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A Review on the Anti-Hyperlipidemic activity of Medicinal plants

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ABSTRACT

Hyperlipidemia has been ranked as one of the greatest risk factors contributing to prevalence and severity of coronary heart diseases. Coronary heart disease, stroke, atherosclerosis and hyperlipidemia are the primary cause of death. The elevation of serum total cholesterol and low density lipoprotein (LDL) cholesterol has been reported as a primary risk factor for cardiovascular disease. Hyperlipidemia is a condition when abnormally high levels of lipids i.e. the fatty substances are found in the blood. Hypolipidemic drugs are extensively used as prophylactic agents to prevent such atherosclerosis induced disorders. But these hypolipidemic drugs are not free from adverse effects. Many plant derivatives and domestic remedies have been screened for their hypolipidemic action. More than 70 medicinal plants have been documented to have significant hypolipidemic action. During the last decade, an increase in the use of medicinal plants has been observed in metropolitan areas of developed countries. Medicinal plants play a major role in hypolipidemic activity. The advantages of herbal medicines reported are effectiveness, safety, affordability and acceptability. This review focus on hyperlipidemia and the role of plants used for the treatment of hyperlipidemia.

INTRODUCTION

TREATMENT OF HYPERLIPIDEMIA USING HERBAL MEDICINES

Hyperlipidemia associated lipid disorders are considered to cause the atherosclerotic cardiovascular disease. The main aim of treatment in patients with hyperlipidemia is to reduce the risk of developing ischemic heart disease[1] or the occurrence of further cardiovascular or cerebrovascular disease. The consumption of synthetic drugs leads to hyperuricemia, diarrhoea, nausea, myositis, gastric irritation, flushing, dry skin and abnormal liver function. The medicinal plants play a major role in hypolipidemic activity. The advantages of herbal medicines reported are effectiveness, safety, affordability and acceptability. Due to less communication means, poverty, ignorance and unavailability of modern health facilities, most people especially rural people are still forced to practice traditional medicines for their common day ailments. Most of these people from the poorest link in the trade of medicinal plants. Over the past decade, herbal medicine has become a topic of global importance, making an impact on both world health and international trade. Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population. This is particularly true in developing countries, where herbal medicine has a long and uninterrupted history of use. Continuous usage of herbal medicine by a large proportion of the population in the developing countries is largely due to the high cost of Western Pharmaceuticals and Healthcare. Herbal medicines have been main source of primary healthcare in all over the world[4]. From ancient times, plants have been catering as rich source of effective and safe medicines. Today according to the WHO as many as 80 % of world populations are still dependent on traditional medicines[2]. Herbal medicines are finished, labeled medicinal products that contain as active ingredients, aerial or underground part of plants or other plant materials, or combination thereof, whether in the crude state or as plant preparations[5]. Medicines containing plant materials combined with chemically defined active substances, including

chemically defined isolated constituents of plants are not considered to be herbal medicines[6]. Chemical principles from natural sources have become much simpler and have contributed significantly to the development of new drugs from medicinal plants[3]. The valuable medicinal properties of different plants are due to presence of several constituents i.e. saponins, tannins, alkaloids, alkenyl phenols, glycol-alkaloids, flavonoids, sesquiterpenes lactones, terpenoids and phorbol esters[7]. Among them some are act as synergistic and enhance the bioactivity of other compounds[8]. The medicinal plants are listed in various indigenous systems such as Siddha (600), Ayurveda (700), Amchi (600), Unani (700) and Allopathy (30) plant species for different ailments. According to another estimate 17,000 species of medicinal plants have been recorded out of which, nearly 3,000 species are used in medicinal field. The Indian Vedas also describes the widespread use of herbal products and aqueous extract of different plant parts for curing different diseases[9]. Maximum 30% of root part of medicinal plant is used in different practices in comparison to other plant parts. Medicinal plant based drug industries are progressing very fast in India but it is best with a number of problems. Currently used hypolipidemic drugs are associated with so many adverse effects and withdrawal is associated with rebound phenomenon which is not seen with herbal preparations[10]. Plant parts or plant extract are sometimes even more potent than known hypolipidemic drugs.

