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Herbal medicine in Treatment of Heart disease: Cardioprotective Activity of Terminaliabelerica.

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Abstract

Cardioprotection and prevention of cell ischemia/necrosis have been therapeutic targets for a long time. New therapies are needed to treat myocardial ischemia because current treatment has only its own limitation on survival and annual costs. The fruit is reported to have hepatoprotective, purgative, choleric, and hypotensive effects. In a clinical study, *Terminaliabelerica* was found to possess antispasmodic, anti-asthmatic and anti-tussive effects. The fruit extracts of *Terminaliabelerica* have been evaluated for anti-mutagenic, antimicrobial and anti-HIV-1 activity. The plant is known to lower the levels of lipid in hypercholesterolemic animals and thus prevent the development of atherosclerosis and myocardial infarction; Triphla and *Terminaliabelerica* reduced the serum glucose level and showed marked antioxidant properties in alloxan-induced diabetic rats. Polyphenols with proteins may be the probable cause of the inhibitory. Gallic acid: 3,4,5- trihydroxybenzoic acid. Is demonstrable the hepatoprotective action extract of *Terminaliabelerica*. The presence of saponins, triterpenoids, carbohydrates, tannins and proteins show the analgesic agent used in the management of chronic pain. Phenolic contents of *T. bellerica* having antioxidant activity and reduced the level of cholesterol and also reduced the serum trasminase, and bilirubin. Due to high efficacy and low toxicity and its anti-oxidant, anti-hyperlipedemic, Antihypercholesterolemic and cardiogenic effects, it will provide an accessible and cheap traditional medicine source for treatment of cardiac disease in developing countries.

Keywords: *Terminaliabelerica*, Cardioprotective Activity.

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1. Introduction

The cardiovascular system is made up of the heart and blood vessels. Cardiovascular disease (CVD) is defined as any serious, abnormal condition of the heart or blood vessels (arteries, veins). Cardiovascular disease includes coronary heart disease (CHD), stroke, peripheral vascular disease, congenital heart disease, endocarditis, and many other conditions. Cardiovascular Diseases (CVD) are the secondary cause of deaths in many parts of the world, although modern drugs are effective in preventing the disorders, their use is often limited because of their side effects and adverse reactions. A wide array of plants and its active principles, with minimal side effects, provide an alternate therapy for heart disease. Moreover, the plant kingdom represents a largely unexplored reservoir of biologically active compounds. *Terminalialibelerica* Roxb of family Combretaceae is distributed throughout. It is found in abundance in Madhya Pradesh, Uttar Pradesh, Punjab, Maharashtra, and also in Ceylon and Malaya. It is used for various ailments in Indian traditional System of Medicine. The famous myrabolan fruits *Terminalialibelerica* is the best single herb for controlling Kapha. It is a powerful rejuvenative herb that nourishes the lungs, throat, voice, eyes and hair. It expels stones or other kapha-type accumulations in the digestive, urinary, and respiratory tracts, gastric ulcers, hemorrhoids, chronic diarrhea, dysentery, parasites, cholelithiasis, ophthalmia, headache, alopecia and premature graying, edema, rheumatism (topical), wounds (topical). (Kirtikar and Basu 1993, 1018-1019; Nadkarni 1976, 1203-04)

2. Need for Herbal Medicine

Herbal treatment for heart disease is not a new concept. People have been using herbs for hundreds of years to treat many chronic diseases, including the cardiovascular ones. Herbs were used to prevent and treat almost every disease long before the advent of modern medicine. Because of the rapidly growing popularity of allopathic medicine, many people today don't even know if herbs can be very effective in treating even the otherwise incurable diseases. The best thing about herbal medicines is that they have very little or no side effects.

Modern Herbal Medicine in Treatment of Heart Disease:

Green Tea- Popular in Asia for centuries, green tea helps to keep blood pressure under control. It also may help keep cholesterol from arteries. They also assist in keeping blood pressure under control.

