

## ABSTRACT

Polycystic ovary syndrome is a heterogeneous endocrine disorder in females of reproductive age, affecting 8-21% of females globally. Aim of the current study was to assess the effective and preventive potential of ethanolic extract of *L. usitatissimum* seeds on physicals parameters (body weight, BMI, estrus cycle), biochemical parameters such as Liver Function Tests (Bilirubin, AST and ALT), and Renal Function tests (Urea and Creatinine), lipid profile, gonadotropin and steroid hormones, and histomorphometry of Ovaries, uterus and liver in PCOS induced mice. In this study, ethanolic extract of *L. usitatissimum* seeds was prepared by using Soxhlet Apparatus. Sixty female swiss albino mice were categorized into ten groups each with six mice; NC-Negative control, PC-PCOS untreated, SC- Metformin, VC-Vehicle control (10% DMSO), TLDLUE (200mg/kg), TMDLUE (400mg/kg), THDLUE (600mg/kg), PLDLUE (2mg/kg EV+200mg/kg extract), PMDLUE (2mg/kg EV+ 400mg/kg extract), and PHDLUE (2mg/kg EV+ 600mg/kg extract). PCOS was induced by a single intraperitoneal injection of 2mg/kg of EV in 0.2ml olive oil. Body weight, naso-anal length, and vaginal smear were monitored daily. All the mice were dissected on 36<sup>th</sup> day of oral administration of treatment dose. LFTs displayed significant improvement with medium and high doses in the effective and preventive groups. RFTs showed significant improvement in Urea and creatinine with medium and high doses in the effective and preventive groups. Gonadotrophin, steroid hormones and lipid profile analysis showed improvement at medium and high doses. Histological changes in ovaries of PCOS mice showed the cysts degeneration and oocytes normal size, regeneration of follicles and follicular fluid at the medium and high doses of ethanolic extract of *L. usitatissimum* seeds. Histological changes in uterus of PCOS induced mice showed significant decline in eosinophil cells quantity, luminal and uterine epithelial thickness when given high dose of *L. usitatissimum* extract. Liver damage was recovered significantly at high doses causing the central vein and sinusoids shrinkage, degradation of fat vacuoles and normal hepatocytes. In conclusion, the current study demonstrated that the oral administration of ethanolic extract of *L. usitatissimum* seeds produced significantly positive results by restoring the estrus cycle to normal, lowering body weight and BMI, balancing the level of sex hormone, maintaining the biochemical level, controlling the morphology of PCOS in the body, and demonstrating significant antifertility effects for the treatment of PCOS.