



A Review on Herbs with Esterogenic Activity

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ABSTRACT

60 million women in India all above the age of 55 years, with women living longer than before, a majority would spend 1/3 of their life in the post-menopausal stages. The health problems cropping up during this period and related to estrogen deficiency of menopause are several decades to identify effective and safe substances for estrogen regulation. This approach proved to be a good alternative to synthetic drugs as the chemicals of plant origin have limited side effects. Various medicinal plants extracts were investigated for their estrogenic activity in animal models. This review presents update information gathered on scientifically screened medicinal plants used for estrogenic activity in females. This review provides the information on botanical name along with their family, parts used, chemical constituents and their estrogenic activity on target organ.

Keywords: *Estrogenic activity, menopause, medicinal plants, hormone replacement therapy.*

INTRODUCTION

Estrogen is naturally occur hormones and are of

importance both for female and male gender. It regulates growth and differentiation of cells, decrease apoptosis and regulate growth factor production. Estrogen play important role only in reproduction system but in functioning of cardiovascular, central nervous, immune and skeletal system.^[1] 66% reduction in estrogen at menopause. Menopause with chronic estrogen deficiency are liable to develop the following: osteoporosis and fracture, ischemic heart disease, myocardial infarction, atherosclerosis, hypertension, stroke, tooth decay, cataract, glaucoma.^[2]

The common therapy given to supply the needs of estrogen is by the hormone replacement therapy(HRT), the hormone used on HRT facilitates the physiological regulation that the natural estrogen dose, but based on the several researchers HRT gives the risk in the stimulation of carcinogenesis process, lead to the enhancement of breast cancer, stroke and blood coagulation. Therefore the alternative therapy for HRT that is safer and affordable for the society should be developed^[3]

Table: List of studied for estrogenic activity:

S. No	Botanical name	Family	Parts used
1.	Pimpinellaanisum. L	Umbelliferae	Seed
2.	Ricinuscommunis. L	Euphorbiaceae	Seed
3.	Glycyrrhizaglabra. L	Fabaceae	Root
4.	Musa paradisiaca. L	Musaceae	Stem
5.	Erythrinavarigata. L	Fabaceae	Leaf
6.	Aloe vera. L	Aspodelaceae	Leaf (sap)
7.	Bauhinia racemosa. Lam	Fabaceae	Stem bark
8.	Asparacusracemosus. Willd	Liliaceae	Root tuber
9.	Nigella sativa. L	Ranunculaceae	Seed
10.	Punicagranatum.L	Lythraceae	Fruit
11.	Saracaasoca.Willd	Fabaceae	Flower
12.	Caricapapaya.L	Caricaceae	Leaf

13.	Glycine max.L	Fabaceae	Seed
14.	Cissusquadrangularis.L	Vitaceae	Whole plant
15.	Bambusaarundinaceae.Willd	Poaceae	Leaf

Pimpinellaanisum. L (Aniseed):

Chemical constituents: Eugenol, Trans anethol, methylchavicol, anisaldehyde, estragole, coumarins, scopletin, umbelliferone, polyphenols, polyacetelenes, (E)-methyleugenol, α -cuparene, α -himachalene, β -bisabolene, p-anisaldehyde, cis-anethol.^[4, 5]

1. The extract was found to be active in stimulating the differentiating and mineralisation of osteoblastic cell culture and inducing like antiestrogens, the insulin growth factor binding protein 3 in mcf-7 Breast cancer cells. No effect was observed on the proliferation of cervical adenocarcinoma cells using the MTT assay the presence of estradiol inhibition the anti-estrogenic effect, thus suggesting as estrogen receptor related mechanism^[6]
2. Transanethol administered orally to immature female rats at 80mg/kg body weight for 3 days. Significantly increased uterine weight to 2mg/kg compared to 0.5g/kg in controls. The results confirmed that trans anethol has estrogenic activity.^[7]
3. Anis is used in the development of synthetic estrogen where the main constituents of plant oil anethol has been considered as the active estrogenic agent.^[8]
4. Anethol from the plant oil has been used for alleviation of menopausal symptoms, prevention of osteoporosis, heart disease and cancer.^[9]
5. P.anisum may have more preference than the other herbs or chemical drugs due to the treatment with P.anisum and placebo to determine maintenance. P.anisum effects an menopausal hot flashes. The results showed that p.anisum can control the symptoms long after the consumption.^[10]
6. The essential oils containing (E)-anethol as major compound showed estrogenic activity in the YES assay. This study indicates that the estrogenic activity of pimpinella oils is not solely due to the presence of anethol components other than anethol may be responsible for contributing towards the estrogenic activity.^[11]

Ricinuscommunis. L (Castor bean):

Chemical constituents: Alkaloids, ricinoleic acid, stearic, linoleic, palmitic acid, sitosterol, squalene, tocopherol, flavonoids, benzoic acid derivatives,

coumarin, terpenoids, fatty acid, ricinine, isorecinoic acid^[12,13,14]