Garlic- prevent the oxidation of LDL cholesterol, may prevent the liver from producing excess fat and cholesterol.

Arjuna- Arjuna, an important Ayurvedic herb, is a coronary vasodilator. It protects the heart, strengthens circulation, and helps to maintain the tone and health of the heart muscle. It is also useful in stopping bleeding and to promote healing after a heart attack.

Ginger- Ginger is an important herb for a healthy heart. Eating a little bit of ginger every day will help to prevent heart attack. It reduces cholesterol. It also reduces blood pressure and prevents blood clots.

Turmeric- lowers blood cholesterol levels by stimulating the production of bile. It also prevents the formation of dangerous blood clots that can lead to heart attack.

Onions- Onions contain adenosine and other "blood thinners" that help to prevent the formation of blood clots. In addition to thinning the blood, onions can help keep the coronary arteries open and clear by increasing the HDL.

Ginkgo biloba- It improves the flow of blood throughout the body. It is also an antioxidant. Ginkgo biloba can benefit the cardiovascular system by preventing the formation of free radicals.

Alfalfa- Alfalfa leaves and sprouts help reduce the blood cholesterol levels and plaque deposits on artery walls.

Citrin- Extract from the plant *Garcinia cambogia*, inhibits the synthesis of fatty acids in the liver. It helps to prevent the accumulation of potentially dangerous fats in the body.

Guggul- This ayurvedic herb is derived from a type of myrrh tree. It has been shown to lower blood-fat levels while raising levels of HDL, the so called "good cholesterol".

Terminalia Belerica:

***Terminalialibelerica* belongs to the family Combretaceae commonly known as 'vibhitaki' in Ayurveda.**

Fruit are dry drupe spherical to ovate to irregularly round, 1.2 to 2 cm diam., dirty whitish brown externally, velvety surface shrunk and somewhat irregularly wrinkled showing 5 longitudinal ridges, upper end the fruit is depressed while the lower and shows round scar of pedicle up to 5 mm diameter.

Photochemistry: Fruit contains 20% to 30% Tannins; Gallic acid, Ellagic acid, Ethyl gallate, chebulagic acid, Flavonandanolignan.

Uses In Traditional System:

In traditional Indian Ayurvedic medicine, Beleric is known as "Bibhitaki" (Marathi: *Behada*) (*Terminalialibelerica*) in its fruit form it is used in the popular Indian herbal rasayana treatment Triphala. In Sanskrit it is called *vibhidaka*. In Ayurveda it is used as bitter, acrid, astringent, laxative, germicidal and antipyretic and is applied in a diverse range of conditions including cough, tuberculosis, eye diseases, dyspepsia, diarrhoea, and dysentery, inflammation of intestine, biliousness, flatulence, liver disease and leprosy. It is also said to cleanse the blood and the voice and to promote hair growth.

Uses in Ayurveda and Siddha:

Rasam, Kashayam, mathuravipakam, ushnaveeryam, pitta kaphahararm, good for vision, hair. Internally for kasam, krimi, swarbhagam. Externally antiseptic, lotion. Paste for pitta swellings, eye diseases. Anthelmintic, antiseptic, astringent, expectorant, laxative, lithotriptic, rejuvenative, tonic. The fruit is one among the triphala of ayurveda. It is useful in asthma, biliousness, bronchitis, inflammations, sore throat, and treating the diseases of eyes, nose, heart and bladder.

Uses in Unani:Tonic to brain and stomachliquifies matter, acts as astringent, expellstouda and safra, dries ruthobath, headache, piles, chronic diarrhea.

