

## "SEERAKA CHOORANAM" A SIDDHA FORMULATION FOR IRATHTHAK KOTHIPPU NOAI (HYPERTENSION)

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### ABSTRACT

*Iraththak kothippu noai* (Hypertension) is one of dangerous non communicable diseases in the world. National survey on health of Sri Lankans finds 18 percent of population suffers a chronic illness. Among the cases reported 39% suffer by high blood pressure. And one third of adult population in Sri Lanka having this High blood pressure. Siddhas mentioned numerous herbal preparations for deferent types of diseases. According to Siddha pharmacopeia the "*Seeraka chooranum*" best polyherbal preparation for the *Iraththak kothippu noai* (Hypertension). The ingredients of "*Seeraka chooranum*" are *Cuminum cyminum*, *Citrus aurantifolia*, *Leucas zeylanica*, *Melothria*

*maderaspatana*, *Saccharum officinarum*, *Azadirachta indica*, *Phyllanthus emblica* and *Solanum trilobatum*. According to Siddha concept of "*Seeraka choornum*" as a main ingredient of *Cuminum cyminum* seed has "Sweet taste, cool potency and sweet Vipakam these properties normalize the aggravated *Pitham* as well as regulate the *Vatham* there for *Pitha* disorder of Hypertension cured by the "*Seeraka choornum*." Research findings revealed that all the ingredients of "*Seeraka chooranum*" possess the anti- hypertensive action. As well as *Cuminum cyminum* possess the chemical compositions of Cuminaldehyde, anthraquinone and flavinodes which have the more powerful blood pressure lowering effect there for "*Seeraka chooranum*" best poly herbal preparation for hypertension.

**KEYWORDS:** *Iraththak kothippu* (Hypertension), "*Seeraka chooranum*", *Cuminum cyminum*.

## INTRODUCTION

Hypertension (*Iraththak kothippu noai*) or high blood pressure one of the dangerous non-communicable disease. According to Siddha system, imbalance of *Udhal dhatus* and *Uyir dhathus* causes the heart diseases. Siddha literatures mentioned the 2.38% of disease are heart disease within the total 4448 diseases. Among the heart diseases *Itaththa Kothippu Noi* (Hypertension) is one of the important disease, other names are *Raththa Pitham* and *Kuruthi Azhal* in Siddha literatures. The high blood pressure is caused by increased *Pitham* and deranged *Vatham*. The etiology of Hypertension also depends upon the increase of *Pitham* which includes over- exposure to sun light, improper yoga practice, consumption of heat generating foods with sour, hot and salt foods and excursive sexual desire. The blood vessels are getting roughness and decrease the velocity of blood circulation. There for accumulate the blood in small blood vessels. This leads to collapse, giddiness, limp weakness and memory loss(Rajalakshmi, Vadivel, & Brindha, 2016).

Worldwide data show, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. Raised blood pressure is a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke. According to the WHO, Global health observatory data globally, the overall prevalence of raised blood pressure in adults aged 25 and over was around 40% in 2008.

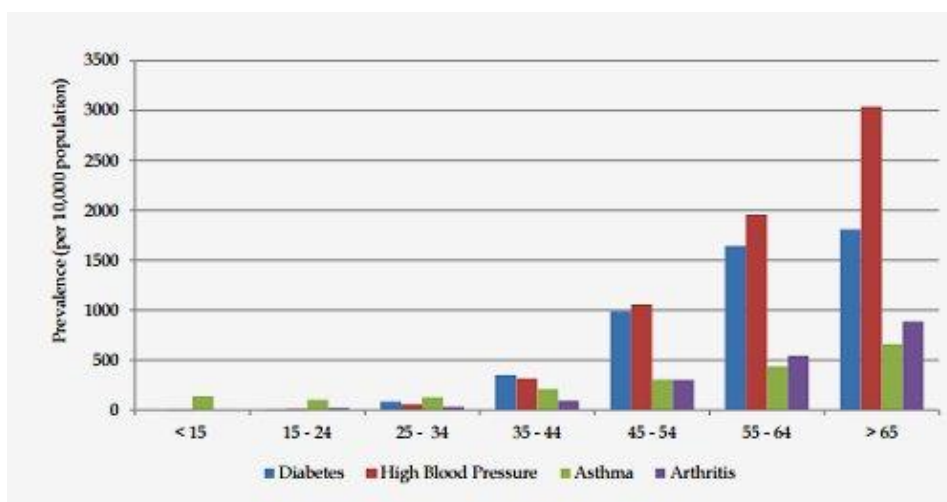
Data were collected among South Asian adults with the sample size was 4485, and about 39.5% were males. Mean systolic and diastolic blood pressures were  $127.1 \pm 19.8$  mmHg and  $75.4 \pm 11.3$  mmHg, respectively. Age-adjusted prevalence in all adults, males and females was 23.7%, 23.4% and 23.8%, respectively. Urban adults had a significantly higher prevalence of hypertension than rural adults.

