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VRIKSHAMLA (GARCINIACOMBOGIA): A NOVEL NATURAL GIFT FOR METABOLIC SYNDROME

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ABSTRACT

In Recent years, metabolic syndrome (MS) becomes a leading health problem world over due to wide range involvement of body systems. The exact etio-pathogenesis and management of this chronic health hazard is still evolving in biomedical sciences. However, it is believed that dyslipidemia imparts a major role in the diathesis of MS and warranting special attention regarding its management. Some lipid lowering agents and metformin is the mainstay for its management. However, their prolong use may leads to develop certain other health related consequences. In view of this, researchers are inclined to other system of medicine to search out safe and effective remedial measures Ayurveda is one of them. It is quite interesting to note that thousand years back *Ayurvedic* scholars pointed out that *Medas* (adipose tissue) play a significant role in the genesis of diabetes mellitus and obesity. This ancient idea is quite comparable to latest development in this field. Current studies revealed that for the management of MS and obesity, the traditional Ayurvedic medicine *Vrikshamla* (*Garcinia combogia*) is an excellent representative in alternative and complementary medicines in a very natural way. The drug *Vrikshamla* is very useful for the management of *Medoroga* (obesity disorders) and cardiac problems as per Ayurvedic lexicons. Researcher believes that it exerts anti-hyperglycemic, insulin sensitization, islet protection, anti-dyslipidemic activities, anti-obesity and antioxidants in animal model systems, ultimately it results in metabolic correction and disease reversible effect. In this review article, *Vrikshamla* (Garcinia cambogia) is presented as potent drug for the treatment of metabolic syndrome and obesity.

KEYWORDS: Metabolic syndrome, Garcinia cambogia, Medoroga, *Vrikshamla*

INTRODUCTION

Metabolic syndrome (MS) is considered as the global epidemic of the 21st century , it is one of the primary health problem faced by the modern western world. The terms “metabolic syndrome,” “insulin resistance syndrome” (IRS), “dysmetabolic syndrome,” “Syndrome X,” “Raven’s syndrome,” “plurimetabolic syndrome,” “hypertriglyceridemia waist,” “cardiometabolic syndrome,” “general cardiovascular syndrome,” and CHAOS (in Australia) are all synonyms that define a cluster of conditions[1,2]. It is described as a chronic proinflammatory and highly reactive oxidative disease. The reason for the increased incidence of MS in the highly industrialized countries is mainly due to the high level of stress, malnutrition, use of over processed food, and physical inactivity. Actually, the MS is a cluster of disorders, all of which are affected by genetics, diet, and other environmental and lifestyle (intrinsic and extrinsic) factors (Grundy et al., 2005)[3].

It comprises an accumulation of different and mutually intensifying diseases and risk factors, which mostly share the common causes. It affects a large number of people in a clustered fashion.

It is considered an emerging epidemic in developing East Asian countries, including China, Japan, and Korea. The prevalence of metabolic syndrome in East Asia may range from 8-13% in men and from 2-18% in women, depending on the population and definitions used [4,5,6]. It is estimated that approximately 25% of the world's population has MS and it will increased up to 38% by the year 2023.This situation appears to be similar in the Indian subcontinent with recent data suggesting about 25% to 33% of the adult Indian population is suffering from MS. Some community such the Punjabi Bhatia community in north India are more prone to be obese with type 2 DM having symptoms of MS[4,5,6,7]. However, several considerations are unique to women with metabolic syndrome, including pregnancy, use of oral contraceptives, and polycystic ovarian syndrome [8]. The prevalence of metabolic syndrome increases with age, with about 40% of people older than 60 years meeting the criteria [9].Hence, metabolic syndrome can no longer to be considered a disease of only adult populations.

