



Research Article

## EVALUATION OF THE ANTIHYPERTENSIVE ACTIVITY OF SEENTHIL CHOORANAM IN DOCA-SALT-INDUCED HYPERTENSIVE WISTAR ALBINO RATS

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### Article info

#### Article History:

Received: 15-02-2026

Accepted: 20-03-2026

Published: 06-05-2026

#### KEYWORDS:

*Seenthil chooranam*, Wistar albino rats, Deoxy-corticosterone acetate, anti-hypertensive activity.

### ABSTRACT

In recent years, traditional medical formulations are increasingly explored for their antihypertensive potential. **Aim:** To assess the anti-hypertensive efficacy of *Seenthil chooranam* and its effects on blood pressure, serum electrolytes and lipid profile in DOCA-salt-induced hypertensive rats. **Materials and Methods:** Hypertension was induced in rats by subcutaneously administering DOCA salt [10mg/kg, twice weekly] along with 2% sodium chloride supplementation for a period of 43 days. The animals were divided into five groups: normal control, hypertensive control, standard drug group [hydrochlorothiazide 5mg/kg] and two *Seenthil chooranam* treated groups [200mg/kg and 400mg/kg orally]. Blood pressure was recorded invasively by carotid artery cannulation. Serum sodium, potassium and lipid profile were analysed using standard biochemical methods. Data analysis was carried out using one-way ANOVA followed by Dunnett's test. **Results:** DOCA-salt induced rats showed a significant increase in blood pressure, serum sodium, total cholesterol, triglycerides, LDL and VLDL levels, with a decrease in serum potassium and HDL levels. Treatment with *Seenthil chooranam* reduced the blood pressure, improved electrolyte balance and lipid profile in a dose-dependent manner, with the higher dose showing effects comparable to hydrochlorothiazide. **Conclusion:** The study concludes that *Seenthil chooranam* has significant antihypertensive effects in DOCA-salt induced hypertensive rats. The observed improvements in blood pressure, serum electrolytes and lipid profile support the therapeutic potential of *Seenthil chooranam* in hypertension management. Further investigations are necessary to clarify its mechanism and long-term safety profile.

### INTRODUCTION

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Hypertension is a dangerous health issue that raises the likelihood of developing heart, brain, kidney and other diseases. Often referred to as a silent killer, it is a leading cause of premature death globally, affecting an estimated 1.4 billion people<sup>[1]</sup>.

A global objective for non-communicable diseases is to decrease the prevalence of hypertension by 33% between 2010 and 2030. The rates of hypertension are increasing, partly due to factors like unhealthy diets, lack of physical activity and an aging population <sup>[2]</sup>. In recent years, traditional medicines are increasingly used. This trial drug *Seenthil chooranam* is a classical Siddha formulation sourced from literature "*Agasthiar Paripooranam - 400*" indicated for *Pitha* disease<sup>[3]</sup> etc., According to Yugi Vaithiya Chinthamani 800, *Uratha pitha vatham* is one of the types under *Pitha* disease<sup>[4]</sup>. Studies found that characteristic features of *Uratha pitha vatham* most probably analogous with hypertensive disorder <sup>[5]</sup>. The ingredients of this formulation are *Seenthil*, *Karisalai* and Earthworm [*Eudrilus eugeniae*]. In previous studies, *Seenthil* [*Tinospora cordifolia*] belongs to Menispermaceae family were screened for its lipid-

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<https://doi.org/10.47070/ayushdharma.v13i2.2644>

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lowering potential, anti-hyperglycemic activity, diuretic activity and cardioprotective activity<sup>[6]</sup>. *Karisalai [Eclipta alba]* belongs to Asteraceae family was known to have diuretic, hypolipidemic and anti-diabetic activity<sup>[7]</sup>. Earthworm [*Eudrilus eugeniae*] extract was known to have anti-thrombotic, antioxidant and hypoglycemic activity in some studies<sup>[8]</sup>. Henceforth, the present study was to evaluate the anti-hypertensive activity of *Seenthil chooranam* on deoxycorticosterone acetate [DOCA] salt induced Wistar albino rats using standard protocol.