An island wide survey conducted by the Department of Census and Statistics (DCS) on Sri Lankan people has found that nearly 18 percent of the population, nearly one in six people, suffers from a chronic illness.

The Department of Census and Statistics officially launched the report of the survey "National Survey on Self-reported Health in Sri Lanka 2014" on Tuesday (July 05) in Colombo.

Distribution of Chronic illness.

Type of illnesses	Percentage to the total cases reported
High Blood Pressure	39.0
Diabetes	30.4
Asthma	13.8
Arthritis	11.4
Heart Disease	9.0
Mental illness	3.1
Stroke/ Paralyzed	2.1
Cancer	1.7
Epilepsy	1.7
Other	15.8



Prevalence of Diabetes, High blood pressure, Asthma and Arthritis by age group (per 10,000 population).

In the binary logistic-regression analysis, nearly one-third of the Sri Lankan adult population is hypertensive (Katulanda P et al, 2014).

But nature has a source of medicinal agents for thousands of years. The World Health Organization (WHO) has also recommended the evaluation of plants for effectiveness against human diseases and for the development of safe modern drugs.

Prevalence of hypertension is very risk for the present and future generation therefore, This research intends to carry out a literary review of *Seeraka Chooranum* (Al-snafi & Al-snafi, 2017) One of the best polyherbal Siddha preparations for hypertension, which was mentioned in the Siddha pharmacopeia with the aim of providing a valuable message to the public regarding the prevention and cure of cardio vascular diseases due to reduces the

Hypertension.

## OBJECTIVE

To study the properties of “*Seeraka Chooranam*” for the management of hypertension.

## Method of Preparation of Seeraka Chooranum

According to the siddha pharmacopeia ingredients and the method of preparation of “*Seeraka chooranum*”.

## Ingredients

1. <i>Seerakam</i>	- <i>Cuminum cyminum L</i>	- 200gm	} 200ml of each juice
2. Lemon Juice	- <i>Citrus aurantifolia</i>		
3. <i>Thumpai</i> leave Juice	- <i>Leucas zeylanica</i>		
4. <i>Mosumosukai</i> Juice	- <i>Melothria maderaspatana</i>		
5. <i>Karumpu</i> Juice	- <i>Saccharum officinarum</i>		
6. <i>Vempu</i> bark Juice	- <i>Azadirachta indica</i>		
7. <i>Neli</i> fruit Juice	- <i>Phyllanthus emblica</i>		
8. <i>Thuthuvalai</i> Juice	- <i>Solanum trilobatum</i>		

## Procedure

200gm *Cuminum cyminum* weighted then wash and dried under the shad. Above mention 200ml each juice prepared separately. Purified 200gm of *Cuminum cyminum* soaked six hours in each juice one by one. Then dried well and powdered. 50gm of sugar powdered mixed with above prepared *Chooranam*.

## Dose

1.5g – 2g three times for one week with warm water.

## Indication

It is specially used for *Piththa* diseases including *Iraththak kothipu*(Hypertetion) and also it can be used Vomiting, Giddiness, Fainting and Indigestion.

## Analysis of Ingredients

1. *Cuminum cyminum* is Apiaceae family plant. Seeds are commonly used for medicinal preparations. Tamil Name-Seerakam, English name-Cumin Seeds, Sanskrit name-Jeeraka and Sinhala name – Suduru.