Metabolic Syndrome increases the risk of type 2 diabetes anywhere from 9-30 times that of the normal population and despite studies vary the risk of heart disease increases 2-4 times over the normal population. There are also other concerns as well as fat accumulation in the liver, resulting in chronic inflammation and the potential for degenerative cirrhosis. The kidneys can also be affected, as there is an association with microalbuminuria- the leaking of protein into the urine, a subtle but clear indication of kidney damage. Other problems associated with metabolic syndrome include obstructive sleep apnea, polycystic ovary syndrome (PCOS), increased risk of dementia with aging, and rapid cognitive decline in the elderly[10].

Diagnostic Criteria of MS

Metabolic Syndrome or the “Deadly Quintet” of 21 century is a cluster of:

- Abdominal Obesity (waist circumference in men-greater than 40 inches and in women-greater than 35 inches).
- Fasting glucose-greater than 110 mg/dl.
- Dyslipidemia- Triglycerides-greater than 150 mg/dl and HDL (good) Cholesterol- less than 50 mg/dl in women, and less than 40 mg/dL in men
- Blood Pressure-greater than 130/ 85 mm Hg
- Increased risk of blood clothing as eventual precursor of heart disease and stroke

For a person to be defined as having metabolic syndrome, the new definition requires the presence of central obesity (NCEP: ATP III, 2001), plus two of the following four additional factors: raised triglycerides, reduced high-density lipoprotein cholesterol (HDL-C), raised blood pressure, or raised fasting plasma glucose level. Gender and, for the first time, ethnicity-specific cut-points for central obesity as measured by waist circumference are included[11,12].

Ayurvedic View on MS

Ayurveda discusses *Meda dhatu* (fat & its related tissues) in detail in the context of *Medoroga* or *Sthaulya Roga* and clearly explains how to maintain healthy quantity and quality of fatty tissues in the body (Ch.Chi.15/29). The

principles of formation and nutrition of *Meda* are narrated in detail in Ch.Su.13/17, Ch.Su.28/4, Ch.Sa.6/10, Ch.Chi.15/16, and Ch. Chi.15/29-32.Metabolic syndrome, obesity and lipid disorders have been vividly conceived in Ayurveda with the context of *Medoroga* and *Prameha*. The classical Ayurvedic texts have vividly described *Santarpana* and *AptarpanajanyaVikaras*, which comprise of diseases due to over nutrition and defective tissue metabolism. Ayurveda is very much concerned about conservation of health rather than eradication of disease. It presumes that improper dietary habits and deranged functions of different sets of *Agni* give rise to formation of *Ama* (reactive antigenic factor) like reactive species at different level of digestion and metabolism.The production of *Medadhatu* is disturbed by variety of etiological factors including *Medodhatvagni*. Side by side, the same also disturb in the quantity (amount and proportion) and quality (contents) of *Medadhatu*. When *Medadhatu* interacts with preformed form of *Ama*, it changes and alters the quality and quality of fatty tissues including cholesterol. The interaction of *Ama* with fatty tissues is known as *Sama Medadhatu*, which is the main cause of *Medoroga*, and it is the liver (*Yakrita*), which is responsible for qualitative derangement of lipids and cholesterol. This form of *Ama*, when circulates all over the body may lead to blockade of micro-channels and precipitate antigenic reactions and generate series of inflammatory events in the body. If such categories of *Ama* interact with *Medadhatu*, it may lead to a variety of metabolic disorders.Since last few decades, the conventional system of medicine is focusing on the concept of metabolic syndrome, which seems very similar to the concept of *Santarpana* and *aptarpanajanya vikaras* of Ayurveda.

The idea of significance of *Meda* (adipose tissue) as the principal *Dushya* has been recently confirmed also in modern medicine where the central obesity and dyslipidemia are being considered as the main components of the basic matrix of this disease. The recent concept of the MS also seems to have been conceived in Ayurveda. It is suggested that the focus of research and development should be around MS as a preventive measure on one hand and prevention and management of complications of MS on the other. Tool to control dyslipidemia, hyperglycemia, and anti-hypertensive is no more a big problems, but problem is lifelong use of these drugs. The central point of consideration today is prevention of MS and prevention and treatment of its complications[7, 13,14,15].

