WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Nature's Remedy: A Comprehensive Review of Medicinal Plants for Osteoporosis

Meraj Unnisa, K. Kiran Kumar, K. Thrilochana, Hobibar Rahman.

Department of Pharmaceutical Chemistry, Pulla Reddy Institute of Pharmacy, Hyderabad, India, 502313.
Email: merajunnisa992@gmail.com, Contact Number:9676107064

ABSTRACT:

Osteoporosis [14] is characterized by porous and weakening bone, which increases the risk of fractures, particularly in the hips, spinal vertebrae, and several peripheral joints.

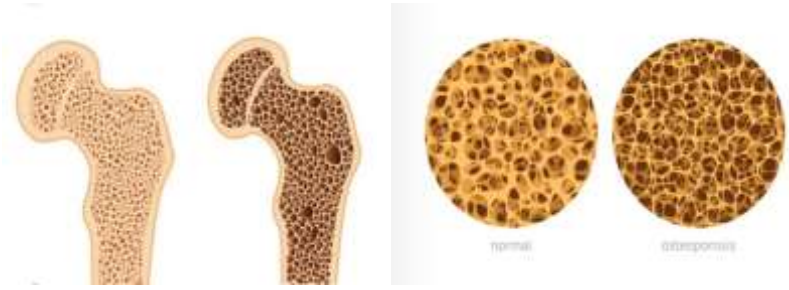
We have included the causes, risk factors, and different herbal plants that can be used to cure Osteoporosis. "Given the role oxidative stress plays in the etiology of osteopenia, one chronic condition that may eventually benefit from antioxidant supplements is osteoporosis, which is linked to a decrease in bone remodeling that results in gradual bone loss"

Keywords: Bone matrix, herbal plants, constituent, oxidative stress, osteopenia and osteoporosis

INTRODUCTION:

Osteoporosis is characterized by decreased bone mineral density brought on by changes in the microstructure of the bone, which ultimately predisposes patients to fragility fractures with little force. Because osteoporotic fractures increase morbidity, death, and disability, they result in a markedly reduced quality of life. During Osteoporotic-related fractures affect 50% of postmenopausal white women. Merely 33 percent of elderly females suffering from hip fractures will be able to regain their independence. White men had a 20% chance of developing osteoporotic fractures, but their one-year death rate from hip fractures is double that of females. Although those with osteoporosis have comparable fracture risks, black men and women had less osteoporosis than their white counterparts.

Disturbances in the process of bone rebuilding lead to osteoporosis. Osteoblasts and osteoclasts are constantly building and breaking down the bone tissue. A high-quality bone matrix requires a good dynamic balance between osteoblastogenesis and osteoclastogenesis. The imbalance is particularly noticeable when the risk factors cause the breakdown process to outpace the building process. Numerous factors, including runt related transcription factor 2, which is involved in osteoblast differentiation, are crucial for osteoblastogenesis. One bone matrix protein that osteoblasts make that is crucial in controlling bone mineralization is called osteocalcin.



Healthy Osteoporosis

MEDICINAL PLANTS USED IN THE TREATMENT OF OSTEOPOROSIS:

POMEGRANATE: its scientific name is *punica granatum* belonging to the punicaceae Pomegranates [1] offer a number of health advantages. Numerous disease risk factors, such as high blood pressure, high cholesterol, oxidative stress, hyperglycemia, and inflammatory activity, can be prevented or treated using pomegranates. As pomegranate peel extract has a high tannin content, we postulated that using pomegranate peel extract as a dietary supplement

would improve bone biology [2]. We also investigated potential cellular and molecular modes of action using an in vitro cell culture model containing osteoblasts and osteoclasts. Additionally, we tried to corroborate findings at the cellular level using a mouse model [3] of osteoporosis.

