

Introduction

Skyrocketing population is one of the main reasons for poverty and pollution in developing countries (1). Therefore, population planning and fertility control have been the main concern for people and health authorities. Considering limited fertility control facilities and methods for men compared with women, most of contraceptive methods are being applied by women. Large numbers of known chemicals lead to a full stop of spermatogenesis and ultimately to irreversible male infertility (2). Therefore, in recent years, the use of medicinal plants is increasing due to availability and low side effects compared with steroid contraceptive medicines (1). However, the use of skyrocketing use of such plants could also have side effects (3). Therefore, it is necessary to conduct scientific researches to determine pharmaceutical properties of plants. Fennel is one of the herbs with several oral and therapeutic consumptions. Fennel (*Feniculum vulgare mill*) is an aromatic plant belonging to the Umbelliferae family, and it is an annual, biennial, or perennial plant with about 2.5 m height, feathery leaves, and yellow flowers (4); and it is indigenous to shores of the Mediterranean and southern Europe (5). Usable parts of the fennel are the root, leaf, and fruit (6). Therapeutic properties for fennel could be due to volatile compounds, phenols, and flavonoids in the plant extract. According to phytochemical studies, over 30 various species of terpenes and terpenoids have been identified in the fennel (7) and, and compounds such as estragol (methyl chavicol), fenchone, trans-anethol, and α -phellandrene are the main constituents of the fennel seed (4). Also, presence of compounds including flavonoids, cumarin, and anethole have been identified. **Cumarin** has anti-aromatize, estrogenic, reductase inhibiting, and anti-androgen activities. Moreover, flavonoids and anethole are also estrogenic compounds (8) that could reduce serum levels of testosterone, and as a result reduce sperm production. Also, beta-sitosterol is one of the available compounds in the fennel extract effects of which was mentioned within previous studies on sperm storage in male rats was mentioned within previous studies (9). In conducted researches, anti-inflammatory, analgesic, and anti-oxidant properties of the fennel fruit have been reported (10). In addition, increasing mammary gland weight, uterine tubules, ovaries, endometriom, myometrium, and vagina in female rats, had an increasing protein concentration in the seminal vesicle and in the prostate gland after oral prescription of the fennel extract (11), and estrogenic effects on milk secretion, facilitating childbirth, increasing sexual desire (12), and menstrual pain relief (5) are additional properties of the fennel that were mentioned within different studies. Considering available reports regarding anti-fertility effects of existing compounds in the fennel, and also little information about the effects of this plant on fertility, the present study aimed at investigating the effects of the hydro-alcoholic extract of the fennel seed on the number of spermatogenic cells and testis structure in male rats. The results of the study could serve as a step toward the development of a mechanism-based approach for the management of fertility or infertility.

گروه محققین پزشکی

Material and Methods:

In this experimental study, forty male Wistar rats which were 8 weeks old and weighing 170-220 g, were obtained from the animal house central of Ahvaz University of Medical Sciences, Khoozastan province, Iran. Rats were housed in standard rat cages and maintained under standard conditions (12 hr light/dark cycle; 25 ± 3 °C temperature; 35%–60% relative humidity), provided with a standard laboratory chow and water ad libitum. The study was were carried out in accordance principles of laboratory care established by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences.

Preparation of extract

Fennel seeds were bought from valid herbalist shops in Ahvaz city of Iran, and authenticated by Dr. Siyahpoosh of Pharmacognosy Department of Ahvaz Jundishapur University, Iran. The specimen was given voucher number a140100002p. Voucher specimen was deposited at the College herbarium; and the extract was produced by the Maceration method. One hundred gram of powdered fennel seed was soaked in 500 ml of 70% ethanol and stirred intermittently for 48 hours at room temperature. The material was filtered using a sterile cotton wool and Whatman (No. 1) filter paper; the pooled filtrates obtained were dried in the oven at 40 °C for 48 hours and the extracted powder was kept at 4 °C until used (13). According to required concentration, the obtained extract was diluted with distilled water; moreover, hydro-alcoholic extract of the fennel at concentrations of 35, 70, 140, and 280 mg/kg/B.W was prepared.

Animals and treatment protocol

The tested rats were divided into 5 groups of 8 rats in each. The control group received 1 ml distilled water (as an extraction solvent), and the experimental groups were given the hydro-alcoholic extract of the fennel seed by gavage at doses of 35, 70, 140, 280 mg/kg body weight daily for 60 days respectively (14, 15).

Sacrification schedule