



**ANTIHYPERLIPIDEMIC ACTIVITY OF SOME MEDICINAL PLANTS FROM BEKASI,
WEST JAVA, INDONESIA - A REVIEW**

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ABSTRACT

Hyperlipidemia is a secondary metabolic dysregulation associated with increased levels of triglycerides, cholesterol, and LDL in serum which is a major risk factor for early cardiovascular diseases such as atherosclerosis, hypertension, coronary heart disease, and others. Increased plasma lipid levels, especially total cholesterol, triglycerides and LDL along with decreased HDL are known to cause hyperlipidemia which is the reason for the onset and development of atherosclerosis. Currently, researchers are starting to look for new antidyslipidemic compound candidates derived from natural ingredients that have been empirically proven to have antidyslipidemic effects. This is done to replace antihyperlipidemic drugs which currently have many side effects. Several medicinal plants native to Bekasi, Indonesia, including *Moringa oleifera*, *Syzygium cumini*, *Aloe vera*, *Annona muricata*, *Persea americana*, *Curcuma longa*, and *Imperata cylindrica* have been scientifically tested to have antihyperlipidemic activity with different mechanisms. Therefore, this review article will discuss the potential of several medicinal plants native to Bekasi, Indonesia which have effects as antidyslipidemia.

KEYWORDS: Antihyperlipidemia, Medicinal plants *Moringa oleifera*, *Syzygium cumini*, *Aloe vera*, *Annona muricata*, *Persea americana*, *Curcuma longa*, *Imperata cylindrica*.

INTRODUCTION

Hyperlipidemia is a predictor of coronary artery disease (CAD). The prevalence of this disease is quite high and increasing in both developed and developing countries in the world.^[1] Hyperlipidemia is an important risk factor in the initiation and development of atherosclerosis. The main manifestations of this disorder include increased plasma concentrations of total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), and low concentrations of high-density lipoprotein cholesterol (HDL-C).^[2] Therefore, the main consideration in the therapy of hyperlipidemia and arteriosclerosis is to reduce the increase in serum/plasma blood lipid levels.^[3] Currently available hypolipidemic drugs have been reported to have a number of worrying side effects including hyperuricemia, muscle damage, impotence, memory loss, peripheral neuropathy, body aches, gynecomastia, skin rashes, and others. In addition, there is also an increased risk of myopathy and rhabdomyolysis which usually occurs when used in combination with other drugs.^[4] Most hypolipidemic drugs can be effective if used for several weeks, but the

consequences can worsen side effects such as liver damage.^[5] Therefore, it is necessary to find new antihyperlipidemic agents derived from natural ingredients in the form of herbal plants. Compared to conventional drugs, herbal plants provide many advantages, including cost-effectiveness, broad cultural acceptance, ease of accessibility, and lower side effects.^[6] Indonesia is the second largest country in the world with forest biodiversity, where there are 28,000 plant species and 2,500 species are medicinal plants.^[7,8] Currently, research to obtain new antidyslipidemic drugs derived from natural ingredients continues to be carried out, one of which is through exploration of active compounds from natural ingredients, especially medicinal plants that have traditionally been used by people to treat hyperlipidemia in various regions in Indonesia, especially in Bekasi.^[9-11] The goal is to find new antidyslipidemic compounds that have mild side effects with low toxicity, so they do not harm patients.^[12,13] This review article will discuss several medicinal plants native to Bekasi, Indonesia that have antihyperlipidemic effects.

Moringa Oleifera

Moringa oleifera is a plant from the *Moringaceae* family. This plant is widely used as a nutritional herb and contains valuable pharmacological actions such as anti-asthmatic, anti-diabetic, hepatoprotective, anti-inflammatory, anti-fertility, anticancer, antimicrobial, antioxidant, cardiovascular, anti-ulcer, central nervous system activity, anti-allergic, wound healing, analgesic, and antipyretic activities. This plant contains a rich source of vitamin A, and vitamin C. Various types of active phytoconstituents such as alkaloids, proteins, quinine, saponins, flavonoids, tannins, steroids, glycosides, and lipids are present in it. Some other constituents are niazinin A, niazinin B and niazimicin A, niaziminin B.^[14] Oral administration of *M. oleifera* at a dose of 250 mg/kg/day was reported to reduce serum TC and LDL-C, and increase serum HDL-C in STZ-induced mice.^[15]

