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Review Article……!!!

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HERBS USED IN THE MANAGEMENT OF OBESITY

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ABSTRACT

Obesity can be defined as an excess of adipose tissue that impart health risk; a body weight of 20% excess over that weight for age, sex, height. It is also define as a medical condition involving an excess accumulation of body fat. It has become the fast growing major disorder throughout the world. The main reason behind obesity is imbalance between intake and outflow of fat. There are various factors by which we can control the obesity by limiting energy intake and increasing the energy expenditure. Obesity therapies include reducing nutrient absorption and applying anorectic drugs, thermogenic drugs or drug that effect lipid mobilization and utilization. Success rate of obesity therapies are very low because most obese persons will not lose weight and of those who loses weight most of them regain it due to the adverse effect associated with these anti obesity drugs. Due to all these reasons now many trials have been conducted to find and develop new anti obesity drugs through medicinally important herbs that would minimize the side effects. Some of the herbs which shows anti obesity activity are *Allium sativum, Bauhinia variegate, Boswellia serrata, Cardiospermum halicacabum, Commiphora mukul, Cucurbita moschata, Cyperus rotundus, Garcinia cambogia, Nelumbo nucifera , Panax japonicus, Pinellia ternate, Rasberry, Rosa canina, Salix matsudana, Salacia oblonga.*

"The devil has put a penalty on all things we enjoy in life. Either we suffer in health or we suffer in soul or we get fat."

INTRODUCTION

Driven by the need to survive and influenced by complex genetic, emotional and socio-cultural factors, the desire to eat is one of the strongest of human instincts. In food deprivation, powerful or exigenic (appetite-stimulatory) responses are elicited[1]. After weight loss, compensatory metabolic alterations resist further reductions in weight[2].However, there are no equally potent or effective counter-regulatory mechanisms for decreasing food intake or increasing physical activity after chronic weight gain. Thus, in modern times, the obesity pandemic represents the inevitable consequence of placing a population pre selected for efficient fat storage into a sedentary environment of caloric overabundance. In such a setting, unless volitional control of energy intake and expenditure is consciously and persistently exercised, weight will gradually increase despite remarkably little net excess caloric intake[3] .

Over the past three decades, the consequences of this tendency to gain weight have become increasingly apparent. The International Obesity Task Force estimates that more than 300 million individuals worldwide are obese and an additional 800 million are overweight[4]. For the first time, the number of overweight individuals in the world is equivalent to the number of underweight. Unless current trends are reversed, the health-related and economic consequences will be enormous. Successful maintenance of the lifestyle changes needed for optimum bodyweight, although possible in some individuals,[5] is uncommon and the current methods for lifestyle modification (alone) as a treatment for obesity are widely regarded as ineffective.

Antiobesity pharmacotherapy is a potentially important adjunctive treatment to lifestyle modification. The ideal antiobesity drug has three important characteristics. First, it should cause sustained clinically significant reductions in bodyweight and reduce obesity-related morbidity and mortality. Second, the

benefit–risk ratio of the drug must be favourable. The track record for safety of antiobesity drugs has been particularly poor,[6, 7] whereas their potential for abuse by non-obese individuals striving to lose weight is high. Third, future affordability and availability are important considerations because obesity is a condition that disproportionately affects minorities and those of low socioeconomic status. Success rate of obesity therapies are very low because most obese persons will not lose weight and of those who loses weight most of them regain it due to the adverse effect associated with these anti obesity drugs. Due to all these reasons now many trials have been conducted to find and develop new anti obesity drugs through herbal medicines that would minimize the side effects. Some of the herbs which shows anti obesity activity are *Allium sativum, Bauhinia variegate, Boswellia serrata, Cardiospermum halicacabum, Commiphora mukul, Cucurbita moschata, Cyperus rotundus, Garcinia cambogia, Nelumbo nucifera , Panax japonicus, Pinellia ternate, Rasberry, Rosa canina, Salix matsudana, Salacia oblonga.*

HERBS WHICH SHOWS ANTI-OBESITY EFFECT

1. ***Allium sativum*[8,9]**

Allium sativum belong to the family Lilaceae. Through the ages, herbalists have considered *Allium sativum* a good carminative for digestive problems. An excellent treatment for diarrohea and a treatment for bacterial, fungal and viral infections. In many cultures *Allium sativum* has been used to treat intestinal parasites. In the first world war, *Allium sativum* was widely used as an antiseptic. In short *Allium sativum* has been used for about every human ailment. Writing in his *Materia Medica, Therapeutics and Pharmacognosy*, Finely Ellingwood (1902) says, "As an antiseptic and preventer of disease". Much modern research on *Allium sativum* has focused on a "prevention of disease". *Allium sativum* has become recognized for its great value in the prevention of arteriosclerosis and its ability to lower high serum cholesterol and triglyceride levels is well-researched and widely recognized. The antioxidant activity has also been linked to its blood

cholesterol-lowering action and its ability to decrease deposits of cholesterol on the walls of blood vessels. By lowering lipids in the blood (such as cholesterol and triglycerides) it benefits the heart. It not only lowers low-density lipoprotein in the blood, buts shifts the ratio of low-density lipoproteins in favor of high-density lipoproteins - so called good cholesterol, which helps the liver metabolize fat substances in the blood, rather than allow them to be deposited in tissues[8,9].