Research finding relevant with Hypertension The anti-hypertensive potential of standardized aqueous extract of *Cuminum cyminum* seeds and its role in arterial endothelial nitric oxide synthase expression, inflammation, and oxidative stress were evaluated in renal hypertensive rats. Renal hypertension was induced by the two-kidney one-clip (2K/1C) method in rats. Systolic blood pressure (SBP), plasma nitrate/nitrite, carotid-eNOS, renal-TNF- $\alpha$ , IL-6, Bax, Bcl-2, thioredoxin 1 (TRX1), and thioredoxin reductase 1 (TRXR1) mRNA expressions were studied to demonstrate the anti-hypertensive action of *Cuminum cyminum*. *Cuminum cyminum* seed was administered orally (200 mg/kg bw) for a period of 9 weeks, it improved plasma nitric oxide and decreased the systolic blood pressure in hypertensive rats. It also up-regulated the gene expression of eNOS, Bcl-2, TRX1, and TRXR1; and down regulated Bax, TNF- $\alpha$ , and IL-6. The data revealed that *Cuminum cyminum* seeds augment endothelial functions and ameliorate inflammatory and oxidative stress in hypertensive rats.(Al-snafi & Al-snafi, 2017).

2. *Citrus aurantifolia* is Rutaceae family plant Leaves, Unripe fruit and Fruit are used for medicinal purpose. Tamil Name-*Elumichai*, English name-Lime, Sanskrit name-Jambira and Sinhala name –Dehi.

The studied show the effects of an aqueous extract of *Citrus aurantifolia* (Ecita) on arterial blood pressure and on isolated heart and aorta activities. Rabbits were used for the study on the arterial blood pressure using a Ludwig manometer. Albino Wistar rats were used for the studies regarding the isolated heart and aorta activities using isolated organ bath systems. Ecita (4mg/kg-16mg/kg b.w) produced a dose-dependent and significant decrease in rabbit blood pressure ( $p < 0.05$ ). Ecita (4mg/kg-16mg/kg b.w) dose-dependently reduced hypertension evoked by adrenalin (30  $\mu$ g/kg b.w.). Ecita (10-8mg/ml-10-2mg/ml) induced both negative inotropic and chronotropic effects on the heart contractile activity. The plant extract (10-8mg/ml-10-2mg/ml) induced a dosedependent relaxation of contractions produced by adrenalin (3.10-3mM) or by KCl (80mM). Ecitaevoked vasorelaxant effects were totally abolished by removal of the endothelium layer or by a pretreatment with L-NAME (mg/ml). It was concluded that the extract possesses an antihypertensive activity which could be related to both cardiodepression and the vasorelaxation. Endotheliumdependent mechanisms might be involved.(Souza, Lamidi, Ibrahim, Samseny, & Mounanga, 2011).

3. *Leucas zeylanica*, Lamiaceae family plant, Leaves, Flowers and Root are used for medicinal purpose. Tamil Name-*Thumbai*, English name-Ceylon slitwort, Sanskrit name-Dronapushi and Sinhala name-Geta-tumba.

The antioxidative activity of *L. zeylanica* was determined by estimating its ability to inhibit the hepatic levels of lipid peroxide (LPO), as indicator of oxidative stress. Concomitantly, the antioxidant phytochemicals such as polyphenols and flavonoids were assessed against pyrogallol and quercetin standards. The ALT and AST activities and the levels of LPO of hepatic tissue were significantly increased by oxidative stress. *L. zeylanica* pretreatment, however, significantly repressed the oxidative stress on hepatic tissue, as indicated by the decreased activities of ALT and AST enzymes and levels of LPO. Analyses of the phytochemicals revealed that the extract of *L. zeylanica* contained substantial amounts of polyphenols ( $74.32 \pm 4.6$  µg of pyrogallol equivalent/mg) and flavonoids ( $15.69 \pm 2.2$  µg quercetin equivalent/mg of extract). Finally, the results of the present study demonstrated the presence of antioxidant phytochemicals, including polyphenols and flavonoids in *L. zeylanica* and henceforth conferred protection against ethanol and H<sub>2</sub>O<sub>2</sub>-induced oxidative stress on hepatic tissue. (Hossain et al, 2013).

