

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## To Role of Medicinal Plant in Hyperlipidemia.

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### ABSTRACT

Hyperlipidemia is one of the most important risk factors for the occurrence and severity of coronary heart disease. The leading causes of death include coronary heart disease, stroke, atherosclerosis, and hyperlipidemia. Serum total and low density lipoprotein (LDL) cholesterol increase has been identified as a primary risk factor for cardiovascular disease. Hyperlipidemia is a condition in which the blood has unusually high levels of lipids, or fatty compounds. To avoid atherosclerosis-related illnesses, hypolipidemic medications are commonly utilised as prophylactic medicines. These hypolipidemic medications, however, are not without side effects. Many plant extracts and home treatments have been studied for their ability to lower cholesterol levels. Medicinal plants play a big impact in lowering cholesterol levels. The effectiveness, safety, cost, and acceptability of herbal medications have all been mentioned as positives. This review includes 20 medicinal herbs that have been found to have strong hypolipidemic activity.

**Keywords:** Atherosclerosis, Hyperlipidemia, Medicinal plant, Lipid.

<https://doi.org/10.33887/rjpbcs/2022.13.3.3>

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## INTRODUCTION

Cardiovascular problems are now recognised as one of the leading causes of morbidity and mortality. The number of fatalities from cardiovascular diseases globally has risen from 14.4 million in 1990 to 17.5 million in 2005, and is expected to reach about 20 million in 2015. Leading variables include circulating substances such as low-density lipoprotein free radicals, homocysteine, and nicotine. When other common diseases, such as diabetes and hypertension, are present, morbidity and death rise [1].

The accumulation of low-density lipoprotein in the intima, oxidation of low-density lipoprotein, uptake of oxidised low-density lipoprotein by macrophage scavenger receptors, effect of macrophages on foam cells, and plaque stability are all involved in the formation of atherosclerotic plaque. Inflammatory cytokines are implicated in all stages of atherosclerosis, making it a chronic inflammatory disease [2].

These blood clots are commonly the cause of heart attacks and strokes. Furthermore, atherosclerotic blood arteries are often fragile and susceptible to rupture. Prevention is the greatest treatment for conditions like atherosclerosis. As a result, traditional medical therapies typically focus on lifestyle changes such as reducing saturated fat consumption, quitting smoking, and increasing aerobic exercise. Drugs are also used to decrease cholesterol and blood pressure, but the most of them have significant negative effects. Using complementary and alternative treatments, particularly medicinal plants and their supplements, to treat conditions like hyperlipidemia. Fortunately, over the last 30 years, substantial research has been conducted on the efficacy of medicinal plants used in traditional medicine, and some of their efficiencies and deficiencies have been documented [3].

### Types of Lipid Present in Body

Cholesterol, like some other lipids, cannot be dissolved in the bloodstream. Furthermore, they must be transported to and from cells by specific molecules known as lipoproteins, which are made up of an outer coating of protein and an inner core of cholesterol and triglycerides. Furthermore, lipoproteins have been discovered to be necessary for cholesterol to circulate around the body. TC, triglycerides, LDL, HDL, and very low density lipoprotein (VLDL) cholesterol are the different types of lipid [4].

### Total Cholesterol

Hyperlipidemia is defined as TC values greater than 100 mg/dL, according to the National Cholesterol Education Program (NCEP). However, epidemiological research suggests that as TC levels fall below 150 mg/dL, the risk of cardiac incidents reduces. Furthermore, for youngsters, TC should be less than 180 mg/dL [5].

### Triglyceride

VLDL carries another type of fat called triglycerides in the blood. Excess calories, alcohol, and sugar in the body are converted to triglycerides, which are then deposited in fat cells all over the body. Triglyceride concentrations of less than 150 mg/dL are considered normal, but those of 200-499 mg/dL are considered excessive. Furthermore, high concentrations are harmful for the development and progression of various CVDs [6].