## MATERIALS AND METHODS

Study population- 30 wistar albino rats

### The trial medication *Seenthil chooranam* study design

Group	Treatment	Dose
I	Normal control	0.25% w/v sodium carboxymethyl cellulose (CMC)
II	Hypertensive control	0.25% w/v sodium CMC (10 ml/kg, p.o.) + DOCA salt (10 mg/kg, s.c., twice in a week)
III	Standard group	Hydrochlorothiazide (5 mg/kg, p.o.) + DOCA salt (10 mg/kg, s.c. twice in a week)
IV	Test group I	SC (200 mg/kg, p.o.) + DOCA salt (10 mg/kg, s.c. twice in a week)
V	Test group II	SC (400 mg/kg, p.o.) + DOCA salt (10 mg/kg, s.c. twice in a week)

### Study Procedure

30 Wistar Albino rats. Animals were selected and given a 2% w/v sodium chloride solution in place of ordinary water until they reached a body weight of 200gm. Wistar albino rats were split up into five groups, each with six animals, and treated as described above. For 43 days, all of the aforementioned medication treatments were administered every day. For up to 43 days, DOCA salt diluted in sesame seed oil was administered twice a week. Sesame seed oil was given to the control group twice a week in place of DOCA.

### The following parameters were measured after 43 Days

Blood sodium and potassium level, serum lipid profile and rat BP was measured after 43 days of measurement.

### Measurement of Serum Sodium and Potassium

After 43 days of treatment, blood samples were taken using the retro orbital method performed under anesthesia. Ether was used to anesthetize the animals. Centrifuge the blood at 6000 RPM for 15 minutes at 25°C after it has been collected. Supernatant was used to measure the levels of potassium and sodium. Serum Na<sup>+</sup> and K<sup>+</sup> levels were measured by using semi-auto analyzer (RA-50, Bayer Diagnostics) and by specialized kits (Auto span, India) at 500 and 550nm respectively. The amounts of Na<sup>+</sup> and K<sup>+</sup> were measured in mmol/L.

Study design- In-vivo experimental animal study

Study period- 43 days

Study place- Animal Bred House, Dept. of Pharmacology, Arulmigu Kalasalingam College of Pharmacy, Krishnankoil, Srivilliputtur

### Experimental Animal

The Committee for the Purpose of Control and Supervision of tests on Animals (CPCSEA) granted authorization for the Institutional Animal Ethics Committee (IAEC approval number-AKCP/IAEC/18/25-26) of the Pharmacy Department to approve all of the tests and procedures detailed in this study.

### Measurement of BP

Rats were anesthetized with ketamine (25mg/kg, i.m.) on the 43<sup>rd</sup> day of the experiment. The left carotid artery (for blood pressure recording) was cannulated under aseptic conditions using a polyethylene cannula loaded with 1% heparin in normal saline. Lastly, BP was measured in millimeters of mercury using the 2K1C-model.

### Measurement of Serum Lipid Profile

Every SLP test was conducted using standard protocols. All of the measurements were made using digital colorimeters and Quimica Clinica Aplicada (QCA) test kits. The enzymatic colorimetric technique was used to determine the serum TC. The dextran sulphate-magnesium (II) precipitation technique was used to measure the serum HDLC. The serum triglyceride was measured using the glycerol phosphate oxidase enzymatic technique. Serum triglyceride was divided by five to determine the VLDLC, and the Friedewald algorithm was used to determine the serum LDLC.