4. *Phyllanthus emblica*, Euphorbiasia family plant, Fruit, bark, leaves and stems are used for medicinal purpose, Tamil Name-*Nelli*, *Amalakam*, English name-Goose berry, Sanskrit name - Amalaki, Amrtaphala and Sinhala name-Nelli.

The *P. emblica* extract significantly decreased arterial blood pressure and heart rate as well as cardiac and renal hypertrophy in a dose-dependent fashion as compared to DOCA control rats. Increased TBARS and decreased endogenous antioxidants activity in serum, heart and kidney tissues of hypertensive rats were also normalized. (Kumar A et al, 2014).

- 5 *Melothria maderaspatana*, Cucurbitaceae family plant. Seeds, Roots and Leaves used for medicinal purpose. Tamil Name-*Musumuskkai*, *Nagilangiai* English name-Madras pea pumpkin, Sanskrit name- Krtarandhrah, Musimusikkay. and Sinhala name -Hin-kekiri.

The antihypertensive effect of *Melothria maderaspatana* leaf fractions on deoxycorticosterone acetate (DOCA)-salt-induced hypertensive rats and to identify compounds from the active fraction by GC-MS analysis Administration of DOCA salt significantly increased the systolic and diastolic blood pressure compared to sham-operated control rats. When treated

with chloroform (CFM), ethyl acetate (EAFM) or methanol fractions of *M. maderaspatana* (MFM), EAFM alone significantly lowered the systolic and diastolic blood pressure. The levels of magnesium and copper significantly increased in plasma and decreased in tissues while the zinc level significantly increased in plasma and tissues, and administration of EAFM brought these parameters back to sham-operated control levels. By GC–MS analysis, phytochemicals such as coumarin, vallinic acid, *p*-coumaric acid, gallic acid, caffeic acid, and ferulic acid were identified in EAFM. In conclusion, the EAFM controls blood pressure in DOCA-salt hypertensive rats and reverts the metabolic alterations in magnesium, copper and zinc. (Chinnadurai V, et al, 2012).

6 *Saccharum officinarum*, Poaceae family plant, Roots and Sugar used for medicinal purpose, Tamil Name-Karumpu English name- Sugar cane Sanskrit name - Ikshu, Khanda and Sinhala name-Ukk.

It contained the hypotensive action based on the research of Preliminary Ethnopharmacological Survey of Plants Used in Mexico for the Treatment of Hypertension (Castillo-españa, Garduno-ramirez, & Estrada-soto, n.d.).

7 *Azadirachta indica*, Meliaceae family plants. Leaves, fruits, Bark and Roots are used for medicinal purpose. Tamil Name-Vempu, Ariddam. English name- Neem, Sanskrit name-Nimpa and the Sinhala name- Kohamba.

The blood pressure lowering effect of the crude extract of *Azadirachta indica* and its aqueous and ethylacetate fractions. In normotensive anesthetized rats, AI, CI(1-30mgkg<sup>-1</sup>) caused a dose- dependent fall in arterial pressure, Ai, Aq being more effective. In isolated rabbit aorta ring preparations, Ai, Cr inhibited phenylephrine(1μM) and high K<sup>+</sup>(80mM) pre-contractions, with slightly higher potency against phenylephrine while Ai. Et Ac was more potent against K<sup>+</sup>, similar to verapamil. The data show that the crude extract of *Azadirachta indica* possesses vasodilator effect, mediated through Ca<sup>++</sup> channel blockade and NO-dependent atropine- sensitive pathways along with cardiac depressant activity which possibly explain its blood pressure lowering effect (Castillo-españa et al., n.d.).






8 *Solanum trilobatum*, Solanaceae family plant, whole plants used for the medicinal purpose, Tamil Name-Thuthuvalai, English name –Climbing Brinjal, Sanskrit name- Vallikantakaarika and Sinhala name - Wel Tibbatu.