### LDL Cholesterol

LDL (low-density lipoprotein) is a kind of cholesterol produced by the liver that transports cholesterol and other lipids from the liver to other parts of the body, including the muscles, organs, and heart. LDL cholesterol concentrations below 100 mg/dL are considered optimum, whereas concentrations in the range of 160-189 mg/dL are considered to be on the upper side, increasing the risk of heart disease. Increasing evidence suggests that normal human LDL cholesterol levels can be as low as 70 mg/dL. Furthermore, it has been demonstrated that as LDL cholesterol concentration drops, the risk of CVD decreases [7].

### HDL Cholesterol

HDL (high-density lipoprotein) is a kind of cholesterol produced by the liver to transport cholesterol and other lipids from tissues back to the liver for breakdown. A high amount of HDL cholesterol has long been thought to be a sign of a healthy heart. HDL concentrations of 60 mg/dL or higher are considered optimum, however HDL concentrations of less than 40 mg/dL are a key risk factor for CVDs. HDL, on the other hand, is frequently understood in the context of TC and LDL concentrations, and hence may be overlooked when LDL is low [8].

### VLDL Cholesterol

VLDL cholesterol is similar to LDL cholesterol in that it is primarily fat with little protein. VLDL cholesterol is a type of lipoprotein that transports cholesterol from the liver to the body's organs and tissues. Cholesterol and triglycerides are combined to make them. VLDLs are similarly heavier than LDLs and have been linked to atherosclerosis and heart disease [9].

### Types of Hyperlipidemia

Hyperlipidemia can be two types.

- **Primary**
- **Secondary**

#### Primary Hyperlipidemia

Hyperlipidemia is due to single gene defect [10,11].

Type	Disorder	Cause	Occurance	Elevated Lipoprotein
1.	Familial lipoprotein Lipase deficiency	Genetic	Very rare	Chylomicrons
2.	Familial Hypercholesterolemia	Genetic	Less common	LDL
3.	Hypertriglyceridemia	Multifactorial common Genetic	Common	VLDL

#### Secondary Hyperlipidemia

Diabetes, myxoedema, nephritic syndrome, chronic drinking, and the use of corticosteroids, oral contraceptives, and Beta blockers are all linked to it [12].

Type	Reasons
Hypercholesterolemia	Hypothyroidisms Anorexia nervosa Obstructive liver disease Nephritic Syndrome Drug Progestin's , Thiazide
Hypertriglyceridemia	Obesity Pregnancy Acute hepatitis Glycogen storage disease Systemic lupus erythematosus

#### Causes of Hyperlipidemia

The most common cause of hyperlipidemia is a change in lifestyle behaviours, with the main risk factor being a poor diet with a fat intake of more than 40% of total calories and saturated fat intake of more than 10% of total calories. with a daily cholesterol intake of more than 300 mg or a curable medical condition The elevated cholesterol levels are the result of an unhealthy lifestyle that includes eating a

high-fat diet as well as other lifestyle factors such as being overweight, smoking, drinking heavily, and not exercising [13]. Diabetes, renal disease, pregnancy, and an underactive thyroid gland are among the other causes. Polycystic ovarian syndrome and renal dysfunction are two other conditions that can raise cholesterol levels. Increases or changes in cholesterol levels have been linked to greater amounts of feminine hormones such as oestrogen. Drugs such as diuretics, beta blockers, and antidepressants have also been found.

## Medicinal Plant used in Hyperlipidemia

### Lipid- Lowering Medicinal Plant

In traditional medicine, many therapies are utilised to treat hyperlipidemia, with medicinal plants playing an important part. Recent studies on medicinal plants and food supplements used in traditional medicine show that antioxidant compounds found in them, such as food fibres, vitamins, flavonoids, sterols, and other antioxidant compounds, can lower lipids, inhibit low-density lipoprotein oxidation, eliminate oxygen free radicals, and possibly improve this disease by affecting the immune system and improving metabolic disorders [14].

### Medicago sativa (Alfalfa)

Medicago sativa is utilised as a nutritional supplement, anti-diabetic, anti-hyperlipidemic, and anti-allergen in traditional medicine. Menstrual issues, gastrointestinal diseases, kidney and urinary tract problems, burns, and arteritis are all treated with it. Because it contains large concentrations of -carotene and vitamins B, C, E, and K, this plant is utilised as a nutritional supplement. Medicago sativa seeds have been shown to lower blood cholesterol levels in experimental animals, according to studies. This plant's seeds were used in monkeys for a year and showed no negative effects while also lowering blood cholesterol levels [15,16].



