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EVALUATION OF HYPOLIPIDEMIC ACTION ON *TINOSPORA CORDIFOLIA*

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ABSTRACT

The evaluate the hypolipidemic action on *Tinospora cordifolia,* played a major role in the protection of people in lipid associated disease. Hyperlipidemia was produced by Triton WR399 (250mg/kg). This is also enhance the lipid profile level. he extraction of *Tinospora cordifolia* and standard drug Nicotinic acid treated hyperlipidemic rat, after treatment of extract and standard drug have significantly decreased lipid profile LDL, VLDL, and triglycerides level, and also enhance the HDL level. These is act as lipid lowering compounds. This plant was valid scientifically basis for consuming if for clinical benefit in the treatment of various diseases in India.

KEYWORDS: *Tinospora cordifolia.*

INTRODUCTION

Health is the ability to manage the physical, mental, social challenges face complete life. It is the ability of a biological system to acquire, convert, allocate, distribute and utilize energy sustainably. The world Health Organization (WHO) defined human health in a broader sensen in its 1948 constitution and not merely the absence of disease or infirmity. The meaning of health has evolved over time. In the biomedical perspective, early definitions of health focused on the theme of the body's ability to function.

Health was normal function that could be distributed from time to time by disease. This is a state characterized by anatomic, physiologic and psychological integrity, ability to perform personally valued family, work and community role is ability to deal with physical, biological, psychological and social stress. For a long time, it was an impractical ideal and most discussions of health returned to the practicality of the biomedical model. In new

conception of health, "as a resource for living" 1984 the health defined it as" the extent to individual (or) group is able to realize aspirations and satisfy needs and to change or cope with the environment.

Hyperlipidemia is a major risk factor for atherosclerosis. Most of the evidence specifically implicates hypercholesterolemia. Elevated levels of serum cholesterol are sufficient to stimulate lesion development. The major components of total serum cholesterol associate with increased risk is low-density lipoprotein (LDL) cholesterol, in contrast, high density lipoprotein (HDL) is believed to mobilize cholesterol from developing existing and transport it to the liver for excretion in the bile, as "good cholesterol".

High dietary intake of cholesterol and saturated fats, such as those present in egg yolk, animal fats, and butter, raises the plasma cholesterol level. Epidermiologic evidence also indicates that several markers of hemostatic and thrombotic function and inflammation are poten predictors of risk for major atherosclerotic events, including myocardial infarction and stroke. Epidemiological studies suggest a correlation between increased blood levels of Lipid profile and coronary, cerebrovascualr disease, inpdendent of the level of total cholesterol (or) LDL.

Factors associated unrestrained weight gain largely obesity induces hypertension, diabetes, hypertriglyceridemia and decreased HDL. Three risk factors are hyperlipidemia, hypertension, and smoking, the rate of myocardial infarction is increased seven times. Hypercholesterolemia associated oxidative stress, and secondary dyslipidemia. Chylomicrons transport exogenous lipid to liver, adipose, cardiac and skeletal muscles tissues such as transaminase and creatinine elevation, skeletal muscle pain and creation kinase elevation. Therefore, developing novel classes of hypolipidemic agents which posse's high efficiency and fever adverse effects has still been a focus on the treatment of dyslipidemia.

Cholesterol are of great importance to the body as the chief concentrated storage form of energy, besides their role in cellular structure and various other biochemical functions. Cholesterol is present in tissue and in plasma lipoproteins' either as free cholesterol or combined, with a long chain fatty acid. Cholesterol is the precursor of all other steroids in the body such as corticosteroids, sex hormones, bile acids and vitamin D. It's typically a product of animal metabolism and therefore occur in food of animal origin such as egg yolk, meat, liver and brain. Obesity means deposition of excess fat in the body. While obesity has long been considered a behavioral disorder, discovery of the hormone leptin in catalyzed, obesity

by demonstrating the existence of an afferent nervous system. A better way to define obesity is to actually measure the percentage of total body fat.