2. *Commiphora mukul*[10]

The effects of the administration of 50 mg of *Commiphora mukul* or placebo capsules twice daily for 24 weeks were compared as adjuncts to a fruit- and vegetable-enriched prudent diet in the management of 61 patients with hypercholesterolemia (31 in the *Commiphora mukul* group and 30 in the placebo group) in a randomized, double-blind fashion. *Commiphora mukul* decreased the total cholesterol level by 11.7%, the low density lipoprotein cholesterol (LDL) by 12.5%, triglycerides by 12.0%, and the total cholesterol/high density lipoprotein (HDL) cholesterol ratio by 11.1% from the post diet levels, whereas the levels were unchanged in the placebo group. The HDL cholesterol level showed no changes in the two groups. The lipid peroxides, indicating oxidative stress, declined 33.3% in the *Commiphora mukul* group without any decrease in the placebo group. The compliance of patients was greater than 96%. The combined effect of diet and *Commiphora mukul* at 36 weeks was as great as the reported lipid-lowering effect of modern drugs. After a washout period of another 12 weeks, changes in blood lipoproteins were reversed in the *Commiphora mukul* group without such changes in the placebo group.

3. *Nelumbo nucifera*[11,12,13]

Nelumbo nucifera belong to family Nelumbonaceae. Traditionally the leaves are boiled with *Mimosa pudica* (Lajjaalu) in goat's milk to treat diarrhoea, the leaf paste is applied to the body in fever and inflammatory skin conditions; young leaves are taken with sugar to treat rectal prolapse . The stamens are mixed with ghee and jaggery and used in treating hemorrhoids. The leaves and flowers are both useful in many varieties of raktapitta or bleeding disorders. The flowers are sometimes prescribed to promote conception. The petals alleviate thirst and inflammations. The seed powder mixed with honey is given in cough. The roots are said to be healthy for teeth. Taken with ghee, milk, and gold it is a general tonic said to promote strength, virility, and intellect. *Nelumbo nucifera* leave extract was recently used to treat obesity in China. *Nelumbo nucifera* shows its anti obesity effect activity by inhibiting the activity of alpha-amylase and lipase and regulate lipid metabolism. *Nelumbo nucifera* leave extract prevent the increase in body weight, parametrial adipose tissues weight and liver triacylglycerol level in mice by impaired digestion, inhibiting absorption of lipids and carbohydrates, accelerated lipid metabolism and regulate energy expenditure.

4. *Panax japonicus*[14]

Panax japonicus belongs to family Araliaceae. The roots of *Panax japonicus* is used as flavoring agent in Tea and Liquors. A decoction of roots used as expectorant and stomachic. The rhizomes of *Panax japonicus* are used as a folk medicine for treatment of life style related diseases and obesity closely associated with life style related diseases. The study was performed to check whether saponin present in rhizomes of *Panax japonicus* prevent obesity or not. The three different type of chikusetsusaponins were isolated from rhizomes of *Panax japonicus*. They are chikusetsusaponin-III, 28-deglucosyl-chikusetsusaponin-IV, 28-

deglucosyl-chikusetsusaponin-V. Which show the anti obesity effect by delaying the intestinal absorption of dietary fat by inhibiting procreatic lipase activity which clearly indicates that the saponin fraction of *Panax japonicus* rhizomes had a significant anti obesity action.

5. *Salix matsudana*[15]

Salix matsudana is commonly know with the names of Hankow willow, Pekin willow and belong to family Salicaceae. A small to medium-sized, upright spreading tree of about 30 feet in height with a 15-foot-spread, the main ornamental feature of this plant is the contorted and twisted branches and twigs (Fig. 1). Branches arise from the trunk at an acute angle and grow up almost parallel to the trunk before they curve back to the horizontal. The winter branch pattern is most interesting and probably accounts for the popularity of the tree. The polyphenol fraction prepared from the leaves of *Salix matsudana* reduced the elevation of plasma triacylglycerol level with in 3-4 hrs after the oral administration at a dose of 570 mg/kg in form of lipid emulsion containing corn oil. In addition 3 compounds were isolated from polyphenol fraction and identified as Apigenin-7-0-d-glucoside, Lutedin-7-0-d-glycoside and Chrysoeriol-7-0-d-glycoside. Apigenin-7-0-d-glucoside inhibit alpha-amylase activity and Lutedin-7-0-d-glycoside, Chrysoeriol-7-0-d-glycoside inhibit palmitic acid uptake which lead to enhanced nor-epinephrine induced lipolysis in fat cells and show its anti obesity effect.

