ABSTRACT

Osteoporosis has been a major health hazard in recent years, afflicting over millions worldwide. Osteoporosis is primarily associated with ovarian hormone deficiency during post-menopause and is the most common cause of age related bone loss. It results from disturbance in the bone remodeling process where bone resorption exceeds bone formation resulting in bone loss which further leads to fracture and debility. For several years, estrogen replacement therapy has been used clinically for the prevention of osteoporosis in post-menopausal women. However, it is reported that prolong use estrogen can lead to a higher incidence of breast carcinoma, endometrial carcinoma, and cardiovascular disease. The present work aims in studying the pharmacognostic and phytochemical profile of the plants *Lepedium sativum* (seeds) and *Pinus roxburghii* (needles and bark) and further evaluate their potential antiosteoporotic activity. The pharmacognostic profile was established with the aim to draw pharmacopoeial standards that would provide referential information for the correct identification the crude drugs and their extracts. HPTLC analysis revealed the presence of β-sitosterol (0.532% w/w) in pet.ether extract and rutin (1.3% w/w) in methanolic extract of the seeds of *Lepedium sativum*. Quercetin, a potent flavonol was isolated, providing a novel, cheap and easy method of obtaining large amounts quercetin from the bark of *Pinus roxburghii*. HPLC analysis of methanolic extract of bark of *Pinus roxburghii* established unbound quercetin amounting to 25.936% w/w. Seeds of *L. sativum* and needles and bark of *P. roxburghii* were evaluated for its anti-osteoporotic activity in ovariectomized rat model of osteoporosis at two different dose levels of 100 and 200 mg/kg per day. Tamoxifene (1 mg/kg) was used as standard. The findings assessed on the basis of biochemical, biomechanical and histopathological parameters. The plant extracts (pet. ether and methanolic extract of *L. sativum* and methanolic extract of needles and bark of *P. roxburghii* demonstrated definite antiosteoporotic effect with methanolic extract of the bark of *Pinus roxburghii* exhibiting the most pronounced activity in a dose dependent manner. The present study establishes both plants to possess antiosteoporotic activity. The study also reveals the bark of *Pinus roxburghii* as a rare and one of the largest source of free unbound quercetin in nature proving it to be potent medicinal plant.

**Keywords:** Pharmacognostic, Phytochemical, *Pinus roxburghii*, *Lepedium sativum*, Quercetin, antiosteopotic activity.