1. The ether soluble portion of the menthanol extract of *R.communis* var. minor possesses antiimplantation anti conceptive and estrogenic activity in adult female rats and rabbits when administered subcutaneously at a dose upto 1.2g/kg and 600mg/kg respectively in divided dose.^[15]
2. In this study 27 female albino rats were used in the determination of aqueous suspension of *R.communis* seed. Estrogen and progesterone levels of these rats were analyzed using electrochemiluminescent method. The results revealed estrogenic property of aqueous suspension of *R.communis* seed which is partly attributed to the anticonceptive effect of the seed^[16]
3. Pregnant rats exposed to reo in this study also showed significantly reduced serum levels of progesterone and estrogens when compared with control. The major estrogen produced during human pregnancy is estradiol and elevated estradiol levels indicate fetal wellbeing^[17]

Glycyrrhizaglabra. L (Liquorice):

Chemical constituents: Liquiritin, isoliquiritin, liquiritigenin, rhamnoliquiritin, prenyllicoflavane A, shinflavone, glycyrrhizic acid, glycyrrhetic acid, isoflavones^[18,19]

1. Glabridin is an isoflavan from licorice root, which is common component of herbal remedies used for treatment of menopausal symptoms. Past studies have been shown that glabridin resulted in favorable outcome similar to 17 β -estradiol suggesting possible role as an estrogen replacement therapy^[20]
2. Data from both in vivo and in vitro experiments demonstrated that glabridin and glabrine are similar to estradiol -17 beta in their stimulation of the specific activity of creatine kinase although at higher concentration, but differ in their extent of action and interaction with other drugs. Whereas glabrine was more effective in post menopausal cells^[21,22]
3. post menopausal women have higher incidence of heart disease compared to premenopausal women suggesting a protective role for estrogen. In the

present study we tested the effects on vascular tissue in vitro of two natural compounds derived from licorice root glabridin stimulated DNA synthesis in human endothelial cells and had a biphasic effect in proliferation of human vascular smooth muscle^[23]

Musa paradisiaca. L (Plantain):

Chemical constituents: Alkaloids, tannin, flavonoids, phenol, saponin, oxalates, glycoside, terphenoid, steroid, polyphenol.^[24,25,26]

1. Ethanolic extract of stem of *M. paradisiaca* was found to possess significant estrogenic activity as indicated by increase in uterine weight, vaginal cornification and uterotropic response. The stem extract acted as estrogen when given alone but when given with ethinyl estradiol it exhibited slight antiestrogenic activity.^[27]

Erythrina variegata. L (Indian coral tree)

Chemical constituents: Alkaloids, flavonoids, triterpenoids, lectin, erythrinine, hydrocyanic acid, gallic acid, hydroxycinnamic acid^[28,29,30]

1. Alcoholic extract of *C. variegata* L leaves was evaluated by uterotropic assay in 17 days old pre pubertal female rats and was chromatographically processed for compound isolation. In this treatment increased the absolute and normalized uterine weight, uterine diameter, endothelial thickness, luminal epithelial cell height, diameter, ovary and number of primary and secondary ovarian follicles relative to vehicle control.^[31]

Aloe vera. L. (Aloe):

Chemical constituents: Lignin, saponin, salicylic acid, amino acid, isoleucine, lysine, methionine, phenylalanine, threonine, valine, tryptophan, alanine, cysteine, glutamic acid, glycine, aspartic acid.^[32, 33]

1. *A. vera* is a suitable plant for developing antifertility drug. It is recommended for working out and should be experimented for antifertility program.^[34]
2. *A. vera* can be used as a contraceptive drug that can increase the estrogen level due to its phytoestrogen components such as β -sitosterol and without deleterious effects on the other vital organs however it is use to be restricted with women suffering from low calcium level as well as osteoporosis.^[35]
3. The results obtained in this study different amounts of *A. vera* hydro-alcohol extract cause an

increase in estrogen hormone in female rats. It appears that use of this plant could have positive effects on the process of fertility.^[36]

Bauhinia racemosa. Lam (Bidi leaf tree):

Chemical constituents: Methyl dibenzoxepin, flavenolglycoside, triterpene, saponin, phenanthroquinone, flavonoids.^[37, 38]

1. In vivo investigation revealed that ethanol extract at dose of 200mg/kg and 400mg/kg shows significant increase in uterine wet weight and uterine weight ratio respectively in albino rats. It was observed that ethanol extract of *B. racemosa* produced significant estrogenic activity.^[39]

Asparagus racemosus. Willd. (Shatavari):

Chemical constituents: Essential oil, asparagine, arginine, tyrosine, flavonoids, resin, tannin, steroidal glycoside (asparagins), bitter glycoside, vit A, B, B1, B2, C, E, Mg, P, Ca, Fe and folic acid.^[40,41]

