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REVIEW ARTICLE

AWARE THE BENEFITS OF PHYTOESTROGENS-MAKE A SAFE JOURNEY TO ROCKY
ROAD OF MENOPAUSE

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ABSTRACT

Menopause is considered to be as an inevitable event in every woman's life. During the menopausal transition, women may experience bothered some symptoms which may affect the quality of life. Menopause is determined by the reduction of the ovarian function and decreased production of estradiol, leading to depletion of the ovarian follicles. Depriving the body of estrogen determine the appearance of specific symptoms such as the vasomotor, psychological and urogenital and more generalized physical changes such as weight gain, skin and hair thickness and general tiredness, and the late problems associated with menopause are osteoporosis and coronary artery disease. Thus, the early 21st century, prescription and use of hormonal therapy is still controversial (Garefalakis, 2008). Therefore, alternative therapies can be used to treat the same symptoms of menopause. Approximately 80% of American women experience hot flashes, while only about 20% of women in many parts of Asia experience them. The researcher believes that the difference between the two groups is the amount of phytoestrogens consuming in the diet. These substances, which are found in plants, act a lot like estrogen when they get into the human body. Although these phytoestrogens are much, much weaker than regular estrogens, they may help to ease the symptoms of the menopausal period for many women. The benefits of phytoestrogens are, bone protective, cardio protective, antioxidants, and cancer prevention. Research evidence shows that, approximately 80% of American women experience hot flashes, while only about 20% of women in many parts of Asia experience them. The researcher believes that the difference between the two groups is the amount of phytoestrogens consuming in the diet. These substances, which are found in plants, act a lot like estrogen when they get into the human body. Phytoestrogens may help to ease the symptoms of the menopausal period for women.

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INTRODUCTION

Menopause is a physiological stage in a woman's life that marks the end of the reproductive stage and is characterized by the permanent cessation of menstruation. Menopause is determined by the reduction of the ovarian function and decreased production of estradiol, leading to depletion of the ovarian follicles (Kopper *et al.*, 2008; Blake 2006; Al- Eassa 2012). Depriving the body of estrogen determine the appearance of specific symptoms such as the vasomotor, psychological and urogenital and more generalized physical changes such as weight gain, skin and hair thickness and general tiredness, dizziness etc. (Burger *et al.*, 2002; Perez 2011). The late problems associated with menopause are osteoporosis and coronary artery disease. Approximately 75-80% of women experience menopausal symptom, almost half of them considers the symptoms painful, while 20-30% has

severe symptoms (Palacios, 2003, Burger 1996). As a result, their quality of life is affected physically and psychologically, as well as socially.

Hormone replacement therapy, although effective in treating symptoms associated with menopause, standard doses may be associated with numerous adverse effects, of which the most serious are: breast cancer, venous thrombo embolism and stroke (Wells *et al.*, 2002). Thus, the early 21st century, prescription and use of hormonal therapy is still controversial (Garefalakis, 2008). Therefore, alternative therapies can be used to treat the same symptoms of menopause. Approximately 80% of American women experience hot flashes, while only about 20% of women in many parts of Asia experience them. The researcher believes that the difference between the two groups is the amount of phytoestrogens consuming in the diet. These substances, which are found in plants, act a lot like estrogen when they get into the human body. Although these phytoestrogens are much, much weaker than regular estrogens, they may help to ease the symptoms of the menopausal period for many women.

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The History of Soy

- There is a lot of material on soy and its discovery and use since at least 2000 to 3000 years' ago. soy and its phytoestrogenic property is well known in the veterinary field. However, no studies on human subjects exist before 1982.
- Allen Doisy first reported to exhibit estrogenic activity in plant extract in 1926. It is in 1940, in Australia, clover disease was recognized. The biological activity of phytoestrogens first identified in female sheep grazing on Australian pastures. And it was then thought that such activity might exist in human.
- Phytoestrogens were identified in the urine of non human primates in 1979 and in human in 1982.
- In India, in April 2001, charak pharma made capsules from soy- evanova which contained isoflavones + lignane + calcium and vitamin C
- Soy bean is a plant cultivated a foodstuff whose health properties have recently been discovered. Thorough studies have revealed that the consumption of the soybeans have favorable effects on people's health.
- Soy bean have been known to mankind in its original area, Asia for 5000 years, as the main food ingredient, it plays a major role as it contains up to 35% of vegetable proteins, as well as 20% vegetable fat and around 30% of carbohydrates.

