

Evaluation of anti-pyretic activity of *Plectranthus vettiveroides*

Abstract

Plectranthus vettiveroides is widely distributed throughout the Sri Lanka. The plant is used as folk medicine in the treatment flatulence, liver disease and jaundice. The plant has bitter taste, cold potency and pungent resultant. The present study was carried out to evaluate the antipyretic potential of infusion from the root powder of *Plectranthus vettiveroides*. Female and male Wistar rats of with body weight 230-250g were used. Which is divided in to 3 groups, in each contains 3 animals. Rats were familiarized to laboratory conditions for four days before the commencement of experiment. Fever was induced by sub cutaneous injection of 15% Brewer's solution (2.5ml) in the nape of the neck. 18 hours after the giving of fever induced drug, rectal temperature was measured. Then the measurement was repeated after 30 minutes. After that infusion of root powder of *Plectranthus vettiveroides* (0.5ml) was orally administered to the test group, 0.5ml of normal saline (0.9%) for control group and 0.5ml of Paracetamol for standard group. After animal received the test compound or the standard drug by the oral administration, the rectal temperatures were recorded again 30, 60,120 and 180 minutes. Single dose administration of test drug produces significant antipyretic effect in Brewer's induced fevered rats. The root powder of *Plectranthus vettiveroides* showed significant reduction in the elevated body temperature of rat which was compared with standard Paracetamol. The results suggest that the infusion of leaf powder of *Plectranthus vettiveroides* possess antipyretic activity and can be used as potent natural antipyretic drug.

Keywords: *plectranthus vettiveroides*, antipyretic, brewer's solution, fever

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Introduction

This study is an experimental study to evaluate the anti-pyretic activity on root powder of *Plectranthus vettiveroides*. Elevation of the body temperature than normal level sometime increase temperature may occur in the part of the body that called "Suram". Suram may be associated with burning sensation of eye, nausea, vomiting, headache, heaviness of the head. It compare with fever in modern medicine. A fever is usually a sign that something out of the ordinary is going on in the body. For an adult, a fever may be uncomfortable, but fever usually is not dangerous unless it reaches 103° F (39.4°C) or higher. For very young children and infants, a slightly elevated temperature may indicate a serious infection. But the degree of fever does not necessarily indicate the seriousness of the underlying condition. A minor illness may cause a high fever, and a more serious illness may cause a low fever.¹ *Plectranthus vettiveroides* is commonly known as Vilamichchu-ver belongs to the Lamiaceae family, In Ceylon, it is found in the warmer parts of the Island on margins of tanks. Trampaikkulam, Polonnaruwa, Ritigala, Batticaloa, Dambulla, Colombo, etc. *Plectranthus vettiveroides* is useful for Anti-pyretic in traditional medicine, Even though the roots having anti-cancer and anti-oxidant potency. As per my knowledge there is no research literature till available for wound Anti-pyretic activity of root of plant form of powder.² Researcher was explored Anti-pyretic effect of *Plectranthus vettiveroides* is powder on the fever model in present study, so as to provide scientific evidence for the traditional application. According to ancient traditional knowledge the plant of *Plectranthus vettiveroides* used for various medicinal purposes by traditional physicians but in the text book of *Porutpanpu nool* (Part I) by K.S.Murugesamuthaliyar mentioned the root of *Plectranthus vettiveroides* give for fever but there are scientific evidence so far. The current study was aimed to evaluate the antipyretic activity of root

of *Plectranthus vettiveroides*. The following quotation mentioned the *Plectranthus vettiveroides* be treated for fever. Based on *Porutpanpu nool* (Part I) by K.S.Murugesamuthaliyar root of *Plectranthus vettiveroides* give for fever. Though there is no scientific evidence so far. Hence, researcher will be conducted the above study to prove it in scientific way.

Literature review

Plant view

Scientific name - *Plectranthus vettiveroides* (Jacob) Singh & Sharma

Natural order - Graminalae

English name - White cuscus grass

Sanskrit name - Hroeberam

Tamil name - *vilamichu ver* (Murugesamuthaliyar, 2008).

Parts used - root

The Organoleptic character is

- Suwai- Bitter
- Thanmai- Cold
- Pirivu- Sweet (Murugesamuthaliyar, 2008).

