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Daucus carota L.: Can it be offered as an alternative treatment for improving semen quality

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In Persian Medicine (PM), various medicinal plants are used to treat male sexual disorders, one of which is Zardak (*Daucus carota* L. var. carota). The nature of *Daucus carota* in PM is characterized by warmth and moisture, while its seeds have a warm and arid temperament (1). Zardak (Jazar, Gazar, or Persian carrot) is known in the texts of PM as a nutritious plant, brain protector, heart and liver tonic, aphrodisiac, and semen increaser (2). The use of *Daucus carota* as an aphrodisiac has been emphasized among the drugs used to treat sexual disorders in PM due to its low side effects, availability, and cost-effectiveness (3). The most effective part of the *Daucus carota* is its seed. The Seed of *Daucus carota* is called doghu in PM sources. Seed of *Daucus carota*, specifically the garden type, improves sexual function. *Daucus carota* contains terpene compounds such as geranyl acetate, cedarone, and azarone, presenting in its volatile oil as monoterpenes and oxygenated sesquiterpenes (4). It also contains polyphenol compounds such as flavonoids and coumarins, alkaloid compounds, and various steroids, all of which have antioxidant activity (5). Recent studies have shown that the polyphenolic compounds found in the *Daucus carota*, such as flavonoids, hydroxycinnamic acid, and anthocyanin, effectively treat infertility (6, 7).

Antioxidants can improve sperm function and their protection (8) because all kinds of oxidative stress can reduce the count, motility, and normal morphology of sperm in men. The imbalance between the production of reactive oxygen species and the antioxidant capacity of sperm in the testis, epididymis, and seminal fluid, ultimately leads to infertility in men (9). Animal studies have shown that *Daucus carota* seed extract can significantly increase LH (Luteinizing hormone) and testosterone levels (9). Furthermore, the seed extract of this plant has nutritional value and improves heart rate, protects against liver toxification, and protects the brain from dementia and other damage (10). Kosuri et al.'s research (2015) aimed to investigate the antioxidant activity of different parts of the *Daucus carota* plant. They found that geranyl acetate (52.45%), cedarone S (14.04%), and azarone E (11.39%) are the main components of the essential oil of the seed. Moreover, the *Daucus carota* seed extract contains many phenolic compounds, including gallic acid. The present study found that the essential oil and the methanolic extract of the *Daucus carota* seed show significant antioxidant activity, which is more significant in the methanolic extract (11). Batouli and Kasiri (2019) performed a systematic review by searching the data of SID, Scopus, PubMed, Google Scholar, ScienceDirect, and PM textbooks, the properties and effective compounds of Persian carrot (*Daucus carota* L. spp. carota) and Carrot (*Daucus carota* L. var sativus) and determined that Persian carrot (Zardak) has various uses in PM, including aphrodisiac, and besides being nutritious, it is a valuable source of natural antioxidant, which has a greater variety of antioxidant compounds than the carrot (12). Nouri et al.'s study (2009) aimed to evaluate the antioxidant effects of ethanol extract of *Daucus carota* seed on the process of spermatogenesis and caudal epididymal sperm reserves in rats. They found that after a four-week treatment period, *Daucus carota* seed extract, compared to the control group, significantly increased epididymal sperm reserves and LH and testosterone levels in rats and reduced the inhibitory effect of gentamicin on spermatogenesis in these rats (9).

Considering the inhibition of gentamicin's oxidant effect, it seems that one of the mechanisms of *Daucus carota* seed extract's effect on improving sperm reserves is inhibiting oxidation in semen. Therefore, seemingly, the compounds in this plant can effectively treat male infertility, so it is suggested that human studies be conducted regarding the effect of Persian carrots or their seeds on male infertility, sexual function, and spermogram indices.

Conflict of interest

The authors declared no conflict of interest.

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None

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