The prevalence of obesity in children and adults in the United States and in many other industrialized contains is rapidly increasing, rising by more than 30 percent over the past decade. Approximately 64 percent of adults in the United States are Overweight, and nearly 33 percent adults are obese. Regular physical activity and physical training are known to increase muscle mass and decrease body fat mass. In obese people, increased physical Activity usually increase energy expenditure more than food intake, resulting in significant weight loss. Obesity is most commonly due to overeating than the caloric requirement. Obesity can be encountered with other caloric diseases. Certain metabolic disorder, and endocrine disorders. Thus, the causes of obesity as listed below, though may not be all complete but encompasses the more common and certain uncommon syndromes which have been reported.

Genetic Influences, Physiological, overeating than caloric requirement, Pregnancy, Postmenopausal women,use of oral contraceptives for prolonged periods, metabolic, diabetes mellitus, hyperlipidaemic states specially, type IV and type V, hypothalamic injuries or disorders, miscellaneous and endocrine disorders, hypothyroidism, cushing's syndrome, pseudohypoparathyrodism islet cell tumour (Insulinoma), Polycystic Overy and acromegaly.

Cell generate energy by reducing molecular oxygen to water. During this, small amount of partially reduced reactive oxygen forms are produced as an unavoidable by product of mitochondrial respiration. Some of these forms are free radicals that can damage, lipids, proteins and nucleic acid. They are referred to as reactive oxygen species.

Free Radicals are chemical species that have a single unpaired electron in an outer orbit. Energy created by this unstable configuration is released through reactions with adjacent molecules. Moreover, free radicals initate autocatalytic reaction, which they react are converted into free radicals to propagate the chain of damage.

Rapid bursts of superoxide production occur in activated polymorpho nuclear leucocytes during inflammation. Because most of the intracellular free iron is in the ferric (Fe^{3+}) state reduced to the ferrous (Fe^{2+}) form to precipitate in the Fenton reaction. This reaction enhanced by superoxide formation, these are lead to damage the cell.

Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population. The advantages of herbal medicines reported are effectiveness, safety, affordability and acceptability *Tinospora Cordifolia* is on such India medicinal plant which has been used in Ayurvedic preparations through the centuries and is distributed throught out the tropical region of India. It has been shown to have hypolipidemic property in many experiments in hyperlipidemic rats, but very few reports are seen.

Moreover this plant is cost effective easily available and less toxic. Therefore, this plant has been chosen to attempt to verify and evaluate the extent of its efficacy as a lipid lowering agent in induction of hyperlipidemic rats.

Among plants of economic importance, medicinal and aromatic plants have played a vital role in alleviating human sufferings. Plants are utilized as therapeutic agents since time immemorial in both organized (Ayurveda, Unani) and unorganized (Folk, tribal, native forms). Demand for medicinal plants is one of the leading areas of research globally.

Use of medicinal plants in the industrialized societies have been traced from the extraction and development of several drugs and chemotherapeutics drugs from these plants as well as from traditional used rural herbal remedies. Among the vast library of important medicinal plants *Tinospora Cordifolia* (Wild) Hook. F and Thomson of family is immensely valuable in terms of chemical constituents in pharmacology. The plant family consists of about 70 genus and 450 species that are found in tropical low land regions.

Herbal medicines represents one of the most important fields of traditional medicine all over the world. Human beings have used plants for medicinal purposes for centuries. The important advantages claimed for therapeutic uses of medicinal plants in various ailments are their safety besides being economical, effective and their easy availability. Because of these advantages the medicinal plants have been widely used by the traditional medicinal practioners in their day to day practice.

Cholesterol are of great importance to the body as the chief concentrated storage form of energy, besides their role in cellular structure and various other bio chemical functions. Cholesterol is present in tissue and in plasma lipoproteins, either as free cholesterol or combined, with a long chain fatty acid. Cholesterol is the precursor of all other steroids in the body such as corticosteroids, sex hormones, bile acids and vitamin D. It's typically a product

of animal metabolism and present in food of animal origin such as egg yolk, meet, liver and brain.

Methods and Extract

The current study, the plant root collected from Tamil University, The roots of *Tinospora Cordifolia* were isolated, chopped into small pieces and dried under shade at room temperature for 10 days the dried roots were powered and this powder was used for the preparation of extract by heat distillation process as detailed by Agarwal *et al*. The extract was assigned a code name TCrE, with standard references (Kirtikar and Basa, 1983).