### Statistical Analysis

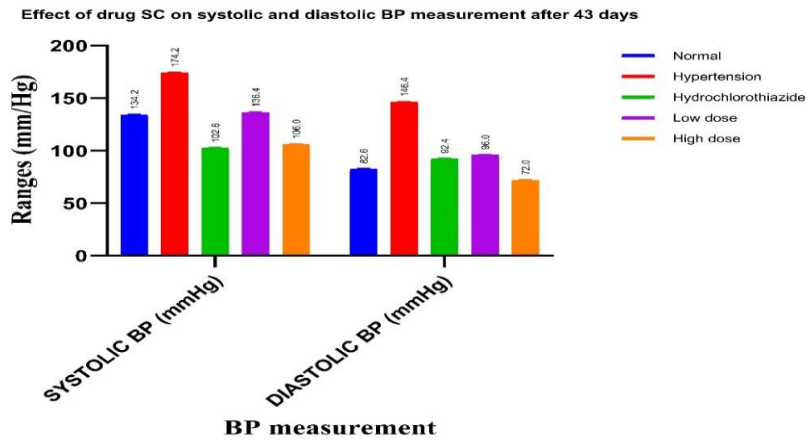
All the data were statistically evaluated with ANOVA and the differences among groups were determined by Dunnett's multiple comparison tests using Graph pad prism 5.0. Values were considered to be significant when P<0.05. All the results were presented as mean ± SEM.

**RESULTS**

**Table 1: Effect of drug *Seenthil chooranam* [SC] on systolic and diastolic BP measurement after 43 days**

Group	Systolic BP [mmHg]	Diastolic BP (mmHg)
Normal	134.2 ± 0.58	82.6 ± 0.43
Hypertension	174.2 ± 0.62	146.4 ± 0.46
Hydrochlorothiazide	102.6 ± 0.46***	92.4 ± 0.46***
Low dose	136.4 ± 0.50**	96.0 ± 0.38**
High dose	106.0 ± 0.60***	72.0 ± 0.34***

Values expressed as mean ± SEM [n=6]. \*\*p<0.01, \*\*\*p<0.001 vs hypertensive control.



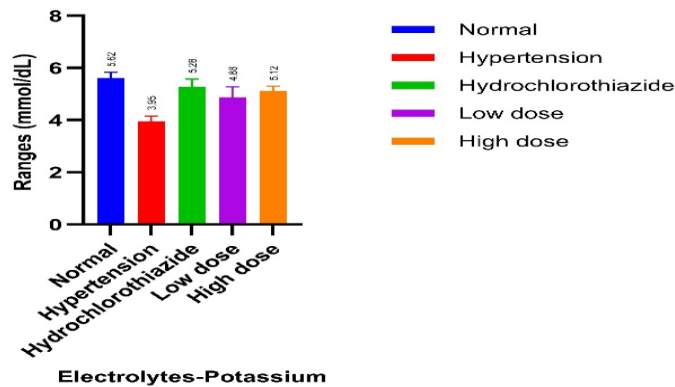
**Fig 1: Effect of SC on systolic and diastolic BP measurement**

**Table 2: Effect of SC on serum sodium and potassium level**

Group	Serum Sodium and Potassium Level	
	Sodium	Potassium
Normal	224.30 ± 3.25	5.62 ± 0.21
Hypertension	268.75 ± 7.95	3.95 ± 0.20
Hydrochlorothiazide	218.40 ± 4.05	5.28 ± 0.30
Low dose	229.15 ± 3.10	4.88 ± 0.40
High dose	221.90 ± 2.85	5.12 ± 0.18

Values expressed as mean ± SEM [n=6]. \*p<0.05 vs hypertensive control.