How did the idea came about to look into diet?

The traditional diet of Chinese and japans women were studied. Their food contained mainly of soy and soy products, which have phytoestrogens.

Studies linking health and soy bean consumption had striking results

- Mayo (1999) did a study on health benefits of soy. Results shows that, Lower number of hormonal depending tumors such as breast cancer, prostate cancer, bone stability, lower risk of developing osteoporosis and an extremely low rate of menopause symptoms for Chinese and Japanese women. However those beneficial effects for the health disappeared when the food consumed did not include a high number of foodstuff rich in soy bean.
- Classical example is of Japanese women they have very little fracture risk when having typical soy rich diet in Japan. But they migrated to west and had change in diet; they started showing increase fracture risk.
- Hot flashes across the globe: Incidence of hot flashes is seen in more than 60% women in USA and Europe. While only approximately 20% incidence is seen in Chinese and Japanese women.

Soy provides isoflavones as BIOCHANIN A and FORMONETIN. The healthy intestinal bacterial flora converts them into active isoflavones, GESTEIN and DAIDZEIN respectively. Thus it is absolutely essential to have healthy intestinal flora.

Phytoestrogens

Phytoestrogens are plant compounds that are structurally or functionally similar to steroidal estrogens .these compounds are weaker than natural estrogens and reside in herbs and seasonings, vegetables, fruits and drinks. Phytoestrogens are selective estrogen enzyme modulators functioning as pro estrogens when estrogen deficiency is present and as anti estrogens when excess estrogen is present. Thus these flavonoids effectively balance the estrogen metabolism in the body.

The three most important types of phytoestrogens are isoflavones, lignans and coumestains. Isoflavones are the most potent and the most common phytoestrogens in supplements.

Types of phytoestrogens

S.No	Types	Common source
1	Isoflavones	Legumes, particularly the soy bean, clover, peas
2	Lignans	Most cereal, fruits and vegetables
3	Flavones	Most red, yellow colored fruits and vegetables
4	Flavanones	Citrus fruit
5	Flavonols	Most red, yellow colored fruits and vegetables
6	Coumestains	Bean shoots, alfalfa sprouts, sunflower seeds and oils, spinach, red beans, split peas, soy beans and some special species of clover
7	Chalcones	Liquorice and apple seeds

Benefits of phytoestrogens

It helps as antioxidants

Isoflavones and other phytoestrogens also act as superb antioxidants, helping the body to remove impurities such as free radicals, the damaging substances ingested by the body in the form of pollutants, and produced by the body as a by-product of normal metabolism.

It helps as Bone protective

The bone conserving action of phytoestrogens is considered to result from the direct estrogen receptor mediated action of genistein on bone building cells called osteoblasts and their precursor cells.

It helps in Cancer prevention

It is proposed that isoflavones inhibit angiogenesis, thus depriving tumor of the blood vessels that enable their growth. Asian diets that typically include phytoestrogens rich foods have been correlated with reduced risk of prostate cancer.

It act as an Anti atherogenic

- Atherosclerosis is initiated by monocytes binding to the endothelium and migrating into intimal layer to develop into foam cells.
- The adhesiveness of endothelial cell is due to lipid induced, oxidant sensitive transcription of adhesion molecules and chemokines, which promote monocytes binding.

- This binding is reliant upon intercellular signaling and oxidant sensitive transcription of adhesion molecules.
- Phytoestrogens protect against atherosclerosis by interfering with these initial process, like alter the activity of growth factors and inhibit the cell adhesion and proliferation thus preventing the atherosclerosis.

It has cardio protective effects

The WHO CARDIAC study supported that consumption of high soybean diet is associated with lower mortalities from coronary artery disease.