Gunam (Action) - Refrigerant, Anti-pitha

A perennial herb with a branched, densely tufted rootstock with long spongy, aromatic, brown root fibres; stems 60-90cm high, stout,

erect, leafy, solid, smooth and hard and polished; leaves 30—60cm long, 0.8—1.8cm broad, sub-bifarious, erect, narrowly linear, firmly acuminate, flat, strongly keeled towards the base, smooth, margins usually scaberulous, sheaths coriaceous, glabrous, not auricled, ligule a ridge of minute hairs; panicle 10—30cm long, erect, narrowly thyriform, of fascicled, suberect, slender, articulate spikes, 5—7.5cm long, spikelets in alternate pairs, a sessile bisexual and a pedicelled male; sessile spikelet 1-flowered, 0.4 cm long, glumes 4, palea ovate-lanceolate; lodicules very minute, broadly quadrate, many-veined, connate; stamens 3, hypogynous, one at the base of the flowering glume, one opposite each vein of the palea, filaments capillary, anthers of two parallel cells; ovary superior, unilocular with a basal erect ovule, style and stigmas short; pedicelled spikelet oblong-lanceolate, pedicel as long as the internode, tip bearded; glumes 4, palea linear-oblong, obtuse; lodicules cuneate, anthers linear.²

It occurs in India, Ceylon, Burma, Malaya and tropical Africa. It is cultivated in the Philippines. In Ceylon, it is found in the warmer parts of the Island on margins of tanks. Trampaikkulam, Polonnaruwa, Ritigala, Batticaloa, Dambulla, Colombo, etc. The oil distilled from the roots of this plant contains vetivenens, vetivenol, vetivenic acid, vetivenyl acetate and similar compounds.²

The root acts as a bitter stomachic, carminative and cholagogue and as such is useful in anorexia, chronic dyspepsia, flatulence, acute and chronic congestion of the liver and jaundice. Its value is attributed to its eliminative powers as a diaphoretic, diuretic and cholagogue. It is often employed as an antiperiodic in malarial fevers.²

In Ceylon, it is used for preparations in the treatment of typhoid fever, hemoptysis, phthisis, anemia, skin and blood diseases, urinary disorders, piles, edema, etc. The bruised roots mixed with milk are. Often applied on the head for congestive headache for the delirium Caused by typhoid, pneumonia and meningitis. The dried roots are used for scenting clothes, for making fans and mats. The oil contains ^ considerable quantities of high grade perfumes.³

The objective of the study was to identify the effectiveness of *Plectranthus vittiveroides* root powder in anti-pyretic activity on animal.

Materials and methods

Plant material

This plant *Vilamichu-ver* was selected through quotation of general character of plant from the book, Siddha material medica (plant division) part-01 by Dr. K.S. Murugesamuthaliyar, Page no-818. Root of *Plectranthus vittiveroides* were collected from the shop, which situated in Trincomalee town. Plant *Plectranthus vittiveroides* (*vilamichu ver*) was authenticated by supervisor.⁴⁻¹¹

Preparation of drug

Plectranthus vittiveroides root was collected. Then dried in shade and chopped well. Then prepared fine powder and stored (room temperature) in airtight bottles for further use.

Dose determination

The dose of the infusion was determined according to common scale with the guidance of supervisor. The dose of the test formulation was calculated by generalizing the human dose to animals based on the body surface area ratio by referring to the common scale. The study was carried out using single dose level, i.e., the therapeutically the tested drug is (3g/60kg).

Animal study

Male & Female Wister rats of weighing 230-250g were procured from University of Peradeniya animal house for experimental study. Female and Male Wistar rats were used for the experiment. The animals were kept in a clean and dry cages with suitable light in laboratory in normal temperature with relative humidity for one week before the commencement of experiments, and were allowed free admission to standard pellet diet and water. According to the common scale and guidance of supervisor the single dose of 3g for 60kg for body weight of human and infusion made by 1g for 10ml for human this dose based on body surface area of Wistar rats. The weighed 3g of fine powder of *Vilamichau ver* was soaked in to 30ml of boiled cool water for overnight and filtered by clean cloth.