**Effect of drug SC on serum potassium level**



**Fig 2: Effect of SC on serum potassium level**

Effect of drug SC on serum sodium level

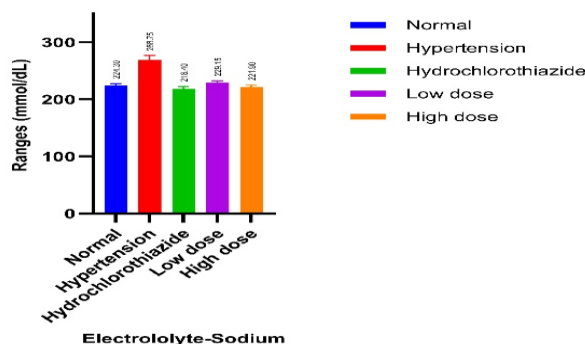


Fig 3: Effect of SC on serum sodium level

Table 3: Effect of SC on serum Lipid profile

Group	Treatment	T.C [mg/dL]	T.G [mg/dL]	HDL[mg/dL]	LDL [mg/dL]	VLDL[mg/dL]
I	Normal Control	82.40 ± 0.45	88.60 ± 0.38	49.20 ± 0.22	19.30 ± 0.15	17.80 ± 0.12
II	Hypertensive Control	195.75 ± 0.70	168.90 ± 0.55	29.60 ± 0.18	128.40 ± 0.52	33.70 ± 0.40
III	Standard Drug	135.20 ± 0.48	118.45 ± 0.42	45.60 ± 0.20	78.90 ± 0.35	23.70 ± 0.28
IV	SC (Low Dose)	158.60 ± 0.52	140.30 ± 0.46	36.80 ± 0.24	102.50 ± 0.40	28.10 ± 0.30
V	SC (High Dose)	142.10 ± 0.40	124.80 ± 0.35	43.90 ± 0.19	86.60 ± 0.30	24.60 ± 0.25

Values expressed as mean ± SEM [n=6]. \*p<0.05 vs hypertensive control.

Effect of SC on serum Lipid profile of Hypertension induced Rat

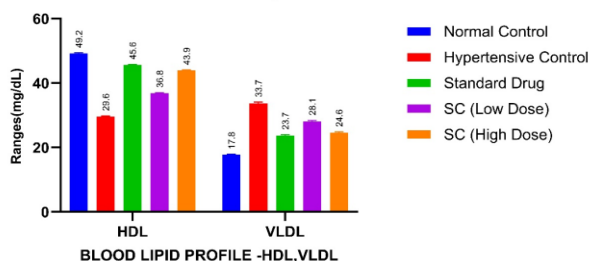


Fig 4: Effect of SC on HDL, VLDL lipid profile

Effect of SC on serum Lipid profile of Hypertension induced Rat:

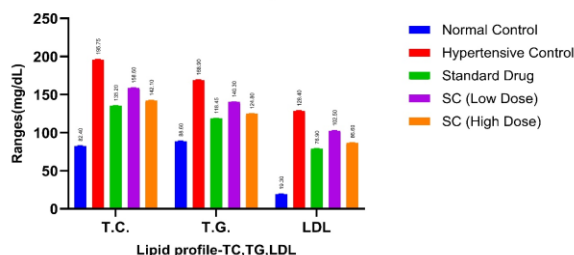


Fig 5: Effect of SC on TC, TG, LDL lipid profile

DISCUSSION

The present study evaluated the antihypertensive potential of *Seenthil Chooranam* in DOCA-Salt-induced hypertensive rats by assessing blood pressure, serum electrolyte levels and lipid profile. DOCA-salt administration is well established experimental model for inducing hypertension, primarily through sodium retention, volume expansion and associated vascular and cardiac remodelling. Hans Selye et al. was the first to demonstrate that DOCA salt induces high BP in rats [9]. In the hypertensive control

group, a significant elevation in both systolic and diastolic blood pressure was observed when compared with the normal control group, confirming the successful induction of hypertension. Treatment with the standard drug hydrochlorothiazide markedly reduced both systolic and diastolic blood pressure, which is consistent with its known diuretic and antihypertensive action. Administration of *Seenthil chooranam* reduced the blood pressure in a dose-dependent manner. Fig.1 shows that the low dose of

*Seenthil chooranam* showed a moderate reduction, whereas the high dose produced a pronounced antihypertensive effect comparable to the standard drug. These findings suggest that *Seenthil chooranam* SC possesses significant blood pressure-lowering activity.

Electrolyte analysis revealed that DOCA-salt-induced hypertension caused a significant increase in serum sodium levels along with a decrease in serum potassium levels, reflecting sodium retention and potassium loss. Treatment with hydrochlorothiazide normalized these electrolyte imbalances. Fig 2 and Fig 3 shows that the *Seenthil chooranam* treatment significantly reduced serum sodium levels and restored potassium levels toward normal values, with the high dose showing better correction than the low dose. This indicates that *Seenthil chooranam* may exert a protective effect on electrolyte homeostasis, which contributes to its antihypertensive action.