It Delay the aging process

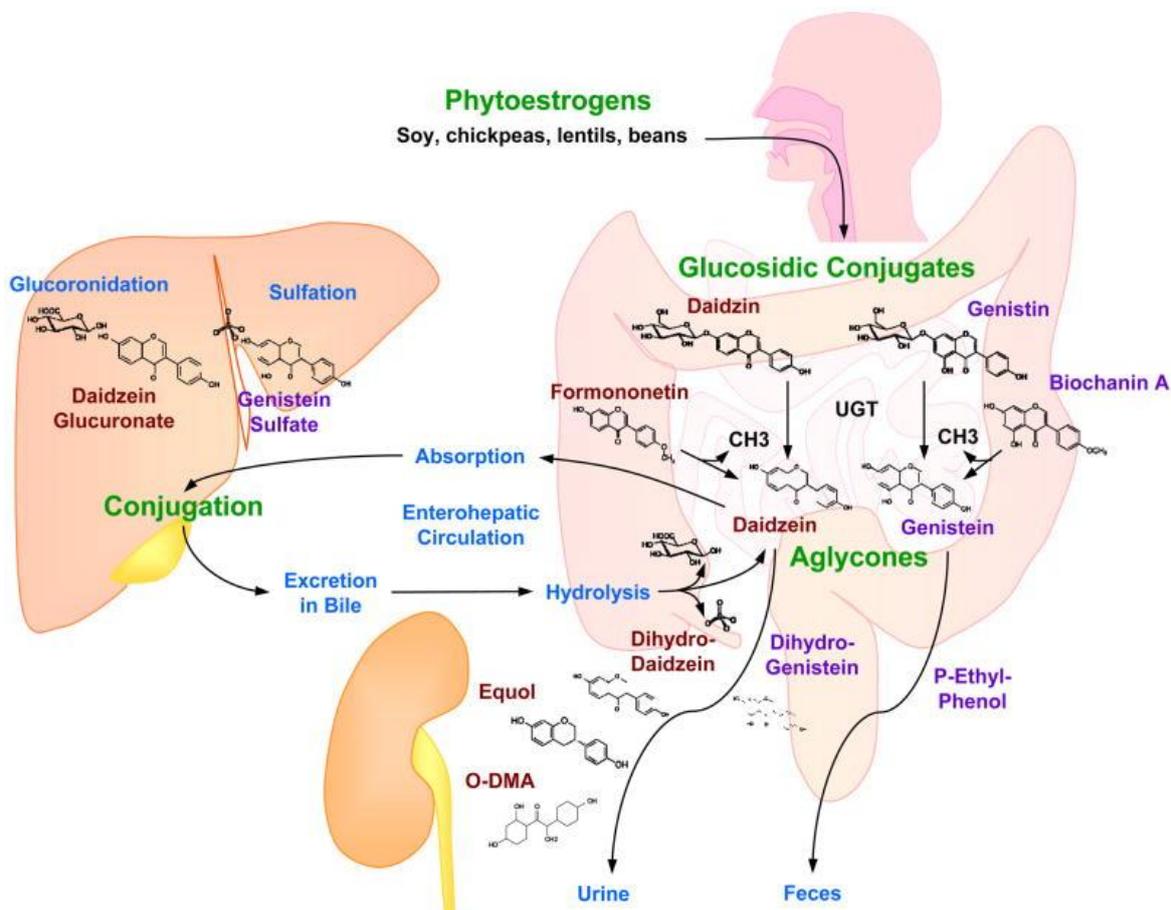
- It helps to inhibit the production of free radicals, which are associated with ageing. Free Radicals are an important factor in the ageing process and are constantly formed in most cells and tissues. Free radicals can be created and cause damage to the cell, including proteins, lipids, and DNA.
- Some population based studies indicate a lower incidence of menopausal discomforts such as hot flashes in Asian women who heavily consume soy foods.
- Studies indicate that the phytoestrogens, isoflavones may help control cholesterol levels, and could potentially protect against osteoporosis.
- Researchers noted that the reduced LDL cholesterol seen in the carotid arteries with soy was due to decreased delivery of LDL to the arteries, which could partly explain the soy's cardio protective effects.