SEBERIAN GINSENG: Eleutherococcus senticosus [4] (Siberian ginseng) belonging to the family Araliacea, has been used as a powerful tonic herb with an impressive range of health benefits. This medicinal herb has been commonly used to treat bone metabolism diseases due to its traditional Korean medicine use to strengthen muscle and bone. Commonly used oriental herb Acanthopanax senticosus (extract) on postmenopausal Korean women's bone [5] mineral density and remodeling. Study participants included 81 postmenopausal women under 65 who had osteopenia or osteoporosis. One control group (n = 40) received 500 mg of calcium per day, whereas the other group (n = 41) received 500 mg of calcium per day + 3 g of AS extract per day. The subjects were divided into these two groups at random. The AS extract group had significantly higher serum osteocalcin [6] levels than the control group after receiving treatment with AS extract for six months (P = 0.041). But dual-energy X-ray absorptiometry (DXA) revealed no appreciable increases in bone mineral density.

RED CLOVER: The species of clover known as red clover, or Trifolium pratense [7] (Fabaceae), is native to Europe, western Asia, and northwest Africa. It has been planted and allowed to naturally occur in many temperate regions, including the Americas and Australia. Pratense means "found in meadows" in Latin. This herbaceous perennial plant can reach heights of between 20 and 80 cm, with a highly diverse range of sizes. With a purple ovoid flower head, three oval leaflets that grow on opposite sides of the stem, and a reddish stem, T. pratense is a well-known meadow herb. Grown extensively as a fodder crop, it is prized for fixing nitrogen, which raises soil fertility. It is grown as a green manure crop because of these factors.

According to the research, T. pratense [8] isoflavones can effectively prevent bone loss brought on by ovariectomy, most likely via lowering bone turnover through the suppression of bone resorption.

VELD GRAPE: The edible Cissus quadrangularis [9] (Vitaceae) shrub grows ramblingly in hotter regions of India, Sri Lanka, Malaya, Java, and West Africa. It is distinguished by a thick, quadrangular, meaty stem. The plant commonly called the "bone setter" is called "Asthisamdhani" in Sanskrit and "Hadjod" in Hindi due to its capacity to fuse bones together. The plant juice is used to cure otorrhea and epistaxis, the stem juice to treat scurvy and irregular menstruation, and the root to treat bone fractures. According to Nadkarni, the root has the same benefits as external plaster for treating bone fractures. Previous research has examined the plant extract's ability to mend fractures. the identification of a phytoestrogenic steroid and its capacity to affect. According to recent studies, C. quadrangularis [10] functions as a gluco-corticoid antagonist, which can speed up bone repair. It has been hypothesized that C. quadrangularis possesses anabolic and/or androgenic qualities because anabolic/androgenic chemicals are known to be antagonists of the glucocorticoid receptor and to stimulate bone formation and fracture healing. It also causes the healing bone's remodeling process to accelerate, as well as the tensile strength and fracture healing time to rise considerably faster. In a different study, where cortisol treatment deteriorated bones[11], its

anti-glucocorticoid characteristic was also documented. After administering C. quadrangularis extract, the healing process commenced and the cortisol-induced weakening was stopped.

NIGELLA SATIVA: it is commonly known as black cumin (ranunculaceae) Traditionally, Nigella sativa[12] seeds (NS) have been used to treat a variety of ailments. Thymoquinone (TQ) is the most prevalent and active component of NS. According to research on animals, NS and TQ may be used to treat diabetes-related osteoporosis and speed up the healing of fractures. Although the exact mechanism is unknown, it has been suggested that the antioxidative and anti-inflammatory properties may be somewhat involved in the treatment of osteoporosis, since the bone disease has been connected to both inflammation and oxidative stress. The antiosteoporotic actions of NS and TQ, the underlying mechanisms behind these benefits, and their safety profiles are highlighted in this research. It has been demonstrated that NS and TQ suppress nuclear factor κB, a transcription factor, as well as inflammatory cytokines including interleukin-1 and 6. It was discovered that NS and TQ supplementation in humans is safe at the current dosage, while pregnant women and children should use caution. More animal and human research is needed to fully evaluate the antiosteoporotic efficacies of TQ and NS, despite their demonstrated potential as antiosteoporotic[13] agents.

