nicotine could adversely affect sperm qualities and Gelam honey was potentially useful in increasing the fertility of juvenile male rats by increasing sperm motility and number of morphologically normal sperm.

Key words: Sprague dawley rats, honey, nicotine, sperm quality.

INTRODUCTION

Biological and experimental data indicated that tobacco in cigarette smoking could lead to reproductive and infertility related problems in humans, especially for males. Tobacco smoking had been shown to reduce the male to female ratio of offspring born to smoking parents, even if only the father smokes (Fukuda et al., 2002). Specific adverse effects of cigarette smoking and passive smoking on sperm density, motility and morphology had been demonstrated (Stillman, 1989; Hull et al., 2000).

Unfavorable effects of cigarette smoking on fertility could possibly be due to the contents of cigarette smoke which includes nicotine, carbon monoxide and other recognized carcinogens and mutagens (Stillman et al., 1986). It had been reported that the reproductive capacity of nicotine injected rats was greatly reduced, and the effect was greater in males than in females (Riesentfeld and Ovila, 1988). Thus, there is an ongoing search for a protective substance from the many ailments of nicotine, including its adverse effects on reproductive health. One of the candidates is honey which contains sugars such as glucose and fructose; mineral such as potassium, calcium, iron, magnesium, sodium chloride, sulphur, and phosphates; as well as vitamins B1, B2, C, B6, B5 and B3 (Estevinho et al., 2008). Honey, one of the oldest remedies known for maintenance of health had also been proven to have antibacterial, antioxidant and wound healing properties (Ajady et al., 2000). Honey had been...