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Scientific Basis for the Therapeutic Use of soybean: A review study

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ABSTRACT

Soybean a species of legume native to East Asia belonging to Fabaceae family .it is a cheap source of protein. This review article was carried out by searching studies in PubMed, Medline, Web of Science, and IranMedex databases up to 2016. Eighty three articles was found, of which 50 *articles were included. The search terms were "soybean", "therapeutic", "pharmacological",* "*Chemistry*"*. Various studies have shown that soybean possess anti-Cancer, vaginal atrophy, lipid-improving effect, antidepressants effect, reproductive effects, anti-menopausal effect, bioavailability effect, estrogen effect, Anti-osteoporosis effect. Various combinations and numerous medicinal properties of soybean extract is shown it deserve more studies about the other useful and unknown properties of this multipurpose plant.*

Keywords: soybean, therapeutic, pharmacological, Chemistry

INTRODUCTION

It is proved that herbal medicine is effective in the treatment of many diseases[1-21]. *Glycine max*, commonly known as soybean in North America or soyabean in British English[22], is a species of legume native to East Asia, widely grown for its edible bean which has numerous uses. The plant, classed as an oilseed rather than a pulse by the UN Food and Agriculture Organization, produces significantly more protein per acre than most other uses of land[23]. Fat-free [defatted] soybean meal is a significant and cheap source of protein for animal feeds and many packaged meals. For example[24], soybean products[22], such as textured vegetable protein [TVP], are ingredients in many meat and dairy substitutes. The beans contain significant amounts of phytic acid[22], dietary minerals and B vitamins[25]. Soy vegetable oil, used in food and industrial applications, is another product of processing the soybean crop. Traditional non-fermented food uses of soybeans include soy milk from which tofu and tofu skin are made[26]. Fermented soy foods include soy sauce, fermented bean paste, natto and tempeh. Soybean seed contains 18-19% oil. Moderate consumption of soy foods appears safe for both breast cancer survivors and the general population[27], and may even lower breast cancer risk[28]. The beans contain significant amounts of phytic acid, dietary mineralsand B vitamins[29].

Anti-menopausal effect

Due to low HRT compliance and its possible risks in long period of time and considering the same activity of soybean supplement and HRT in relieving the hot flash as menopausal symptoms in women, it seems that soybean supplements can be an alternative therapy to hormone [30].

It showed that the most effective remedy was hormone treatment, but a study of isoflavines, such as soybean, suggests it is possible to alleviate the disturbances caused by menopause. it is necessary to have consensus on an individualized health plan which permits one to carry out adequate therapeutic adjustments in accordance to the needs which occur over the entire menopause process[31].

The possibility of an association between habitual natto intake and bone mineral density [BMD] and BMD change over time in healthy Japanese women was assessed. No significant association was observed between the intake of tofu or other soybean products and the rate of BMD change in the postmenopausal women. Natto intake may help prevent postmenopausal bone loss through the effects of menaquinone 7 or bioavailable isoflavones, which are more abundant in natto than in other soybean products [32].

This analysis was conducted to determine the efficacy of extracted or synthesized soybean isoflavones in the alleviation of hot flashes in perimenopausal and postmenopausal women.

Soy isoflavone supplements, derived by extraction or chemical synthesis, are significantly more effective than placebo in reducing the frequency and severity of hot flashes. Additional studies are needed to further address the complex array of factors that may affect efficacy, such as dose, isoflavone form, baseline hot flash frequency, and treatment duration [33].

The quantitative RT-PCR analysis of these genes indicated significantly higher expression of CHS, CHI, IFS, HID, IF7GT, and IF7MaT as compared to the control leaves. These findings suggest that ethylene activates a set of structural genes involved in isoflavonoid biosynthesis, thereby leading to enhanced production of isoflavones in soybean plants[34].

Vaginal atrophy

The effects of vaginal administration of isoflavones derived from Glycine max [L.] Merr. on the morphology and expression of estrogen receptors in vaginal epithelium of postmenopausal women was evaluated. It led to improvements in vaginal atrophy symptoms, maturation values, vaginal pH, morphology and expression of estrogen receptors in vaginal epithelium. Isoflavones proved good treatment options for relief of vulvovaginal atrophy[35].