Preparation:

- a. Triphalacurna
- b. Bibhitakaghrta / avaleha / curna
- c. Bibhitakadikvatha
- d. Bhibhitakaditaila
- e. Bibhitakisura
- f. Triphalaghrta / kvatha
- g. Lavangadivati
- h. Balaguti

Pharmacological Studies on Terminalia Belerica:

The extract of fruit *Terminaliabelerica* was produced dose dependent **chloretic effect** evidenced by increase in bile flow, bile salt and bile acids.(*Siddiqui H.H., 1963*). Hypercholesterolaemia and atherosclerosis were induced experimentally in rabbits by cholesterol feeding. T. belerica reduced the levels of lipids in hypercholesterolemic animals. There was also a significant decrease in liver lipids and heart lipids ($P < 0.05$) in the drug-treated animals. (*Shaila et al.,1995*).Terminaliabelerica fruit extract and its active principle (gallic acid: 3,4,5- trihydroxybenzoic acid) were investigated against carbon tetrachloride induced toxicity in liver in rats. The degree of hepatoprotective conferred by active principle was ethanolic extract of T.belerica. (*Shukla et al., 2005*).

Anthelmintic potential of ethanolic and aqueous extract of fruit pulp of *Terminaliabelerica* using *Pheretimaposthuma* as test worms. Various concentrations (10, 25, 50 and 100 mg/ml) of ethanolic and aqueous extract. (*LalitMachawal et al., 2010*). Terminaliabelerica in Indian system of medicine for treatment of wide range of diseases and reported to have antioxidant properties. In the present study, the free radical scavenging.The antioxidant potential was compared with known antioxidant (butylated hydroxyl toluene) and correlated with total phenolic and flavonoid content in crude extract and fractions. Fractions rich in polyphenolic content were more effective than the crude extract.(*Guleria et al., 2010*).The antisecretoryand analgesic activities of the crude extract of *Terminaliabelerica* inhibited the castor oil-induced intestinal fluid secretion in mice at the dose range of 300 - 1000 mg/kg. Hence justifying its medicinal used in diarrhea and pain.(*Arif-ullah Khan et al. ,2010*).

Antimalarial:

Four lignans (termilignan, thannilignan, hydroxy-3', 4'-[methylenedioxy] flavan, and anolignan B) possessed an antimalarial activity *in vitro*.(*Valsaraj et al., 1997*). T.belerica prevented alloxan-induced hyperglycaemia from 6th day of administration and there was 54% reduction on 12th day. Oxidative stress produced by alloxan was found to be significantly lowered by the administration of T. belerica extract. (*Sabu et al .,2004*). An extract of Terminaliabelerica showed significant inhibitory activity on (HIV-1) human immunodeficiency virus-1 reverse transcriptase, with IC50 NMT 50 mg/ml (el-Mekkawy et al 1995). Four lignans (termilignan, thannilignan, hydroxy-3',4'-(methylenedioxy) flavan, anolignan B) possessed demonstrable anti-HIV-1 *in vitro*. (*Valsaraj et al , 1997*). Two polyphenolic fractions isolated from T. belerica were significantly effective against mutagenic effects in *Salmonella typhimurium*. Interaction of the polyphenols with S9 proteins may be the probable cause of the inhibitory effect. (*Padam et al .,1996*).

Respiratory disorders:

In an open clinical trial of 93 patients suffering from various respiratory conditions *Bibhitaki* was found to have anti-asthmatic, anti-spasmodic, expectorant and anti-tussive activities (*Trivedi et al., 1979*). A bioactivity-guided fractionation of an extract of Terminaliabelerica fruit rind led to the isolation of two new lignans named termilignan and thannilignan, together with 7-hydroxy-3',4'(methylenedioxy) flavan and anolignan B. All four compounds possessed demonstrable antimalarial and antifungal activity *in vitro*.(*Valsaraj, et al. ,1997*).

3. Conclusion

The prime reason is that other system of medicine although effective come with a number of side effects that often lead to serious complications. Plant based system of medicine being natural does not pose this serious problems. Though *Terminaliabelerica* fruit has various medicinal applications, but it is the need of hour to explore its medicinal values at molecular level with help of various pharmacological tools and techniques. However most of the therapeutic properties are proved in animal experiment model, therefore it is very effective to controlled the cardiovascular diseases.

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