ABSTRACT

Polycystic ovarian syndrome is a complicated multifactorial disease affecting 5 to 10% of women at their reproductive age. The objectives of this study was to study the histopathological changes in ovaries of PCOS induced mice after treating with plant extract, nanoparticles and chitosan nanoparticles. Methanolic *Gymnema sylvestre* was a medicinal plant used for this purpose. Methanolic plant extract was used to prepare nanoparticles. The preparation of chitosan nanoparticles by ionic gelation method using methanolic extract *Gymnema sylvestre* (GSBE) bark was done and the synthesized *Gymnema sylvestre* chitosan nanoparticles (CZCNPs) were characterized by XRD and FTIR. The present study was conducted on female mice model. With the usage of Estradiol valerate PCOS was induced in them. The induction of PCOS was checked by the microscopic examination of vaginal smear of mice which shows metestrus stage. The PCOS ovaries contain atretic follicles with irregular estrus cycles. It was also observed that the granulosa cell layer was also reduced in the cyst containing ovaries and destroyed oocytes when they were compared with the normal control group. After clinical exposure, the histological results and gonadotrophic hormone level was determined. *Gymnema sylvestre* loaded nanoparticles (low dose) shows polycystic are disappeared, regaining of corpus luteum also observed and high dose 100mg/kg show the formation of primary follicles and oocyte takes place. Gymnema loaded chitosan nanoparticles low dose (50mg/kg) show formation of defined follicles and zona granulosa and zona pellucida was also developed and its high dose (100mg/kg) shows the formation of corpus luteum, mature follicles was observed. The hormonal analysis indicated that the level of FSH was significantly increased in PCOS induced rats with the administration of higher dose of GSCNPs compared to other treatment. While the level of LH when the PCOS induced rats were treated with higher doses of GSCNPs compared with other experimental groups. These biochemical and histopathological evidence proves that biomolecules loaded TPP cross-linked chitosan nanocomplex was used as protective therapy for the treatment of PCOS.