Role of Ayurveda in the Management of MS

It seems that issues depicted above can be tackled with the holistic approach of Ayurvedic therapeutics by utilizing the natural therapeutic resources, dietary control, and other bio-purificatory measures of Ayurveda, which may not only control the lipid and sugar metabolism in the system but also control progression of MS into other major cardiovascular and other lifethreatning complications. In this concern we have put an overview on *Vrikshamla* (Garcinia cambogia) in the light of MS[16].

Metabolic Syndrome and *Vrikshamla* (*Garcinia cambogia*)

Several researches proves that *Garcinia cambogia* have potential to reversing the etiopathogenesis of obesity, dyslipidemia and MS. It also minimizes signs and symptoms of these disorders. In Ayurveda this plant is described under *Amla Skandha*, and *Hridya mahakashaya* by Acharya Charaka. It is advocated for the management of variety of disorders such as *Vatavikara*, *Hridroga* and *Shoola*.

Plant Introduction

Garcinia cambogia is a tropical species of family Clusiaceae. It is native to Indonesia. The height of Trees up to 12 meter tall. The fruit of the plant looks like a small, green pumpkin. The leaves of plant are used for cooking of curries in

India. The fruit rind and extracts of Garcinia species are used for many traditional recipes. Various species of Garcinia are used similarly in food preparation in Assam (India), Thailand, Malaysia, Burma and other Southeast Asian countries.

Botanical Classification

Kingdom	Plantae
Subkingdom	Tracheobionta
Devision	Magnoliophyta
Class	Magnoliopsida
Subclass	Dilleniidae
Order	Malpighiales
Family	Clusiaceae
Genus	Garcinia
Species	***Garcinia cambogia***

Chemical Composition

The fruits of *Vriksamala* contains 10% maleic acid and very little quantity of tartaric and citric acid. Garcinia is a rich source of active compounds including garcinol, isogarcinol, xanthochymol, isoxanthochymol and Hydroxycitric acid. These are flavonoids, benzophenones, xanthones, lactones and phenolic acids. Xanthones are oxygenated heterocyclic compounds present in higher plants. Xanthone nucleus is symmetric and is known as xanthen-9H-ones or 9-xanthenone or dibenzo-γ-pyrone[17].

The biological activities of these compounds depend on the different substituent's position and nature. Flavonoids are polyphenolic compounds, which are remarkable group of plant metabolites. The antioxidant and free radical scavenging activity of flavonoids depend on the position of hydroxyl groups and other chemical features[18].

Benzophenones are organic group of aromatic ketones having the parent compound diarylketone, which have wide applications in pharmaceutical industry [19]. As the plant has a wide range of biologically active compounds showing broader activity range.

Ayurvedic Pharmacodyamic

Rasa	:	*Madhura, Amla, Katu* (*Amlarasa* dominant)
Guna	:	*Ruksha, Laghu*
Virya	:	*Ushna*
Vipaka	:	*Amla*
Prabhava	:	Hridya,
Doshaghnata	:	*Kapha-Vatahara* and *Pittavardhaka*

Parts Used : Fruits, Seed oil, Root bark

Dose : 2 to 4 gm powder, Fruit Juice-10 to 20 ml,

Fruit extract- The usual dose of Garcinia extract is 300 to 500mg TID before meal with water.

Disease Indication

Hridya (cardio protective), *Yakritõttejaka* (liver stimulant), *Jvaraghna* (anti-pyretic) *Dipana, Pachana* (appetizers & digestant), Udararoga (GI disorders), *Trishna* (excessive thirst), *Arsharoga* (haemorrhoids), *Grahniroga* (disorders of small and large bowel), *Gulma* (flatulence), *Shoola* (painful conditions), *Krimiroga* (worm Infestations).