Sources of phytoestrogens

Food items	Lignan content (µg/100g)	Total phytoestrogen (µg/100g)
Vegetables		
Soy bean sprouts	2.2	789.6
Garlic	583.2	603.6
Winter squash	113.3	113.7
Green beans	66.8	105.8
Collards	97.8	101.3
Broccoli	93.9	94.1
Cabbage	79.1	80
Fruits		
Dried prunes	177.5	183.5
Peaches	61.8	64.5
Strawberry	48.9	51.6
Raspberry	37.7	47.6
Watermelon	2.9	2.9
Nuts and other legume seeds		
Pistachios	198.9	382.5
Chestnuts	186.6	210.2
Walnuts	85.7	139.5
Cashews	99.4	121.9
Hazel nuts	77.1	107.5
Lentils	26.6	36.5
Beverages		
Wine, red	37.3	53.9
Tea, green	12	13
Wine, white	8	12.7
Tea, black	8.1	8.9
Coffee, decaf	4.8	5.5
Beer	1.1	2.7
Black bean souce	10.5	5330.3

Absorption, metabolism and excretion of isoflavones

Phytoestrogens, found in diet as gluco conjugates (daidzin, genistin), are hydrolyzed in the intestine, by the action of UDP-glucuronosyltransferase (UGT) secreted by intestinal bacteria,



into the active forms aglycones (daidzein and genistein). Genistein and daidzein are also produced from the demethylation of their precursor's biochanin A and formononetin, respectively. The aglycones are absorbed from the intestinal tract to the liver where they are mainly conjugated with glucuronic acid and sulfates. Some of the conjugated aglycones are excreted in the bile where they are hydrolyzed, and some of the unconjugated aglycones are excreted in the feces, while some are reabsorbed to the liver via enterohepatic circulation. In blood, Isoflavones are metabolized mainly into equol and O-desmethylangolensin (O-DMA) which are excreted in urine.

When it can be detectable in the blood

For isoflavones to be effective, genistein levels 25 mmol/l should be achieved. Even in high soy consumers it is unlikely that the blood isoflavones concentrations ever exceed 1-5 mmol/l. when total isoflavones intake is 50 mg/day, the blood plasma concentrations achieved are 50-800 ng/ml for genistein + daidzein + equol. After 6 weeks of isoflavones intake, detectable levels are achieved in blood. The plasma half life of genistein, daidzein is 7 to 9 hours for adults.

Mechanism of action

- Binding of estrogen receptors
- Modulation of sex steroid binding protein

Pro estrogenic effects:

Reduce the severity and frequency of menopausal symptoms such as hot flashes, night sweats, vaginal dryness, depression etc..

- Preserves bones and prevents fractures
- Regulates blood lipid profile favorably

Anti estrogenic effects

Reduce the risk of hormone related cancer such as breast cancer. Study shows that 45 mg of soy isoflavones has been shown to lengthen the first half of the menstrual cycle that is before ovulation, in pre menopausal women. It is perhaps the combined effect of lower estrogen exposure and a lengthened cycle that confers protective benefits against breast cancer in premenopausal women.

Dosage

It should be taken in quantities measuring 1-2 mg per kg body weight as once or twice daily, preferably with a high carbohydrate meal.

Target tissues for phytoestrogens

- Reproductive tissues – uterus, breast, prostate
- Cardiovascular tissue – arteries, lipoproteins
- Skeletal tissue – lipoproteins bone

Contra indications for using phytoestrogens

- Pregnant and lactating mother
- Women on birth control pills
- Infants and children

- Any interactions with hormonal replacement therapy or cancer therapy

Conclusion

Menopause is a normal stage of life experienced by women all over the world. It occurs typically between the ages of 40 and 60 years when the ovaries stop producing the hormones estrogen and progesterone, which are responsible for the monthly menstrual cycles. When the ovaries stop making these hormones, the menstrual cycles stop as well. Unfortunately, for many women, the drop in hormone production can cause uncomfortable side effects, such as hot flashes and vaginal dryness. The good news is that simple dietary changes may reduce some of these menopausal symptoms.

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