Pl. 75. Luzerne cultivée. Medicago sativa L.

### Chemical constituent

- Canavanine
- Coumesterol
- Chrysoeriol

### Use of Medicago sativa

- Diabetes
- Indigestion
- Make skin Radiant
- Prevent kidney stones
- Use to Prevent cancer

### Allium sativum L

Garlic, *Allium sativum* L (garlic), is used to cure a wide range of ailments. One of the most important substances found in *Allium sativum* L is the aromatic component alliin. When garlic is sliced or pressed, an enzyme called Alinase impacts alliin, converting it to allicin, the major component of garlic's pungent odour. 13 Garlic is now used to treat gastrointestinal problems, asthma, diabetes, cardiovascular diseases, hypercholesterolemia, the common cold, and high blood pressure, among other things. 14 Although it is claimed that using this plant lowers cholesterol and blood pressure, scientific evidence to the contrary exists. Although some studies from the 1980s and 1990s suggested that garlic could help lower blood cholesterol levels, more current investigations have found the opposite [17,18].



### Chemical constituent

- Allicin
- E-Ajoene
- Z-Azoene

### Uses of *Allium sativum* L

- Diabetes
- Antioxidant
- Coughing
- Anti - Fungal
- Colon Cancer

### Glycine max (Soybean)

Soya is utilised as a high-protein dish in Asia and as a low-cholesterol meat in traditional American cuisine. The American Food and Drug Administration has approved the use of the healthy heart label on food goods containing soybeans. Soybean has been used in traditional medicine to lower blood cholesterol and as an anticancer and anti-osteoporosis medication [19,20].



### **Chemical constituent**

- Saponine
- Isoflavones
- Phytates

### **Uses of Glycine max**

- Help in preventing cancer
- Help in maintaining steady blood pressure
- Help to maintain brain function
- Help in improving bone health
- Help to boost heart health

### **Dietary plant Fiber with Hyperlipidemic Activity**

Dietary fibres are complex carbohydrate polymers derived from plants and made up of simple sugars. They are classed based on their solubility. Soluble fibres are made up of sticky components such as gum pectin and mucilage, which the bacteria in the colon quickly absorb. Insoluble fibres are structural and/or matrix fibres that are digested without alteration, such as lignin, cellulose, and hemicelluloses. Clinical and laboratory studies have shown that dietary fiber can help decrease blood cholesterol levels [21,22].

### **Plantago psyllium**

Plantago psyllium is a water-soluble fiber made from the husk of the Plantago ovate seed. When compared to placebo, 6 to 8 weeks of psyllium treatment reduced total cholesterol by 3.5 percent to 5.6 percent and low-density lipoprotein cholesterol by 5.1 percent to 8.8 percent in those with hypercholesterolemia. 5 g psyllium seed was taken three times per day for six weeks in a study on 125 people with type 2 diabetes and hyperlipidemia. After two weeks of treatment, these patients' total cholesterol, low-density lipoprotein cholesterol, and plasma triglyceride levels all reduced, but their high-density lipoprotein cholesterol level climbed [23,24].

### **CONCLUSION**

In most nations, hyperlipidemia and its associated side effects are now recognised as one of the medical issues. In addition, hyperlipidemia exacerbates metabolic abnormalities and raises the risk of cardiovascular disease, particularly in individuals with diabetes and high blood pressure. Compounds found in food supplements and medicinal plants, such as dietary fibres, vitamins, flavonoids, sterols, and other antioxidants, have been shown to help with lipid metabolism by affecting the metabolic processes of different tissues. Most of these plants' lipid-lowering benefits have been linked, at least in part, to their antioxidant capabilities, and many therapeutic plants contain antioxidant properties. 103-106 As a result, it could be worthwhile to investigate alternative medicinal plants with antioxidant properties for their hypolipidemic properties.

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