Preparation of standard drug

The single dose of standard Paracetamol is 3.34mg/200g (1g/60kg) in 0.1ml according to the body weight. The 15 % (w/v) suspension of Brewer's yeast solution was prepared weighed 7.5g and it was mixed with 50ml of 0.9% saline. To use as a dose for induced fever 10ml/kg (2ml/200g) (15g yeast mixed with 100ml of water).

The subcutaneous injection of Brewer's yeast suspension (15% of yeast, 0.9% saline is used) is known to produce fever in rats. The increase temperature can be achieved by administration of compounds with pyretic activity. Male & Female Wister rats of with body weight 230-250g were used. Which is divided in to 3 groups (control, test and standard) each group compromising with 4 rats and cages with Wistar rats were labeled. The first group served as control for received with distilled water (0.1ml/200g).

The second group for administration with Paracetamol (3.34mg/200g) as the standard drug. The third group was issued with tested drug (0.01g/200g). This test was carried out at laboratory in normal temperature. By insertion of thermo couple in the depth of 2cm in the rectum the initial rectal temperature was recorded. Before it the animals are febrile by injection of 10ml/kg (2ml/200g) of brewer's suspension subcutaneously in the back below the nape of the neck of wistar rats then immediately massaged on injected area for suspension is spread beneath the skin. Immediately after yeast administration the food is withdrawn. 18 hours post challenge, the raise in rectal temperature was recorded. The measurement was repeated after 30 minutes. Only animals with the body temperature of at least 38°C are taken into the test. After animal received the test compound or the standard drug by the oral administration, the rectal temperatures were recorded again 30, 60, 120 and 180 minutes.

The differences between the actual value and the starting values were registered for each time intervals. The maximum reduction of temperature to the test group is calculated. The results were compared with the effect of standard drug.

Result and discussion (Tables 1-2)

In test group significantly decreased the induced elevated body temperature as compared to control group. The sudden reduction of temperature was observed from ½ hour to 1 hour period after administration of test drug. The maximum antipyretic activity by Paracetamol as a standard drug was observed within 1 hour period. After the 1 hour, administration of test drugs shows markedly reduction in elevated body temperature in rats compared to control. The results indicate the test drug less equal to standard drug (Figures 1-4).

Table 1 Reading of rectal temperature with time interval before induce and after

Control	Base line	6.00 a.m	6.30 a.m	7.00 a.m	7.30 a.m	8.00 a.m
R1	36.8	38.2	38.2	38.0	38.1	38.0
R2	36.9	37.9	37.9	38.0	37.9	37.9
R3	36.8	37.8	37.9	37.9	37.8	37.9
R4	36.8	38.0	38.0	38.1	38.1	38.0
Test						
R5	36.7	38.1	38.0	37.9	37.5	37.0
R6	36.8	38.2	38.0	38.0	37.3	36.9
R7	37.0	38.1	38.1	37.6	37.4	36.9
R8	36.9	38.2	38.1	38.0	37.4	37.0
Standard						
R9	36.8	38.2	38.0	37.9	37.5	36.8
R10	36.8	38.1	38.0	37.8	37.4	36.8
R11	37.0	38.0	37.9	37.8	37.3	36.8
R12	37.1	37.9	37.8	37.7	37.2	36.9

Table 2 Average rectal temperature of all three groups with the time

Group	Initial reading	After 18 hours				
		6.00am(drug give)	6.30am	7.00am	7.30am	8.00am
Control	37.93	37.97	38	38	37.97	37.95
Standard	37.96	38.05	37.92	37.8	37.35	36.8
Test	38.00	38.15	38.05	37.87	37.4	36.95

