nitric oxide will increase releasing of GnRH from hypothalamus and LH and FSH hormones from pituitary gland [15, 16].

In addition to central effects of silymarin on hypothalamus-pituitary-testis axis, increased testosterone levels in the current study can also be related to synthesis and metabolism of this hormone. Silymarin is counted as a potent inhibitor of aromatase enzyme [13]. Aromatase catalyzes the conversion of testosterone to estrogen. By inhibiting this enzyme, the serum levels of testosterone increase [13].

In this study a significant increase of the mean number of spermatid and spermatozoid cells in the groups receiving dose of100 and 150 mg/kg of silymarin was observed compared to the control group. Oufi et al. (2012) in their investigation onsilybin (one of the structural isoforms of silymarin) effects on testicular tissue of laboratory white mice showed that this flavonoid is able to improve the testicular parameters such as the diameter of the primary spermatocytes and spermatids, the motility of sperm and the percentage of live sperms. It is also able to increase the levels of testosterone secretion [13].

There is a direct relationship between serum concentration of LH and FSH hormones and the number of spermatogenic cells. FSH receptors are present on the surface of Sertoli cells and by binding to these receptors, FSH activates adenylyl cyclase enzyme and increase cAMP levels and as a result activates protein kinase C (PKC) in the cytosol [18]. The catalytic subunit is then activated and enters to the nucleus and activates there the transcription of ABP gene. FSH increases synthesis and secretion of ABP (androgen binding protein) and thus the concentration of testosterone in the seminiferous tubules is provided for normal process ofspermatogenesis[19]. By binding to Leydig cells, LH also increases the secretion of testosterone [20]. Testosterone is also known as the survival factor of spermatogenesis process [21]; so, an increase in sperm density and count is detected due to the enhancement of the level of the mentioned hormones by silymarin.

Polyunsaturated fatty acids contain a major part of fatty acids constructing the mammalian sperm membrane. Therefore, the sperm membrane is so sensitive to damages caused by oxygen free radicals which are generated by lipid peroxidation [22]. Since free radicals produced in daily reactions of the body are more effective in reducing the count and motility of sperm,one of probable mechanisms of silymarineffectson enhancement of sperm count may be caused by the antioxidant properties of it.

Studies results show that antioxidants in male reproductive system reduce oxidative stress in testis and increase the activity of Leydig cells and so resulting in increase of secretion of testosterone and improvement of spermatogenesis (sperm generation) process [23, 24]. The additive or synergistic effect of silymarin on the content of glutathione peroxidase has been approved in the various tissues of rats [25, 26]. Glutathione peroxidase (GPX) which plays a special role in protection of sperms and ductus deferens in testis tissue and epididymis is one of the major antioxidants [27].

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