



Spirulina: Spirulina is rich source of protein it has approximately 60 to 70 percent protein with eight essential and ten non essential amino acids.^{[1] [2]} Spirulina has got the anti-oxidant property.^[3] Spirulina supplies several vitamins needed to carry on metabolic processes; it also provides various minerals and essential fatty acids.^{[4] [5]}

Coenzyme Q10: It is a nutrient used by the body in the production of energy. It acts as an antioxidant and in treatment for rare and serious mitochondrial disorders^[6]. Thus helps in energy production in the body. Coenzyme Q10 at 10 mg/day results in significant increases in sperm count and motility.^[7]

L - Carnitine: Carnitine is a quaternary ammonium compound biosynthesized from the amino acids lysine and methionine.^[8] In living cells, it is required for the transport of fatty acids from the cytosol into the mitochondria during the breakdown of lipids (or fats) for the generation of metabolic energy. It acts as an antioxidant^[9] and helps in male fertility to improve sperm quality as well as normal functioning of sperm^{[10] [11]}.

¹ Ciferri, O. "Spirulina, the Edible Microorganism." *Microbiological Reviews*. 47, 4, Dec. 1983.

² Babadzhanov, A.S., et al. "Chemical Composition of Spirulina Platensis Cultivated in Uzbekistan." *Chemistry of Natural Compounds*. 40, 3, 2004.

³ "Spirulina in Human Nutrition and Health" by Eric Gershwin and Amha Belay

⁴ Babadzhanov, A.S., et al. "Chemical Composition of Spirulina Platensis Cultivated in Uzbekistan." *Chemistry of Natural Compounds*. 40, 3, 2004.

⁵ Tokusoglu, O., Unal, M.K. "Biomass Nutrient Profiles of Three Microalgae: Spirulina platensis, Chlorella vulgaris, and Isochrysis galbana." *Journal of Food Science*. 68, 4, 2003.

⁶ Berbel-Garcia, A.; et al. (July 2004). "Coenzyme Q 10 improves lactic acidosis, strokelike episodes, and epilepsy in a patient with MELAS". *Clinical Neuropharmacology* **27**: 187–191. doi:10.1097/01.wnf.0000137862.67131.bf. PMID 15319706.

⁷ Tanimura J. Studies on arginine in human semen. Part III. The influences of several drugs on male infertility. *Bull Osaka Med School* 1967;13:90–100

⁸ Steiber A, Kerner J, Hoppel C (2004). "Carnitine: a nutritional, biosynthetic, and functional perspective". *Mol. Aspects Med*. **25** (5-6): 455–73. doi:10.1016/j.mam.2004.06.006. PMID 15363636.

⁹ Claudio Cavazza, *Composition for the Prevention and Treatment of Osteoporosis due to Menopause Syndrome* (2002), US Patent 6,335,038, column 3

¹⁰ Costa M, Canale D, Filicori M, et al. L-carnitine in idiopathic asthenozoospermia: a multicenter study. *Andrologia* 1994;26:155–59

¹¹ Vitali G, Parente R, Melotti C. Carnitine supplementation in human idiopathic asthenospermia: clinical results. *Drugs Exptl Clin Res* 1995;21:157–59

Asparagus Adscendens: Safed musali has been used in Ayurvedic science since years. The rhizome powder is given as a nutritive tonic with milk in case of seminal weakness and impotence ^[12]. The rhizome extracts contain a large number of very important steroids, triterpenoids, glycosides, saponins, essential oil and phytoecdysteroids that are analogues of invertebrate steroid hormones ^{[13] [14] [15]}. Asparagus has been considered as powerful aphrodisiac ^[16] herb. It used to treat various sexual problems especially for men. It is very useful in treating male sexual disorder including low libido as it is libido and sperm enhancer.

Zinc: Lack of zinc can reduce testosterone levels. ^[17] For men with low testosterone levels, zinc supplementation raises testosterone and also increases fertility. ^[18] For men with low semen zinc levels, zinc supplements may increase both sperm counts and fertility. ^[19] Zinc acts as a carrier of various metabolic reactions and semen coagulum during ejaculation into the female reproductive tract. ^[20]

Arginine: Arginine is an amino acid found in many foods; it is needed to produce sperm. Most research shows that several months of arginine supplementation increases sperm count and quality ^{[21] [22]} and also fertility. ^{[23] [24]} However, some studies have reported that arginine helps few, ^[25] if any, infertile men. ^[26] Arginine restores erectile function and harder and longer-lasting erections.

Selenium: Selenium helps in increasing the sperm motility. ^[27]

¹² Kapoor LD (2001) Handbook of Ayurvedic medicinal plants. CRC Press, LCC, New York, Washington D.C., pp. 55.

¹³ Tandon M and Shukla YN (1995) Phytoconstituents of *Asparagus adscendens*, *Chlorophytum arundinaceum* and *Curculigo orchioides* : A review. J. Med. Aroma. PlantSci. **17** : 42 - 50.

¹⁴ Rao PS, Beri RM and Budhiraja RP (1952) Studies on tuber mucilage : Part V. Mucilage from the tubers of *Asparagus adscendens* Roxb., J. Sci. Industr. Res. **11B** : 127 - 128.

¹⁵ Dinan L, Savchenko T and Whiting P (2001) Phytoecdysteroids in the genus *Asparagus*(Asparagaceae). Phytochemistry **56** : 569 - 576.

¹⁶ Nadkarni, Indian Materia medica vol 1, p. 669, 2000

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¹⁸ Netter A, Hartoma R, Nahoul K. Effect of zinc administration on plasma testosterone, dihydrotestosterone and sperm count. *Arch Androl* 1981;7:69–73.

¹⁹ Marmar JL et al. Semen zinc levels in infertile and postvasectomy patients and patients with prostatitis. *Fertil Steril* 1975;26:1057–63.

²⁰ Jonsson et al., 2005

²¹ De Aloysio D, Mantuano R, Mauloni M, Nicoletti G. The clinical use of arginine aspartate in male infertility. *Acta Eur Fertil* 1982;13:133–67

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²⁷ Alternative in Health V.2 I.4 May/June 1997