Recent Experimental and Clinical Reports on Garcinia Cambogia

- The effect of HCA in animals is maximum when administered 30-60 minutes prior to feeding[20].
- Experimental studies shows that HCA inhibits fat synthesis and reduces food intake. Acute oral toxicity studies in animals demonstrate that CitriMax (50% HCA as calcium salt) has a low acute oral toxicity. HCA-SX was not mutagenic in the presence or absence of metabolic activation in Ames genotoxicity assays in strains TA98 and TA102. In several, placebo-controlled, double-blind trials employing up to 2800 mg/day HCA, no treatment-related adverse effects were reported. The intake of HCA at levels up to 2800 mg/day is safe for human consumption[21].
- Long-term *Garcinia cambogia* supplementation ameliorates adipogenesis in mice fed a HFD by promoting fatty acid oxidation with a simultaneous decrease in fatty acid synthesis in visceral WAT. Furthermore, GC exhibited a protective role against glucose intolerance induced by HFD. Moreover, this study provides the first evidence that long-term GC supplementation significantly increased hepatic collagen accumulation, lipid peroxidation and MCP-1 and TNF-α mRNA expression as well as plasma AST and ALT levels, thereby contributing partly to the exacerbation of steatohepatitis in HFD-induced obese mice at the doses given[22].
- Hydoxycitrate reduces body weight, which is regain after substantial body weight loss in male rats and the effects are presumably linked to its inhibiting effect on lipogenesis, but the exact mechanism still has to be determined[23].
- Consumption of the Garcinia cambogia extract effectively ameliorates HFD-induced obesity, probably by modulating multiple genes associated with adipogenesis, such as aP2, SREBP1c, PPARgamma2, and C/EBPalpha in the visceral fat tissue of mice[24].
- Ethylacetate extract of fruit rind of Garcinia cambogia and leaves of Bauhinia variegata an invirtro study reveals that Garcinia cambogia is less efficient in scavenging NO, DPPH, SO and H2O2 whereas it is more efficient in scavenging hydroxyl radical and has high reducing activity. Bauhinia variegata is less efficient in NO, SO, DPPH, OH radical whereas it is more efficient in H2O2 and has high reducing activity[25].
- 3.3% of Garcinia extract was examined on 10% sucrose on mice for a period of 4 weeks. The findings of this study confirmed that Garcinia cambogia efficiently improved glucose metabolism in mice and displayed leptin-like activity[26].

CONCLUSIONS

As disease entity MS is quite prevelant now days, which is linked with a wide range of medical ailments such as-diabetes, hypertension, heart disease, obstructive sleep apnoea, asthma, non-alcoholic fatty liver disease, osteoarthritis and polycystic ovary syndrome, and cancer but also it reduces the life span of individual. The same idea is concieved in Ayurveda in the context of *Ashtoninditiya* chapter of *Charaka samhita sutrasthana* 21 in relation to *Atisthaulya* (morbid obesity). In Ayurvedic terms this disorder can be considered as *Atisthaulya*/*Medoroga*[27]. If proper measure are not taken in due course of time then it is be converted into a cluster of morbid conditions. It is not only a very serious health problem of our society but also a very big economic burden to the nation and world too. There are several treatment modalities are available in modern medicine for the management of MS but majority of them targeting only lipid metabolism and side by side imparts various unwanted effects and toxic effects on their prolong use. On the other hand Ayurveda acquire holistic approach for its management through pharmacological and non-pharmacological measures. In this regard, the main target of Ayurvedic is generalised but at subtle level it act at the level of *Medadhatu* alonge with it correct the functioning of *Bhutagni*, *Medo Dhatvagni, Medovaha Srotas, Ama* & *Vatadosa* and improves overall wellbeing. A very ideal example of such versatile action is *Vrikshamla* (Garcinia cambogia), which is described in Ayurveda for management of cardiac and certain other related problems. It having very good *Medonashana, Vatanashana* and *Agnideepaka* properties. Acoording to modern researchers *Vrikshamla* (Garicinia cambogia) contains HCA which having very good effect on lipid metabolism and ultimately it reverses the disease condition. Ayurvedic drug *Vrikshamala* is very good alternative to the parallel counter part and it can be used alone or as an adjuvent with conventional modern drugs. It is better, safe and natural alternative for the management of MS.

Conflicts of Interest: No

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