*Seenthil chooranam* demonstrated a beneficial influence on serum lipid profile. DOCA-salt induced hypertensive rats exhibited significant dyslipidemia, a known risk factor for cardiovascular complications. Fig 4 and Fig 5 shows that the *Seenthil chooranam* treatment significantly reduced total cholesterol, triglycerides, LDL, and VLDL levels while increasing HDL levels in a dose-dependent manner. The high-dose *Seenthil chooranam* group showed lipid lowering effects comparable to the standard drug. Improvement in lipid parameters suggests that *Seenthil chooranam* may reduce cardiovascular risk by preventing atherosclerotic changes.

## CONCLUSION

The results of this study show that *Seenthil chooranam* effectively reduces high blood pressure in DOCA salt-induced hypertensive rats. *Seenthil chooranam* also corrected the electrolyte imbalance and improved the lipid profile in a dose-dependent manner. The high dose of *Seenthil chooranam* was more effective than the low dose and showed results comparable to the standard drug. These findings suggest that *Seenthil chooranam* shows anti-hypertensive potential against DOCA-Salt induced model.

## Acknowledgement

The author expresses sincere gratitude to Mr. M. Santhanakumar, Associate Professor, HOD, Department of Pharmacology, Arulmigu Kalasalingam College of Pharmacy for rendering the necessary facilities to carry out this research and also extends heartfelt thanks to the faculty of Department of PG Pothu maruthuvam for providing support.

## REFERENCES

1. World Health Organization. Hypertension [Internet]. Geneva: World Health Organization; 2023.
2. A Siddha Herbal Formulation Alleviates Hypertension in DOCA Salt Induced Hypertensive Rats, Evaluation of Acute, Sub Acute Toxicity, Anti-oxidant and Diuretic activity. Ayushdhara. 2025 Jul. 25; 12[3]: 91-102.
3. Agasthiar Paripooranam-400 Moolamum Uraiyum, pg no:116, Thaamarai Noolagam, Chennai.
4. Ramachandran SP. Yugi Vaithiya Chinthamani 800 Moolamum Uraiyum, Thaamarai Noolagam, pithanoigal. 2<sup>nd</sup> edition; 2013. p.138.
5. Ayyasamy U. Analogical comparison of Uratha Pitha Vatham with hypertension and Ratha Pitham with purpura-an in-depth re-analysis of Siddha literature. Neuro Quantology. 2022;2 0[7]: 43-49. doi: 10.14704/nq.2022.20.7.NQ33004.
6. Upadhyay AK, Kumar K, Kumar A, Mishra HS. *Tinospora cordifolia* [Wild] Hook.f. and Thoms. [Guduchi]- validation of the Ayurvedic pharmacology through experimental and clinical studies. Int J Ayurveda Res. 2010; 1(2): 112-121. doi: 10.4103/0974-7788.64405.
7. Khairullah AR, Solikhah TI, Ansori ANM, Raharjo HM. Review on phytochemistry and pharmacology of *Eclipta alba* L: A valuable medicinal plant. Res J Biotechnol. 2022; 17[3]: 134-139. doi: 10.25303/1703ribt134139.
8. Zhu Z, Deng X, Xie W, Li H, Yi H, Yit R, Deng Z. Pharmacological effects of bioactive agents in earthworm extract: a comprehensive review. Anim Model Exp Med. 2024; 7[5]: 653-672. doi: 10.1002/ame2.12465.
9. Hans Selye et al. Production of hypertension and hyalinosis by desoxocortisone, British Medical Journal, Jan 1950: 4647-52

### Cite this article as:

M.Sharmila, R. Menaka, K. Sudhamathi Pushparaj. Evaluation of the Antihypertensive Activity of Seenthil Chooranam in DOCA-Salt-Induced Hypertensive Wistar Albino Rats. AYUSHDHARA, 2026;13(2):101-105.

<https://doi.org/10.47070/ayushdhara.v13i2.2644>

Source of support: Nil, Conflict of interest: None Declared

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