1. Asparagus stimulant of endometrium and ovarian tissue regulating menstruation and ovulation, balance hormonal level, (TSH, FSH, LH, Estrogen) and improve conception rate in women.^[42]
2. *A. racemosus* extract increase in uterine weight and uterine glycogen without altering serum estrogen, progesterone levels in immature rats as against ovariectomized rats used as control. This study indicates that the phytoestrogen performs its function by binding directly to the estrogen receptor without enhancing the endogenous estrogen level.^[43]
3. *A. racemosus* methanolic extract is more potent in protecting the animals from osteoporosis than the aqueous extract. All of their effects observed in this study are similar to estrogen treatment. Hence *A. racemosus* shall be considered as safe and effective antiosteoporosis in the treatment of postmenopausal condition.^[44]

Nigella sativa. L. (Black caraway):

Chemical constituents: Arachidonic, linoleic, linolenic, oleic acid, almitoleic, palmitic acid, stearic and myristic acid, β sitosterol, cycloecalenol, cycloartenol, sterol esters, sterol glycosides, thymoquinone, thymohydroquinone, thymol, carvacrol, p-cymene.^[45]

1. *N. sativa* by giving different dose 300, 600 & 1200mg/kg respectively to ovariectomized rat to observed low dose of 300 mg/kg of *N. sativa* show occurrence of vaginal cornified and nucleated

epithelial cell which can be helpful in managing post menopausal symptoms as alternative for hormone replacement therapy.^[46]

2. Low dose *N. sativa* methanol extract and linoleic acid had prominent estrogenic like effect which were significantly different from there of control group in different experiments.^[47]
3. The ethanol extract of seeds showed antifertility effect in male rats that is probably due to inherent estrogenic activity.^[48]

Punicagranatum. L. (Pomegranate):

Chemical constituents: Polyphenol, flavonoids, anthocyanins, hydrolysable lipid.^[49]

1. On line biochemical detection coupled to mass spectrometry was applied to rapidly profile the estrogenic activity in the pomegranate peel extract.^[50]
2. The study suggest that the peel of *P. granatum* possess potent estrogenic activity in ovariectomized rat and substantiate the ethnic use in treatment of post-menopausal osteoporosis.^[51]

Saracaasoca. Willd. (Ashoka tree):

Chemical constituents: Tannin, flavonoids, phytosterol, alexone, esters, anthocyanin, fattyacid, carbohydrates.^[52]

1. The three doses administered to ovariectomized rats treatment with high dose was found to be more efficacious when compared with ovariectomized rats. The finding of this study firmly support the estrogenic potency of ethonolic extract of *S.asoca* which may be the reason of phytoestrogen.^[53]
2. Treatment with *S. asoca* reduced the thickening of two to four layer and the serum estrogen level diminished significantly to compared to rats administered with estrogen alone.^[54]

Caricapapaya. L. (Papaya):

Chemical constituents: Phytate, flavonoids, protein, carbohydrate, calcium, Mg, Fe and β -carotene.^[55]

1. *C. papaya* leaf contains flavonoid quercetin, which exhibits estrogenic effect. Based on the study the treatment of papaya leaf extract (PLE) increase the number of mammary lobules and uterine weight as well as estrogen dose. In summary PLE can be developed as a source of phytoestrogen.^[56]

Glycine max. L. (Soya bean):

Chemical constituents: Carbamate, lupeone, coumesterol, apigenin, stigmasterol, β -sitosterol,

B-daucosterol.^[57]

1. 11g soya contains 2.4mg phytoestrogens which is strongly estrogenic through it is a nonsteroidal plant product. It is a safe alternative to hormonal therapy.^[58]

Cissusquadrangularis. L. (Devil back bone):

Chemical constituents: potassium, calcium, zinc, sodium, iron, copper, calcium oxalate, Mg, resveratrol, piceatannol, pallidol, phenol, tannin, carotene.^[59]

1. Friedelin rich fraction showed estrogenic activity as indicated by vaginal cornification increase in uterine weight and rise in serum estrogen.^[60]

Bambusaarundinacea Willd. (Bamboo):

Chemical constituents: Oxalic acid, benzoic acid, arginine, cysteine, histidine, isoleusine, leucine, methionine, phenyl alanine, therionine, valine, tyrosine, niacin, riboflavin, thamin, glutaline, choline, nuclease, proteolytic enzyme.^[61]

1. Estrogenic activity of the hydro alcoholic extract of *B.aurinacae*leaves (HEBA) infemalewister rats. It was observed that HEBA possess significant estrogenic activity at 400mg/kg.^[62]

CONCLUSION:

Only few scientific studies on plants are demonstrated its effect on sex hormones included that it may be useful as a contraceptive especially in preventing the transmission of HIV. Family planning has been prompted through several methods of contraception, but due to adverse effect produced by synthetic steroidal contraceptive attention has now been focused in indigenous plants for their possible contraceptive effects.

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