Lipid-improving effect

The effect of treatment with β-conglycinin, a major soyabean protein, on blood lipids in menopausal women was evaluated. Compared with the changes from baseline in the placebo group, apoB and NEFA were significantly lowered in both the low-dose and high-dose β-conglycinin groups [P< 0·05]. In conclusion, the results suggest that β-conglycinin intake significantly decreases serum TAG and LDL-cholesterol levels[36].

Antidepressants effect

Antidepressants and the association of soybean with antidepressants was investigated. It was concluded that soybean has an antidepressant effect per se, and the association of soybean and antidepressants increases their effects [37].

Reproductive effects

The effects of soy phytoestrogens on cardiovascular risk factors and the reproductive system was investigated. Naturally occurring estrogens [called phytoestrogens] found in soybeans, in the belief that delivery of phytoestrogens via the diet would be more acceptable than pharmaceutical regimens [38].

The effects of six-month dietary traditional fermented soybean intake on BMI, reproductive hormones, lipids, and glucose among postmenopausal women was investigated. The result showed that dietary fermented soybean had favorable effects on progesterone and cholesterol, but had no effects on estradiol, glucose, and triglycerides. [39].

Anti- Cancer

A high consumption of omega-6 polyunsaturated fatty acids, which are found in most types of vegetable oil including soybean oil, may increase the likelihood that postmenopausal women will develop breast cancer [40]. Another analysis suggests an inverse association between total polyunsaturated fatty acids and breast cancer risk [41].

A study suggests soy isoflavones intake is associated with a significant reduced risk of breast cancer incidence in Asian populations, but not in Western populations [42].

Because of the phytoestrogen content, some studies have suggested that soybean ingestion may influence testosterone levels in men. It showed that neither soy foods nor isoflavone supplements alter measures of bioavailable testosterone or estrogen concentrations in men[43].

It showed that soy foods and enterolactone may increase the development of prostate cancer although no significant associations were observed for the soy isoflavones. Furthermore, soy consumption has been shown to have no effect on the levels and quality of sperm [44].

The association between soy consumption and prostate cancer risk in men was studied and the result showed that "consumption of soy foods is associated with a reduction in prostate cancer risk in men" [45].

It was evaluated whether genistein or estrogen treatment has the same effect when administered immediately or late to rats induced with menopause using ovariectomy. The result show that isoflavone renders a lower risk of cancer when compared to estrogen in treatments [46].

Bioavailability effect

The bioavailability of isoflavones after a single ingestion of aglycone-rich fermented soybeans [Fsoy] and glucoside-rich non-fermented soybeans [Soy] was compared. The results of this study demonstrated that the isoflavones of aglycone-rich Fsoy were absorbed faster and in greater amounts than those of glucoside-rich Soy in postmenopausal Japanese women [47].

Estrogen effect

changes induced on the vagina of ovariectomized rats after treatment with soybean concentrated extract or conjugated equine estrogens and the association of both drugs was evaluated.The result suggest that a high dose of isoflavone-rich soy extract may have positive effects on the vaginal structures of ovariectomized rats, but this action is less than that of estrogen treatment on vaginal thickness. In addition, soy extract may not block the estrogen effect on vaginal tissue [48].

Efficacy of soybean in alleviating the symptomatology derived from the lack of estrogen was investigated.the result showed that Treatment with PHYTO SOYA resulted in a significant improvement of the symptomatology that accompanies the lack of estrogen during menopause[49].

Osteoporosis effect

The relationships between the bone stiffness index measured by ultrasound, bone turnover markers, and lifestyle factors, including Natto intake, were examined .interactional effect of Natto intake and VDR RFLP, indicated that the B allele group was a risk factor of bone mineral loss and that Natto was effective in maintaining bone stiffness in this group. Although the present study was cross sectional and requires longitudinal investigation, Natto may improve the bone health of people who have a low affinity receptor for vitamin D[50].

CONCLUSION

Various combinations and numerous medicinal properties of soybean extract is shown it deserve more studies about the other useful and unknown properties of this multipurpose plant.

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