

Evaluating the Ameliorating Potential of Plant Bioactive Compounds Against Nicotine-Induced Male Infertility

by Muhammad Jahangeer | Ghulam Mustafa | Areej Riasat | Abid Sarwar | Shaista Nawaz | Naveed Munir | Department of Biochemistry Government College University Faisalabad, Pakistan & Food & Biotechnology Research Center, PCSIR, Laboratories Complex Lahore Pakistan | Department of Biochemistry Government College University Faisalabad, Pakistan | School of Biological Sciences, The University of Punjab Lahore Pakistan | Food & Biotechnology Research Center, PCSIR, Laboratories Complex Lahore Pakistan | Food & Biotechnology Research Center, PCSIR, Laboratories Complex Lahore Pakistan | Department of Allied Health Professionals, University of Management & Technology Lahore Pakistan

Smoking has a detrimental effect on the cardiovascular and respiratory systems. By analyzing several biochemical parameters in animals, the current study effort is intended to screen and characterize the phytochemical components found in therapeutic plants as well as to examine the reproductive potential of phytoconstituents against nicotine-induced toxicity in male rats. *In silico* study was conducted to determine the effect of ten selected medicinal plants to overcome nicotine addiction by inhibiting the target protein sex hormone-binding globulin (SHBG), A disintegrin and metalloproteinase 17 (ADAM17), and deoxyribonuclease I (DNase I). Various phytochemicals were extracted and docked against 3 proteins by software PyRx and Discovery Studio and only best selected four phytochemicals that are strongly bound with selected receptor proteins were screened for *in vivo* study. In animal trials, total rats (n=44) were administered with two different doses of phytochemicals (low dose 05 mg/kg and high 10 mg/kg for three (03) weeks. At the end of significantly change ($p < 0.05$) in body weight, reproductive effect by evaluating the level of FSH, LH, testosterone, prolactin and DHEA-SO₄. The results of all *in vivo* assays conducted as part of the recent research work offer considerable evidence that the chosen phytochemicals have significant medicinal potential, as well as the ability to induce specific hormone release and improve reproductive structures. Significant ($P < 0.05$) improvement in the structural architecture of testicular tissue particularly in the high-dose group (10 mg/kg b.w.) was also observed. By our findings, it is suggested that herbal remedies for treating testicular apoptosis and infertility may be identified utilizing cutting-edge techniques.

Keywords: Infertility; Phytoconstituents; Smoking; Testicular damage; Therapeutic response; Molecular docking