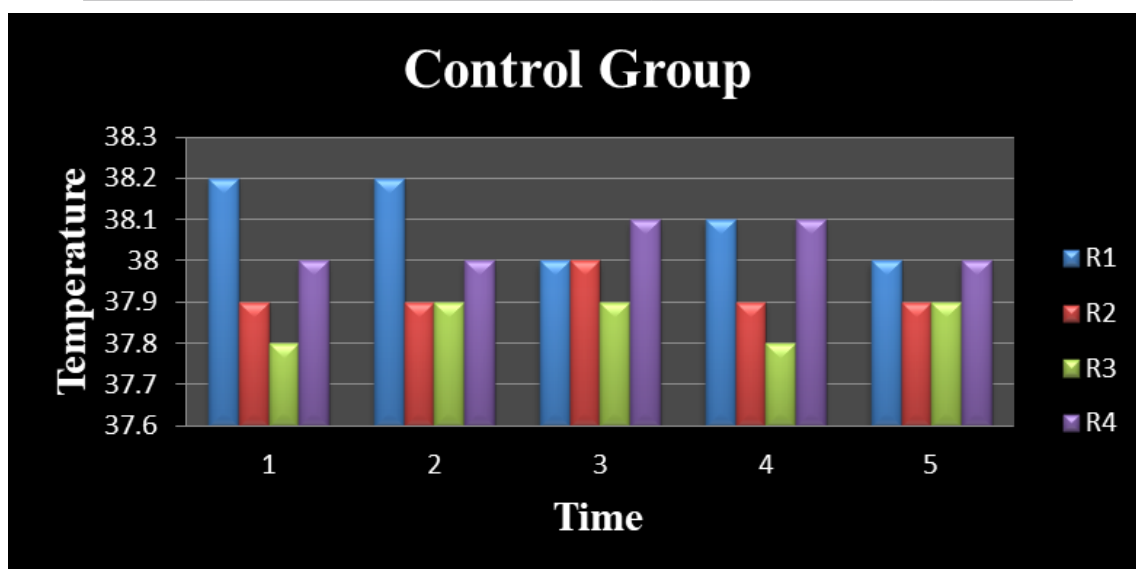


Figure 1 Pattern of the temperature reduction of control group with time.

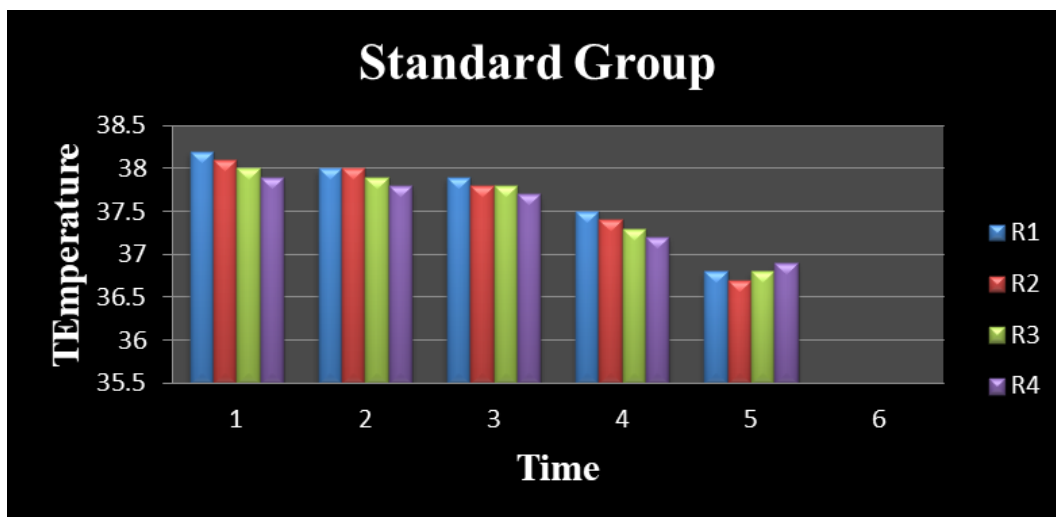


Figure 2 Pattern of the temperature reduction of standard group with time.