CONCLUSION:

We found that there aren't many human clinical studies on medicinal herbs that are used to induce osteogenesis after analyzing the medical literature. The effects of many herbs and phytochemicals on bone metabolism and homeostasis in human subjects remain poorly understood, despite the fact that they have been demonstrated to have antiosteoporotic properties in vitro or in animal studies. To prove the safety and efficacy of certain phytoconstituents in preclinical and clinical skeletal loss control, however, a great lot more research is needed.

REFERENCES:

1. Spilmont M, Léotoing L, Davicco MJ, Lebecque P, Miot-Noirault E, Pilet P, Rios L, Wittrant Y, Coxam V. Pomegranate peel extract prevents bone loss in a preclinical model of osteoporosis and stimulates osteoblastic differentiation in vitro. Nutrients. 2015 Nov 11;7(11):9265-84.
2. Spilmont, Mélanie, et al. "Pomegranate peel extract prevents bone loss in a preclinical model of osteoporosis and stimulates osteoblastic differentiation in vitro." *Nutrients* 7.11 (2015): 9265-9284.
3. Spilmont, Mélanie, et al. "Pomegranate seed oil prevents bone loss in a mice model of osteoporosis, through osteoblastic stimulation, osteoclastic inhibition and decreased inflammatory status." *The Journal of nutritional biochemistry* 24.11 (2013): 1840-1848.
4. Lim, D. W., Kim, J. G., Lee, Y., Cha, S. H., & Kim, Y. T. (2013). Preventive effects of Eleutherococcus senticosus bark extract in OVX-induced osteoporosis in rats. *Molecules*, *18*(7), 7998-8008.
5. Lim, Dong Wook, et al. "Preventive effects of Eleutherococcus senticosus bark extract in OVX-induced osteoporosis in rats." *Molecules* 18.7 (2013): 7998-8008.
6. Eun, So Young, et al. "Anti-osteoporosis effects of the Eleutherococcus senticosus, Achyranthes japonica, and Atractylodes japonica mixed extract fermented with nuruk." *Nutrients* 13.11 (2021): 3904.
7. Occhiuto, Francesco, et al. "Effects of phytoestrogenic isoflavones from red clover (Trifolium pratense L.) On experimental osteoporosis." *Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives* 21.2 (2007): 130-134.
8. Kang, Su Jin, et al. "Dried pomegranate potentiates anti-osteoporotic and anti-obesity activities of red clover dry extracts in ovariectomized rats." *Nutrients* 7.4 (2015): 2622-2647.
9. Ligett NW, Reid DM. The incidence epidemiology and aetiology of osteoporosis. Hosp Pharmacist 2000; 7: 62-8.

10. Lauritzen JB, Lund B. Risk of hip fracture after osteoporosis fractures: 451 women with fracture of lumbar spine, olecranon, knee or ankle. Acta Orthop Scand 1993; 64: 297-300.

11. Gruber HE, Ivey JL, Baylink DL, et al. Long term calcitonin therapy in postmenopausal osteoporosis. Metabolism 1986; 314: 1676-86.

12. Sobhy, Noha S., et al. "Potential Effect of Nigella sativa on Osteoporosis in Ovariectomized Rats: Possible Role of Hypoxia Inducible Factor 1-α." *Journal of Evolutionary Biochemistry and Physiology* 59.2 (2023): 395-410.

13. Osman, Muhamed T. "Nigella sativa has beneficial effect on osteoporosis and bone healing: Is it a fact or fiction? A systematic review." *Asian J Pharm Clin Res* 10.5 (2017): 41-46.

14. Shirwaikar A, Khan S, Kamariya YH, Patel BD, Gajera FP. Medicinal plants for the management of post menopausal osteoporosis: A review. The Open Bone Journal. 2010 Mar 5; 2(1).