Research Article
AMERICAN JOURNAL OF PHARMACY AND HEALTH RESEARCH
www.ajphr.com
2017, Volume 5, Issue 3
ISSN: 2321–3647(online)

Anti-Osteoporotic Activities of Plant Acalypha Indica Extracts

Mathew George*
Pushpagiri College of Pharmacy, Tiruvalla, Kerala, India.

ABSTRACT

Acalypha Indica is a species of plant having catkin type of inflorescence. It occurs throughout tropical Africa and South Africa, in India and Sri Lanka, as well as in Yemen and Pakistan. This plant is held in high esteem in traditional Tamil Siddha medicine as it is believed to rejuvenate the body. Pharmacological investigation has shown that the plant has potent anti- bacterial, anti-fungal, anti-arthritic, anti-osteoporotic, anti-oxidant, neuroprotective, wound healing, post-coital antifertility activities. The present review article attempt to summarize the anti- osteoporotic activity of the plant.

Keywords: Euphorbiaceae, Acalyphine, Pharmacological, and Anti-osteoporotic

*Corresponding Author Email: mathewlincg@gmail.com
Received 28 February 2017, Accepted 11 March 2017

Please cite this article as: George M *et al*., Anti-Osteoporotic Activities of Plant Acalypha Indica Extracts. American Journal of Pharmacy & Health Research 2017.

INTRODUCTION

Osteoporosis (OP) is characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to enhanced bone fragility and consequent increase in fracture risk. OP that associated with ovarian hormone deficiency following menopause is by far the most common cause of age-related bone loss. Postmenopausal osteoporosis (POP) has become a major problem with significant morbidity and mortality . In the modern clinical practice for prevention and treatment of POP, hormone replacement therapy (HRT), as well as some drugs, such as raloxifene, bisphosphonates, calcium and vitamin D, calcitonin, and parathyroid hormone, have been widely used. Although the bone protective effects of these agents are well-confirmed, side effects, such as hypercalcemia, increased risk of endometrial and breast cancer, vaginal bleeding and hot flushes, have also been reported. Due to some severe side effects or lack of efficacy of synthetic drugs, the potential efficacy of traditional medicines has arouse the interest of scientists and doctors .so they seek the cures from traditional medicines for treatment of some chronic and difficult diseases, including the treatment for OP. Many traditional plants have been reported to have anti- osteoporotic activity such as Acalypha Indica. The present work is aimed to evaluate the anti- osteoporotic effect of plant Acalypha Indica extract by induction of osteoporosis by ovariectomy in rats.

MATERIALS AND METHOD

Plant extract

Plant Acalypha Indica extracts (IIIM P06 A001 and A002)

IIIM-P006-A001- ethanolic extract

IIIM-P006-A002- Water extract

Experimental animals

Balb/c mice (8-2 weeks old, weighing between 18-22mg)

Wister rats (12-16 weeks old, weighing between 130- 150 mg)

All the studies were conducted after obtaining prior approval from the institutional ethical committee in accordance with the National Institute Of Health “Guide for care and use of laboratory animals”.

Chemicals

Alendronate sodium, Phenobarbital sodium, Potassium hydroxide, Sodium hydroxide

ANTI-OSTEOPOROTIC ACTIVITY EVALUATION

Induction of osteoporosis by ovariectomy

Ovariectomized animals are often used to study metabolic and physiological conditions associated with hormonal changes such as osteoporosis. Bilateral ovariectomy in experimental group rates were performed using pre-operative anesthetic procedures. Anesthesia was induced by intra-peritoneal injection of 40mg of pentobarbital sodium per kg weight of rat. A dorsal midline skin incision is made caudal to the posterior border of the ribs. Using blunt dissection to tunnel subcutaneously, lateral to skin incision, the muscles of the posterior abdominal wall are separated in order to enter the abdominal cavity. Mosquito forceps were used to crush fallopian tube and not to crush or contact the ovary. After the ovary was removed, the uterine horn and other blood capillaries were ligated. Stiches were made on subcutaneous muscle by absorbable thread and incised skin by nylon thread. The process was repeated on the other side.

After ovariectomiced , all animals are left 24 hours in suitable condition for recovery. Then the rats were treated orally once a day with different drugs after random grouping of animals into five groups, which include normal control, ovariectomiced negative control, standard positive control and experimental group. During the treatment up to 30 days the blood was drawn from retro-orbital sinus of each animal weekly. Then serum collected from blood and concentration of alkaline phosphatase was determined. After 30 days all animals were sacrificed to determine the bone parameters and to collect the Data of weight of adrenal gland and uterus. After sacrifice of animals, the right and left femur was excised out and adhering soft tissues was removed by putting into KOH solution and length was measured. Before measurement of bone weight and density, the femur was cut at ends and marrow was washed out with normal saline and weight was measured bone density and volume was measured by Archimedes principle .Briefly, each bone was put in an un stoppered vial filled with deionized water, and the vial was placed under vacuum for 90 minutes to ensure that all the air trapped diffused out of the bone. Each bone was removed from vial, blotted with gauze sponge, and then volume was measured and returned to vial containing ethanol and density was calculated.

