

The necessity of pistachios in the daily diet of women of reproductive age

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Infertility in women is of global problem and has several causes. Hormonal disorders, ovulation defects, and polycystic ovarian syndrome are known as the main female infertility causes. Obesity and high levels of cholesterol have negative effects on ovulation and implantation in female [1]. Oxidative stress (OS) is created by the imbalance between free radical production and the body's antioxidant defense system. Numerous studies confirmed the effect of OS on the female reproductive system. OS is responsible for the decrease in oocyte maturation, embryo formation and implantation, and pregnancy development. Naturally human body has a powerful antioxidant system but in different conditions, this system cannot prevent the effects of OS alone, so an external source of antioxidants is necessary [2].

Today, nutrition specialists recommend the consumption of a healthy diet, with rich fruits and vegetables to cover the human body's antioxidant needs because the use of natural antioxidants usually causes fewer side effects and more benefits. Fruits and vegetables are a small part of our caloric intake, but due to the presence of micro-nutritional substances such as vitamins, pro-vitamins (ascorbic acid, tocopherols) and carotenoids have beneficial effects [3]. Since the intake of antioxidants through food is limited, some artificial and industrial antioxidants are added to food to enrich food. Some of these artificial and synthetic antioxidants are butylhydroxyanisole (BHA), tertbutyl-hydroquinone (TBHQ), butylhydroxytoluene (BHT) and tert-beta-hydroxyquinone. There is more evidence that supports the toxicity effects of artificial antioxidants on the human body. Experimental studies reported the risk of liver damage and cancer increased in laboratory animals after using artificial antioxidants [4]. Therefore, it is essential to find natural antioxidants with less toxicity and more effectiveness.

Nuts have a wide range of antioxidants in micro-nutritional components. For example, phenolic compounds in nuts are in two forms, simple molecules such as phenolic acids and large polymeric molecules such as tannins. It has been reported that the effects of nuts on human health [5]. Between nuts, less focus has been paid to pistachio, but limited research introduces it as one of the main sources of natural antioxidants. *Pistacia vera* L. is a plant of the Anacardiaceae family and is traditionally called pistachio. There were several documents that the phenolic compounds found in pistachio (flavon-3-1, anthocyanin, Proanthocyanidin, phenolic acids, stilbene, flavanone, isoflavone, flavonol). Antioxidant, anti-inflammatory, and antimicrobial effects of phenolic compounds are known. Medical research

confirmed the positive effects of pistachio on decreasing cholesterol levels, positive effects on lipid profile, weight control, and reducing the risk of cardiovascular disease (CVD) [6].

An increase in body weight can elevations the risk of ovulation disorders. Studies demonstrated the positive effects of pistachios on female laboratory animals. Pourmasumi et al. reported pistachio oil can prevent the negative effects of anxiety on ovarian tissue in mice [7]. In another study, Mohammadi-Nasab et al. showed pistachio oil helps decrease stress in PCOS rats [8]. Scientifics suggested that ovulation disorders in overweight women could be treated by a healthy diet and lifestyle changes. Fat women, who suffer from infertility, can increase the pregnancy chance by a healthy diet with high amounts of nuts, vegetables, and fruits [1, 2, 8]. In conclusion, the importance of a healthy diet with daily pistachio intake is beneficial for women of reproductive age.

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