6. *Pinellia ternate*[16]

Pinellia ternate belongs to family Araceae. The beneficial effect of *Pinellia ternate* extract is clearly visible from the blood biochemical profiles which shows that there is significant reduce level of triglyceride and free fatty acids is seen in obese persons. *Pinellia ternate* extract leads the white fat depots to convert into thermogenically active brown adipose tissue, which is capable of utilizing fatty acids for production of heat via uncoupling of oxidative phosphorylation. These changes would create a negative energy balance and subsequent loss of fat content within these tissues. It suggest that *Pinellia ternate* extract also protect fat storage and have anti-obesity effect.

7. *Cucurbita moschata*[17]

Cucurbita moschata commonly known as Pumpkin and winter squash belongs to family Cucurbitaceae. During the screening of a variety of plant sources for their anti-obesity activity, it was found that a water-soluble extract, named PG105, prepared from stem parts of *Cucurbita moschata*, contains potent anti-obesity activities in a high fat diet-induced obesity mouse model. In this animal model, increases in body weight and fat storage were suppressed by 8-week oral administration of PG105 at 500 mg/kg, while the overall amount of food intake was not affected. Furthermore, PG105 protected the development of fatty liver and increased the hepatic β-oxidation activity. Results from blood analysis showed that the levels of triglyceride and cholesterol were significantly lowered by PG105 administration, and also that the level of leptin was reduced.

8. Raspberries

Raspberry ketone (4-(4-hydroxyphenyl) butan-2-one; RK) is a major aromatic compound of red raspberry (*Rubus idaeus*). The structure of RK is similar to the structures of capsaicin and synephrine, compounds known to exert anti-obese actions and alter the lipid metabolism. The study was performed to clarify whether RK helps prevent obesity and activate lipid metabolism in rodents. To test the effect on obesity, the following groups designed in vivo experiments: 1) mice were fed a high-fat diet including 0.5, 1, or 2% of RK for 10 weeks; 2) mice were given a high-fat diet for 6 weeks and subsequently fed the same high-fat diet containing1% RK for the next 5 weeks. RK prevented the high-fat-diet-induced elevations in body weight and the weights of the liver and visceral adipose tissues (epididymal, retroperitoneal, and mesenteric). RK also decreased these weights and hepatic triacylglycerol content after they had been increased by a high-fat diet. RK significantly increased norepinephrine-induced lipolysis associated with the translocation of hormone-sensitive lipase from the cytosol to lipid droplets in rat epididymal fat cells. In conclusion, RK prevents and improves obesity and fatty liver. These effects appear to stem from the action of RK in altering the lipid metabolism, or more specifically, in increasing norepinephrine-induced lipolysis in white adipocytes.

9. *Rosa canina*[18]

Rosa canina belongs to family Rosaceae. The 80% aqueous acetone extracts from the fruit (50 mg/kg/d) and seeds (12.5 and 25 mg/kg/d) of *Rosa canina* L., but not from the pericarps, were found to show substantial inhibitory effect on the gain of body weight and/or weight of visceral fat without affecting food intake in mice for 2 weeks after administration of the extracts. With regard to the active constituents, the principal constituent, *trans*-tiliroside (0.1–10 mg/kg/d), potently inhibited the gain of body weight, especially visceral fat weight, and significantly reduced blood glucose levels after glucose loading

(1 g/kg, ip) in mice. On the other hand, kaempferol and *p*-coumaric acid lacked such effect and kaempferol 3-*O*-β-d-glucopyranoside tended to reduce the gain of body weight and visceral fat weight, but not significantly, at a dose of 10 mg/kg/d. These results indicate the importance of both kaempferol 3-*O*-β-d-glucopyranoside and *p*-coumaroyl moieties for anti-obese effects.

CONCLUSION

It is now becoming exceedingly apparent that available anti-obesity drugs dose not properly meet therapeutic demand of majority of patients problem and that the herbal remedies remain to be the ultimate therapeutic hope for many such patients of world. Critical analysis of our current understanding of the most popular and most well studied anti-obesity active medicinal plant reveal that many therapic relevant questions have not yet been properly answered. There are many herbal pharmaceutical companies are now concentrating their efforts to identify the active constituents and their mode of action of these herbs.

It can not be ignored though, that numerous herbal remedies continue to be the only therapeutic possibilities for a majority of global population and that uncontrolled medicinal use of herbal remedies in the world have consistently increased during the past few decades, therefore extensive effort should be taken to rationalize the situation because herbs are promising natural sources for obtaining structurally and functionally noval drugs and/or “hits” and “leads” suitable for drug development purpose.

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