COMMIPHORA MUKUL

(Guggul) - Guggul is the oleo-gum resin obtained by the incision of the bark of Commiphoramukul belonging to the family Burseraceae.Guggul contains gum (32%), essential oil (1.45%), sterols (guggulsterols I to IV, cholesterol, Z and E-guggulosterone), sugars (sucrose, fructose), amino acids, flavonoids (quercetin), cembrene, allylcembrol, ellagic acid etc. The steroids present in the Guggul is responsible for hypolipidemic activity.

LIQUORICE

consists of dried, peeled or unpeeled roots and stolons of Glycyrrhizaglabra belonging to the family Leguminosae.
Chief constituent is glycyrrhizin which is a saponin glycoside accounts for the sweet taste. It also contains flavonoids: liquiritin and isoliquiritin that produce antigastriceffect in ulcerative colitis. The ethanolic root extract of liqourice has significant anti hyperlipidemic activity. Phytoconstituents like glycyrrhizin, coumarins, flavonoids are known to have anti hyperlipidemic activity.

ASHWAGANDHA

consists of dried roots and stem bases of Withaniasomnifera belonging to the family Solanaceae.Chief constituent is Withanine, which is an alkaloid. It also contains somniferine, pseudotropine, pseudowithanine, tropine, hygrine, anaferine, anahygrine and steroidal lactones known as withanolides. Its root powder decrease total lipids and TG (Triglycerides).

MORINGA OLIEFERA

(Drumstick) is a fast-growing, drought resistant tree belonging to the family Moringaceae. It contains Oleic acid (84%), L-ascorbic acid, 2,6dihexadecanoate (9.8%), 9 octadecenoic acid (1.88%), 9 octadecenamide (0.78%), methyl ester hexadecanoic acid (1.31%). It is also a rich source of potassium, calcium, iron, phosphorus, vitamin A and D. It also contains polyphenols such as quercetin, which is responsible for hypolipidemic effect.

ARJUNA

is the dried bark of TerminaliaArjuna belonging to the family Combretaceae. Arjuna contains minerals like calcium and magnesium. Phytochemicals found are:
• Phenolic compounds: terminolic acid, arjunolic acid
• Glycosides; arjunetin and arjunosides I-IV
• Flavones
• Tannins
• Phenolic acids: ellagic acid and Gallic acid
Flavonoids, tannins and saponins present in Arjuna are responsible for hypolipidemic activity.

GYMNEMA

consists of dried leaves of Gymnemasylvestre belonging to the family Asclepiadaceae.Gymnema leaves contain triterpenesaponins belonging to oleanane and dammarene classes. Oleananesaponins are gymnemic acid and gymnemasaponin, while dammarenesaponins are gymnemasides. Other constituents are flavones, anthraquinones, phytin, resins, tartaric acid, formic acid, stigmasterol. Gymnemic acid produces the hypolipidemic effects.

GARCINIA CAMBOGIA

is a glabrous and evergreen tree belonging to the family Clusiaceae. The chief constituent is hydroxycitricacid(HCA). HCA helps to lower the production of TG and cholesterol. Other constituents are;
• Polyisoprenylatedbenzophenone derivatives: Camboginol I and Cambogin II.
• Acids like tartaric acid, citric acid and phosphoric acid

CROTOLARIA JUNCEA

is an erect, branched annual plant belonging to the family Fabaceae. The plant contains carbohydrates, phenolics, flavonoids, tannins, steroids, terpenes and volatile oils. Riddelline, seneciphylline, chodesmine alkaloids are also present. The ethanolic extract of leaves of the plant shows anti-hyperlipidemic activity. The amino acid 2-amino-5-hydroxyhrxanoic acid from the seeds of Crotolariajuncea shows dose dependent lipid lowering activity.

CONCLUSION

Antihyperlipidemic drugs are those drugs used to reduce high levels of lipids such as cholesterol in the blood. Medicinal plants play an important role in management of hyperlipidemia. Hyperlipidemia is related to cardiovascular disorder and obesity. Synthetic hypolipidemic drugs are extensively used to prevent such disorders, but these drugs have other adverse effects. Due to adverse side effects of these drugs, there is a demand for new herbal compounds for the treatment of hyperlipidemia. The potency of herbal drugs is

significant and they have negligible side effects than the synthetic hypolipidemic drugs. There are large number of plants and bio molecules that have been observed for their anti hyperlipidemic activity. The main chemical classes include flavonoids, saponins, tannins, steroid alkaloids, phenolic acids etc. Patients demand these natural products due to their hypolipidemic activities and less adverse effects.

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