A previous study investigated the effect of *S. trilobatum* on lipid peroxidation in swiss albino mice (Venkalesan et al, 2008). Enhanced lipid peroxidation was observed in lung, liver and kidney of tumor bearing animals with a significant decrease in enzyme and non enzymic antioxidants. Administration of *s. trilobatum* extract significantly decreased the level of lipid peroxidation and enhanced the activity of antioxidant enzymes. their result suggests that *S. trilobatum* possess strong antioxidant activity that could prevent lipid peroxidation and augmenting defence system. due the antioxidant property(Sahu, Rathi, Koul, & Khosa, n.d.), *S. trilobatum* might exhibit antihypertensive effect(Castillo-españa et al., n.d.).

## RESULT AND DISCUSSION

According the review the plant and chemical composition and pharmacological actions were tabulated to analysis.

Plant	Organoleptic character	Chemical constitution	Seyal(Action)
 <i>Cuminum cyminum</i>	Suwai- Sweet & Pungent Veeriym -cool Vipakam - Sweet	Cuminaldehyde, alkaloid, anthraquinone, coumarin, flavonoid, glycoside, resin, saponin, tannin, steroid Protein, Carbohydrate, Minerals, and Vitamins	Astringent Carminative Appetizer Anti-hypertensive
 <i>Citrus aurantifolia</i>	Suwai- Sour, pungent Veeriym- Heat Vipakam - Pungent	Citric acid Malic – acid Tartaric acids Pectin Sugar Other salts	Refrigerant Carminative Astringent Anthelmintic Ant scorbutic
 <i>Leucas zeylanica</i>	Suwai- Sweet, pungent Veeriym- Heat Vipakam - Pungent	Essential oil ammonia Volatile alkaloid	Anti-microbial Anti-bacterial Insecticidal activity Antioxidant activity Hepatoprotective
 <i>Melothriamaderaspatana</i>	Suwai- Astringent& Pungent Veeriym – Heat Vipakam - Pungent	Sugar Coumarins Amino acids Flavonoids Saponins Tannins Triterpenes Glycosides	Anti-hyperlipidemic Anti-oxidative Antihypertensive Diuretic Anti-microbial
 <i>Saccharumofficinarum</i>	Suwai- Sweet Veeriym-Cool Vipakam - Sweet	Sucrose	Anti-vinous Cardio-tonic Demulcent Diuretic Hypoglycemic
<i>Azadirachta indica</i>	Suwai- Bitter Veeriym- Heat	Nimbin Nimbinin	Antipyretic Tonic



	Vipakam - Pungent	Ethyl acetate Nimbidin amorphoussulphur,	anthelmintic, antidiabetic, antibacterial, antiviral, sedative
 <i>Phyllanthusemblica</i>	Suwai- Sweet, sour, astringent Veeriyam cool Vipakam - sweet	Ascorbic acid Gallic acid Ellagic acid L-malic acid-2-O-gallate Tannins	Diuretic Laxative Aphrodisiac Cooling
 <i>Solanumtrilobatum</i>	Suwai- Bitter & Pungent Veeriyam heat Vipakam - Pungent	Triterpenoids Steroids, Triterpenoids, sugars, phenoliccompounds, tannins, anthroquinone, amino acids, Saponins. phytosterols, flavonoids and cardiacglycosides. B solamarine, solasodine, solaine	Haemolytic Anti-inflammatory Anti-diabetic Anti-bacterial Anti-oxidant

This research aims to find out and analyses the pharmacological properties of “*Seeraka Chooranam*”. Here each and every ingredients of *Seeraka Chooranam* analyzed in detail according to Siddha as well as modern pharmacological aspect relevant to which enables the *Chooranam* to cure and prevent the hypertension.

According to Siddha medical system the functional properties of the human body relevant to the Taste (*Suvai*), Potency (*Veeriyam*) and Post digestive taste(*Vipakam*) of medicinal properties.

*Suvai* (taste) is the object of gustatory. The specific Quality of taste is responsible for their manifestation. Totally six type of taste present in the substance *Pittam* is increased by sour, pungent and salt. It is decreased by bitter, astringent and sweet. *Vattam* is increased by bitter, astringent and pungent. It is decreased by sour, sweet and salt. Main Ingredient of *Seeraka Chooranam* is *Cuminum cyminum*. It has Sweet taste therefore it can farcify the aggravated *Pitham* and also it possess the Pungent taste, pungent stimulated and regulate the *Vatham* and *Thasa vayukal* and its functions therefore the cardiovascular system is refreshed and function properly and normalize the blood pressure. Other ingredients of *Seeraka chooranum* also have the taste which regulate the *Pitham* and *Vatham*.