Collection of plant

Kingdom:	**Plantae**
Clade:	Angiosperms
Clade:	Eudicots
Order:	Ranunculales
Family:	Menispermaceae
Genus:	Tinospora
Species:	***T. cordifolia***

Extracted plant material powder by maceration method

One liter of double distilled water was mixed with 100g of powdered Tinospora cordifolia stem, filtered twice with Whatman no.1 and then with nitrocellulose membrane. The extracted liquid was subjected to water bath vaporization to remove the water. For water bath evaporation, liquid extract material was be placed into a beaker and subjected to water bath evaporation at 60ºC temperature for 7-10 h daily for 2-3 days until a semisolid state of extracted liquid is obtained. The semisolid extract produced was kept in the deep freezer at-20ºC overnight and then subjected to freeze drying. Extract obtained by this method was then weighted and stored at 22ºC in desiccators until further use. The rat were fed with powdered plant material extract with sterile tap water. Phytochemical screening of the extract of Tinospora cordifolia was also carried out.

The root of *Tinospora cordifolia* were first washed well and dust was removed from the plants. Plant was washed several times with distilled water to remove the traces of impurities from the root. The dried plant at room temperature and coarsely powdered. The powder was extracted with 70% ethanol for 48 hours. A semisolid extract was obtained after complete elimination of alcohol under reduced pressure. The extract was stored in refrigenerator used.

The different concentrations (20mg/ml, 40mg/ml, 60 mg/ml and 80 mg/ml) respectively of plant extract used in this study. The stem, leaves and roots of Tinospora cordifolia were isolated, chopped into small pieces and dried roots were powered and this powder was used for the preparation of extract by heat distillation process as detailed by Agarwal et al.The extract was assigned a code name TCrE.

Experimental Animals

Healthy male albino wistar rats for used. They were inbred and grown under suitable laboratory conditions, they were housed two per cage in a room maintained at light –dark cycles and a constant temperature of 22±20ºC. The animals were provided with pellet chow and water.

Animal Experimental Design

Body weights of the animals were recorded and they were divided into 5 Groups of 6 animals each as follow.

Group I: Served as normal (N) without any treatment and considered as controls (Feed, saline and distilled water).

Grou II: Served as hyperlipidemic (H) drug 250mg/5ml saline administrated daily for 20 days, with formulated feed.

Group III: Served as hyperlipidemic drug for first 20 days. Then the animal were treated 100mg Nicotinic acid (NA) with 1ml saline for next 30 days.

Group IV: Served as hyperlipidemic drug for first 20 days. Then the animal were treated 100mg of stem leaves and TCrE (3g/kg) per oral daily for next 30 days (TA).

Group V: Srved as hyperlipidemic drug for first 20 days. Then the animal were treated TCrE (6g/kg, per oral) daily for next 30 days (T_B). N- Normal, H-Hyperlipidemic drug, NA-Nicotinic Acid, TA-Test group I, TB- Test group II.

The duration of the study was included 50 days, including induction and treatment. The rats were average administrated Triton WR1339 dissolved in Saline at 180-250 mg/kg body weight. All blood sample were collected within a one – hour period between 8 am to 9 am,

Twelve hours fasted blood sample all collected under light. Biochemical assay were analyzed for total lipids, total cholesterol, triglycerides, protein were analyzed via standard reference methods. Also analyzed LDH, AST, ALT and ALP were estimated using commercially available kit (Beacon Assay kit).

Biochemical estimaton

Triglycerides of serum are estimated by the method of Foster and Dunn, HDL Cholesterol in serum is estimated by the method of Burstein, The serum GOT was estimated by the method of Reitman and Frankel, The serum GPT was estimated by the method of Reitman and Frankel, The serum alkaline phosphatase activity was estimated by the method of Kind and King's,

The value of VLDL cholesterol can be calculated as follows. If the value of Triglycerides is known, VLDL cholesterol can be calculated based of Friede walds equation (1972). VLDL cholesterol = Triglycerides / 5. The values were expressed as mg/dl serum.