Syzygium Cumini

Syzygium cumini is a plant from the *Myrtaceae* family. This plant has a variety of medicinal properties, which are associated with the presence of bioactive compounds in various parts of the plant. The leaves are used to treat skin diseases, gastric diseases, constipation, leucorrhea, and diabetes; the fruit is used to treat pharyngitis and spleen diseases; while the bark is used as an astringent, anthelmintic, and carminative. In addition, the seeds are used as an astringent, diuretic, and especially to treat diabetes.^[16] Oral administration of *S. cumini* at a dose of 300 mg/kg/day for 15 days has been reported to reduce serum TC, LDL-C, and triacylglycerol, and increase serum HDL-C in diabetic rats.^[17]

Aloe Vera

Aloe vera has long been used as a traditional medicine to accelerate wound healing. The benefits associated with *A. vera* are attributed to the polysaccharides contained in its leaf gel although there are various indications for its use. Its biological activities include improving wound healing, antifungal, anti-inflammatory, anticancer, and immunomodulatory activities.^[18] Administration of *A. vera* at a dose of 500 mg/kg/day for 4 weeks was reported to reduce serum TC, TG, and LDL-C, and increase serum HDL-C in streptozotocin (STZ)-induced rats.^[19]

Annona Muricata

Annona muricata is a tropical plant with dark green, oval-shaped leaves, and white-fleshed fruit with green, thorny skin. This plant has fruit that is often used in making juice, ice cream, or as an additive in food.^[20] The *A. muricata* plant is reported to have properties in treating several diseases such as cancer, gout, tumors, hypertension, diabetes mellitus, ulcers, diarrhea, and allergies.^[21] Oral administration of *A. muricata* at doses of 200 and 300 mg/kg/day has been reported to reduce serum TC, LDL-C, and TG, and increase serum HDL-C in diabetic rats.^[22]

Persea Americana

Persea americana is a plant belonging to the *Lauraceae* family that is commonly used as an ingredient in traditional medicine in several countries. This plant is used in traditional medicine to treat various diseases, such as menorrhagia, hypertension, abdominal pain, bronchitis, diarrhea, and diabetes.^[23] Oral administration of *P. americana* at doses of 100 and 200 mg/kg/day has been reported to reduce serum TC and triacylglycerol in CCl₄-induced mice.^[24]

Curcuma longa

Curcuma longa is a medicinal plant belonging to the *Zingiberaceae* family. This plant is widely cultivated in Asia, especially in India and China. *C. longa* is a sterile plant and does not produce any seeds. This plant grows 3-5 feet tall and has yellow flowers. Its rhizome is a thick and fleshy underground stem.^[25] *C. longa* has been widely reported as a medicinal plant that can help control inflammation and pain. This effect is because this plant contains at least three natural polyphenols, namely curcumin, demethoxycurcumin, and bisdemethoxycurcumin which are known as curcuminoids.^[26] Administration of *C. longa* containing curcumin at a dose of 300 mg/kg/day for 12 weeks has been reported to reduce serum TC, TG, and LDL-C, and increase serum HDL-C in mice induced by a high-fat diet.^[27]

Imperata cylindrica

Imperata cylindrica is a medicinal plant from the *Gramineae* family which is known to have 72 chemical compounds that have been successfully isolated and identified, including saponins, flavonoids, phenols, and glycosides which are the main ingredients. This plant is known to have various pharmacological activities, including hemostasis, urinary tract repair, anti-inflammatory, antibacterial, anticancer, and immune system enhancement.^[28] Oral administration of *I. cylindrica* at a dose of 15 mg/200 g of rat body weight has been reported to reduce serum TC and LDL-C in a hypercholesterolemia rat model.^[29]

CONCLUSION

Indonesia is a country that has various types of medicinal plants that have potential properties to be developed as alternative medicines for the treatment of hyperlipidemia. All of these plants have been empirically proven and scientifically tested to lower blood cholesterol levels. This is inseparable from the active compounds contained in these plants which have anti-hyperlipidemic properties with different mechanisms of action. Research on these medicinal plants is expected to be used to improve the treatment of hyperlipidemia and to replace antidyslipidemic drugs which currently have many side effects.

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