*Veeriyam* (potency) is the attributer factor of the substance. *Cuminum cyminum* has the cool potency it can reduce the *Thee pootham* there for it can reduce the hypertension but some

other row material of *Seeraka Chooranam* has the hot potency it maintained the property of *Pitham*, there for the quality of blood is regulated and maintained by the *Seeraka chooranum*.

Vipakam it is the post digestive taste, *Cuminum cyminum* has the sweet *Vipakam* there for it can regulate and normalized the aggravated *Pitham*. Other ingredients also support the action.

According to the *Seyal* all the ingredients possess the anti- hypertensive activity which was proven by the researches. And also most of the ingredient has the anti-oxidant, Anti-hyperlipidemic, Cardio-tonic and Anti-inflammatory Specially Oxidative stress promotes vascular smooth muscle cell proliferation and hypertrophy and collagen deposition, leading to thickening of the vascular media and narrowing of the vascular lumen. In addition, increased oxidative stress may damage the endothelium and impair endothelium-dependent vascular relaxation and increases vascular contractile activity. All these effects on the vasculature may explain how increased oxidative stress can cause hypertension. Treatment with antioxidants has been suggested to lower oxidative stress And it reduce the blood pressure (Internal Medicine D and Hypertension Unit) There for it can cure the Hypertension.

*Seeraka chooranum* contained the chemical compositions from the *Cuminum cyminum* give more support for Hypertensive treatment.

Cuminaldehyde for hypertension- inhibited lipid peroxidation and lipoxygenase activity in vitro in human erythrocyte ghosts and also effectively scavenged ROS 96 (Scientific Figure on Research Gate, 2018).

Anthraquinone, containe the antioxydent activity, *Daucus carota* (carrot) has been used in traditional medicine to treat hypertension. Activity-directed fractionation of aerial parts of *D. carota* resulted in the isolation of two Coumarin glycosides coded as DC-2 and DC-3. Intravenous administration of these compounds caused a dose-dependent (1–10 mg/kg) fall in arterial blood pressure in normotensive anaesthetised rats. In the *in vitro* studies, both compounds caused a dose-dependent (10–200 µg/ml) inhibitory effect on spontaneously beating guinea pig atria as well as on the K<sup>+</sup>-induced contractions of rabbit aorta at similar concentrations. These results indicate that DC-2 and DC-3 may be acting through blockade of calcium channels and this effect may be responsible for the blood pressure lowering effect of the compounds observed in the *in vivostudies* (Gilani H at el, 2000).

Flavonoides-A number of studies have shown that consumption of fruit, vegetables, wine and tea may protect against stroke, for which hypertension is the major risk factor. Flavonoid compounds, including flavonols, flavones and isoflavones, represent an important source of antioxidants in the diet. Flavonoid intake has been inversely associated with mortality from coronary heart disease and stroke. We hypothesize that individuals with hypertension have lower circulating flavonoid levels. Increased consumption of flavonoid-rich foods may decrease rates of hypertension. Lowering blood pressure through increased dietary consumption of dietary antioxidants may decrease the rate of end-organ damage that is secondary to hypertension (Moline J, 2000).

## CONCLUSION

According to the literature review *Seeraka Chooranam* has the, Sweet, Bitter, Pungent *Suwai*, Cool and hot *Veeriyam* and Sweet *Vipakam*. and also it contained the anti-hypertensive and astringent property that are regulate the *Vatham* and *Pitham* and reduce blood pressure and risk of the heart diseases and current research findings revealed the Anti- hypertensive, Anti-oxidant, Hypolipidaemic Diuretic and Anti angina actions are present in the ingredients. In addition to that *Seerakam* possess the chemical compositions of Cuminaldehyde, anthraquinone and flavinodes which have the more powerful action of blood pressure lowering effect there for *Seeraka chooranum* best medicine for hypertension.

## RECOMENTATION

Above mentioned statement should prove through the clinical study and animal study.

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