RESULTS AND DISCUSSION

Table 1: Results of ovarictomized rat model

S.NO	Group /dose in mg/ kg	Dose Mg/kg	Body weight	Bone length	Bone weight	Volume	Density
1	Normal control	-	170.25±2.2130	3.00±0.0408	276.12±05.21	0.190±0.0026	1.40±0.01925
2	Ovariectomized	-	195.50±7.5770	3.10±0.0408	275.00±07.78	0.215±0.0032	1.273±0.0311
3	IIIM-P06-	250	220.75±9.07	3.12±0.06	312.00±10.	0.235±0.00	1.326±0.01

	A001		70	29	26	86	20
4	IIIM-P06-A002	250	215.25±10.55	3.12±0.0853	316.50±11.46	0.227±0.0070	1.385±0.0110
5	Alendronate sodium	1.16	160.20±2.010	3.04±0.0244	278.70±03.06	0.019±0.0037	1.39±0.0118

Table-2: Serum alkaline phosphate level of ovarictomized rat model

SNo	Group	1st week	2nd week	3rd week	4th week	5th week
1	Normal control	428.82±8.599	418.250±41.842	379.75±47.449	337.52±40.316	396.07±37.041
2	Ovariectomized control	478.70±77.455	507.075±58.419	540.00±48.936	507.42±36.042	538.40±27.118
3	IIIM-P06-A001	339.15±30.167	671.875±38.971	437.95±33.362	485.17±20.299	486.55±11.758
4	IIIM-P06-A002	563.50±43.690	567.020±17.700	504.97±24.380	516.75±39.830	501.67±37.228
5	Alendronate sodium	549.30±26.870	532.360±66.610	454.42±40.826	403.16±69.710	383.64±27.540

Table 3: Weight of uterus and adrenal glands

S No	Group	Wt of uterus	Wt of adrenal gland
1	Normal control	0.1377±0.0114	0.0247±0.0019
2	Ovariectomized control	0.0282±0.0039	0.0313±0.0012
3	IIIM-P06-A001	0.0180±0.0022	0.0263±0.0022
4	IIIM-P06-A002	0.0230±0.0036	0.0308±0.0026
5	Alendronate sodium	0.0270±0.0027	0.0258±0.0013

Plant extracts IIIM-P06-A001 and IIIM-P06-A002 showed moderate to marked inhibitory effect Dose of 250 mg/kg body weight of extracts inhibited loss of bone mineral in ovariectomized rat Both extract decrease the elevated level of alkaline phosphatase in ovariectomised rat. But there is no effect of plant extract on uterus and adrenal weight in ovariectomized rat.

CONCLUSION

Osteoporosis is characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to enhanced bone fragility and consequent increase in fracture risk. The present work is aimed to evaluate the anti- osteoporotic effect of plant Acalypha Indica extract by induction of osteoporosis by ovariectomy in rats. Plant extracts IIIM-P06-A001 and IIIM-P06-A002 showed moderate to marked inhibitory effect .Dose of 250 mg/kg body weight of extracts inhibited loss of bone mineral in ovariectomized rat .Both extract decrease the elevated level of alkaline phosphatase in ovariectomised rat. But there is no effect of plant extract on uterus and

adrenal weight in ovariectomized rat .Both plant extracts inhibited the secondary symptoms of arthritis produced because of the involvement of immune system. The secondary symptoms studied are swelling in the un-injected paw and swelling in the fore .studies revealed the reduction of elevated level of enzymes SGOT and ALP.

REFERENCES:

1. Kamoj, V.P. (2000).Herbal Medicine Current Science,78(1): 35-39.
2. Kokate,C.K, Purohit, A.P. and Gokhale, S.B. (2005).Pharmacognosy. Nirali Prakashan, 30th Edn.
3. Deighton,C.M, and Walker, D.J.(1991)The familial nature of rheumatoid arthritis. AnnRheum Dis.,50: 62-65.
4. Bull,N.Y.(1971)Disturbance of function (function laesa):The legency fifth cardinal sign of inflammation, added by Galen to four cardinal signs of Celsus. Acad Med.,47(3): 303-322.
5. Kumar, Abbas, A.K., Fausto, N.and Mitchell,M.(2007).Robbins basic pathology. W.B. Saunders. Philadelphia, Pennsylvania, USA.,6: 960.
6. Coussens, L.M. and Werb, Z. (2002). Inflammation and cancer. Nature 420(6917):860-867.
7. Segal,B.H.,Leto, T.L.,Gallin,J.I., Malech,H.L. and Holland, S.M.(2000) Genetic, biochemical, and clinical features of chromatous disease.Medicine.,79:170-200
8. Chandel, K.P.S.,Shukla,G. and Sharma,N.(1996)Biodiversity in medicinal and aromatic plants in india: Conservation and utilization.239.
9. Stone and Benjamin, C.(1970).The flora of Guam.Micronesica.6:651-569.