RESULTS AND DISCUSSION

Following, were the effects in rats following administration of aqueous root extract of *Tinospora Cordifolia* However, treatment reversal, no significant increases was found, lipid profile Significant increase in HDL level was observed. It has been well established that nutrition plays an important role in the etiology of hyerlipidemic and atherosclerosis. It is evident from results that showed significant lipid lowering and HDL increaselly activity. The explanation to this effect possibly in the differences in the mechamisms of hypolipidemic action of *Tinospora Cordifolia* the significant decreases in lipid profile, elevation in HDL good safety margin in experimental models combined with traditional application, as cardiprotective agent definitely promote *Tinospora Cordifolia* as an agent to be clinically tested for the treatment of hyerplipidemia and its associated cardiovascular disorders. High level of total cholesterol and important, LDL are the predictors of atherosclerosis.

TCrE significantly reduced both the total cholesterol and LDL cholesterol. Recent studies show that triglycerides are directly or indirectly related to coronary heart diseases. In present study, TCrE has markedly decreased the triglycerides levels. These effect without causing mortality or adverse effects in rats, points towards the efficacious role of *Tinospora Cordifolia* as hypolipidemic agent.

Tinospora Cordifolia If also increased HDL Cholesterol level in the serum possibly be blocking 3-hydroxy-3- methyl glutaryl coenzyme A (HMG–CoA) reductase. One day of treatment period the hyperlipidemic control group, showed significant increase (P<0.001) in total cholesterol, triglyceride, LDL, VLDL and significant decrease in HDL –C (P<0.05) level. *Tinospora Cordifolia* (test group) treatment period, a highly significant decrease in total cholesterol, triglycerides, LDL and VLDL level and significant in increase HDL levels was observed. (P<0.001). On the end of the day Test group B showed greater percentage elevation in the serum HDL – C than Nicotinic acid and Test group. A.

The cardiac marker enzymes are LDH, AST, ALT and ALP are significantly increased in treated with hyperlipidemic drugs. This condition lead to correlated with cause liver dysfuntion. The effect of root extraction of *Tinospora Cordifolia* regulate the all Cardiac marker enzymes, like AST, ALT, ALP also significantly (P<0.05) decreased the activites. It also regulate the play a critical role in liver injury, myocarodial and pulmonary infarction, hepatobiliary dysfunction, cardiovascular and atherosclerotic diseases.

Table 1: Effect of *Tinospora cordifolia* Extract on Lipidprofile and biomarker level in hyperlipidemic Rats.

Parameters	Normal Saline	Hyperlipidemic drug	Nicotinic acid	Test A	Test B
Cholesterol (mg/dl)	85±.1.19	190±1.12	97±1.25	86±1.15	85±1.18
Triglycerides (mg/dl)	63±2.39	134±2.14	70±2.19	70±2.19	63±2.40
HDL (mg/dl)	25.18±2.15	13.0±2.11	21.5±2.48	22.2±2.16	24.1±2.42
LDL (mg/dl)	41.13±2.18	86.2±2.23	54.9±2.16	59±2.16	42.1±2.29
VLDL (mg/dl)	11.15±2.12	18.1±2.28	13.6±2.31	13.6±2.71	12.1±2.72
LDH	118±0.12	166±0.16	127±0.51	120±0.52	117±0.12
AST	43.29±3.26	74.89±5.03	35.11±3.54	40.11±3.26	42.25±3.96
ALT	29±1.96	58.56±4.02	25.75±3.36	26.80±3.32	28.67±2.29
ALP	74±5.11	98±6.79	67±5.11	70±5.10	72±5.46

CONCLUSION

The result shows that the *Tinospora Cordifolia* has a definite hypolipidemic, cardioprotective and antiatherosclerosis potential. There is also valid scientific basis for consuming it for clinical benefits in the treamtment of cardiovasulcar disease in India. Hence, the present study helps to support the traditionally claimed cardioprotective activity of *Tinospora Cordifolia*. However, further studies are necessary to support these findings. Also an extensive case, control study is required to documents its therapeutics application in human beings.

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