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TREE NUTS FOR ERECTILE DYSFUNCTION AND MALE INFERTILITY: A NATURAL DRUG?

A new research project is underway to evaluate the effect of tree nut consumption on sperm quality and function. Increasing the chances of fertility is of great interest for developing public health strategies in developed countries.

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Infertility is a disease defined by the failure to achieve a successful pregnancy after 12 months or more of regular unprotected intercourse. It is estimated that one in seven couples worldwide have problems conceiving (Evers, 2002; Boivin et al., 2007). Male factors, including but not limited to urogenital abnormalities, infections of male accessory glands, varicocele, endocrine disturbances, immunologic factors are responsible for 40-50% of these cases (S. Sabanegh, 2011).

Currently, the etiology of suboptimal semen quality is poorly understood, and many physiological, environmental, and genetic factors, including oxidative stress, have been implicated (Auger et al., 2001). Moreover, the dietary pattern, or different components of the diet have been studied as possible determinants of sperm function and/or fertility. In this context, a high intake of antioxidants, fruits, vegetables, poultry, sea foods, skim milk, and shellfish as well as low intake of full-fat dairy, sweets, and processed meat, especially with high-saturated fat foods, have been positively or inversely associated with sperm quality (Eslamian et al., 2012; Wirleitner et al., 2012; Afeiche et al., 2013). Moreover, several nutrients have been implicated in fertility. L-Arginine (present in walnuts) has been demonstrated to improve sperm concentration and motility (Eskiocak and Gozen, 2006; Srivastava et al., 2006; Srivastava and Agarwal, 2010). Selenium protects sperm from oxidative damage and defines sperm morphology in the epididymis (Beckett and Arthur, 2005; Camejo et al., 2011; Moslemi and Tavanbakhsh, 2011). Zinc and vitamins C and E have antioxidant properties believed to be important to male fertility (Young et al., 2008; Colagar et al., 2009; Ross et al., 2010; Camejo et al., 2011). Low folate levels have been associated with sperm aneuploidy (Young et al., 2008), total sperm concentration and infertility (Young et al., 2008; Murphy et al., 2011). Polyunsaturated fatty acids (PUFAs) have been shown to play critical roles in sperm maturation and membrane function (Lenzi et al., 1996, 2002; Wathes et al., 2007), and are associated to an increase of sperm count, as well as some but not all clinical investigations of male infertility (Aksoy et al., 2006; Tavilani et al., 2006; Khosrowbeygi and Zarghami, 2007; Oborna et al., 2010; Safarinejad et al., 2010; Attaman et al., 2012).

In this context, nuts are rich in several of the previously mentioned nutrients that have been associated to sperm function and fertility. Most of the fats in nuts are monounsaturated fatty acids (MUFA) which are less susceptible to oxidation than long chain PUFA (López-Uriarte et al., 2009; Ros, 2009). Although walnuts are richer in PUFA compared to other nuts and therefore more susceptible to LDL oxidation, the higher amounts of antioxidants that they contain may counteract the pro-oxidant effect of fat (Kris-Etherton et al., 2008). Tree nuts also contain dietary fiber, minerals (e.g. magnesium that stimulates the production nitric oxide), antioxidant vitamins (e.g. folate, vitamin E) and other bioactive compounds such as phytosterols, polyphenols and other dietary antioxidants, which can prevent adverse effects on oxidative stress (Ros, 2009; Ros et al., 2010). This is important because increased seminal antioxidant levels have repeatedly been linked with improved semen parameters and fertility outcomes (Sikka and Orleans, 1995; Saleh et al., 2003; Eskenazi et al., 2005; Tremellen, 2008; Young et al., 2008).


Interestingly, Robbins and collaborators (2012) described a beneficial effect of chronic nut consumption on semen quality, demonstrating that walnuts added to a Western-style diet improved sperm vitality, motility, and morphology (conventional semen parameters) (Robbins et al., 2012). Unfortunately we have only scarce evidences suggesting that nuts may be important in modulating other fertility parameters in men. For these reasons, we believe that a large randomized dietary intervention trial with tree nut consumption in the context of an unhealthy dietary pattern like a westernized diet would beneficially affect semen quality and functionality, not only in the all of considered conventional classic semen parameters as mentioned above, but also in other parameters like: sperm DNA fragmentation, sperm ROS index, sperm miRNA expression profiles, sperm DNA methylation, and sperm chromosome stability.

In this context it is important to mention that recently the International Nut and Dried Fruit Council Foundation - World Forum for Nutrition Research and Dissemination has co-funded a new study that will be conducted in the next two years by the Human Nutrition Unit of the Rovira i Virgili University in collaboration with the Cell Biology Unit of the Autonomous University of Barcelona.

It is important to remark that tree nuts have been related throughout history as a symbol of procreation and fertility (Casas-Agustench et al.

Nuts are rich in several nutrients that have been associated to sperm quality and functionality

2011). In fact, a recent study has demonstrated that pistachio consumption improves erectile function, probably because it contains (as other types of nuts) several antioxidants and arginine, a precursor of nitric oxide, a powerful substance that increases vasodilatation (Aldemir et al. 2011).

As stated before, to demonstrate that a food group such as nuts can modulate sperm function increasing the chances of fertility is of great interest for developing public health strategies in developed countries where infertility seems to have increased drastically. This will add more evidence in demonstrating that nut consumption will be important for fertility not only improving erectile function, but also modulating the functionality of semen. 

2015 RESEARCH GRANT:

<https://www.nutfruit.org/2015-inc-grants-recipients>

Project: *Effect of nut consumption on semen quality and functionality in a cohort of healthy males (clinical study).*

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