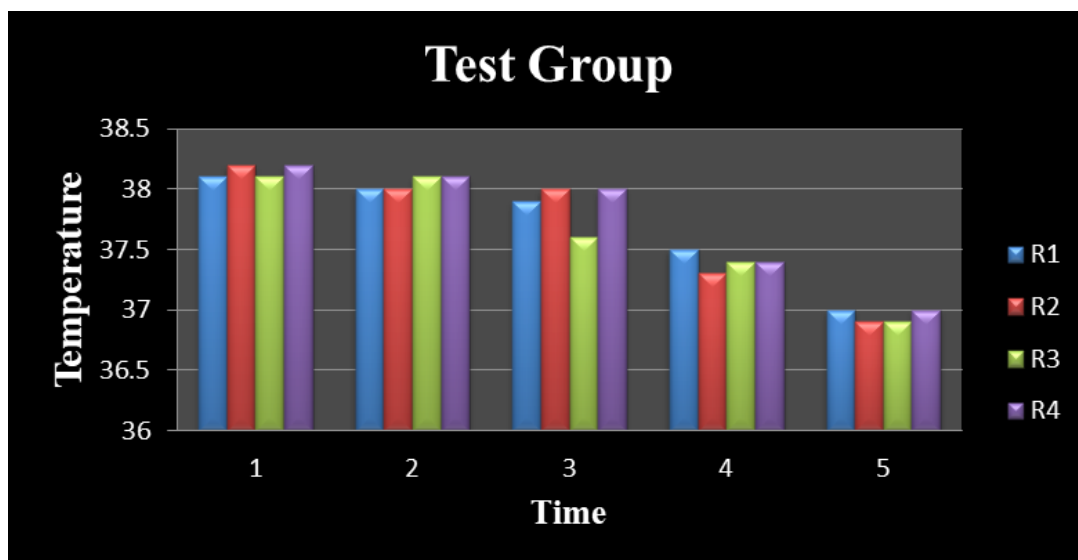


Figure 3 Pattern of the temperature reduction of Test group with time.

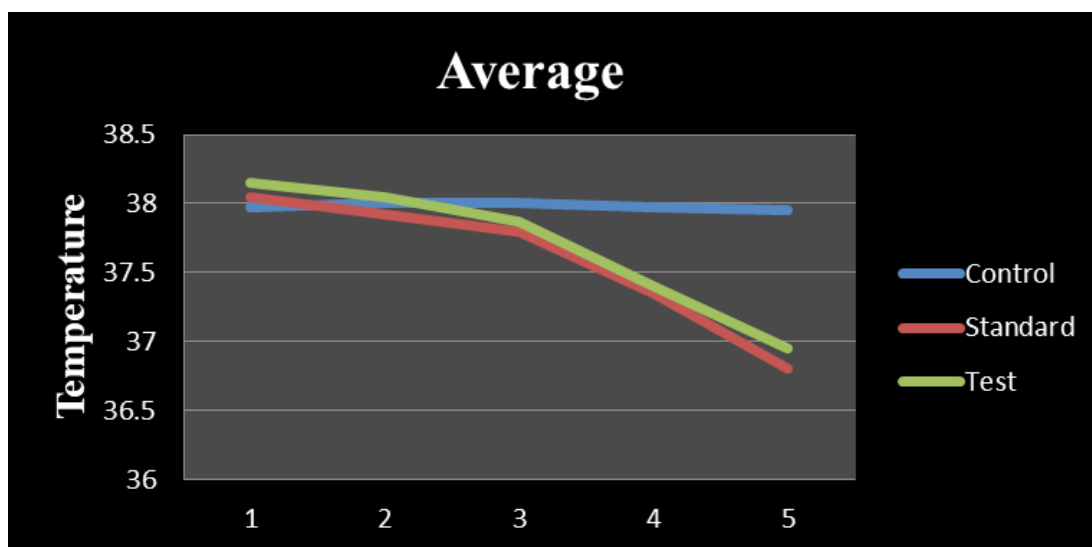


Figure 4 Average temperature decline with the time.

Discussion

As per siddha literature of Kunapadam *Moolihaivahuppu* - *Muthatpaakam*, *Porutpanpu nool*, *Plectranthus vettiveroides* root powder were mentioned for fever and it was made to do the above scientific studies. To cure the fever-the antipyretic action is playing a major role to treat the fever. Therefore the researcher did the above scientific study. Fever is usually a sign that something out the ordinary is going on in the body. But in siddha medicine it is a disease. For an adult, a fever may be uncomfortable, but fever usually is not dangerous unless it reaches 103°F (39.4°C) or higher. For very young children and infants, a slightly elevated temperature may indicate a serious infection. But the degree of fever does not necessarily indicate the seriousness of the underlying condition. A minor illness may cause a high fever, and a more serious illness may cause a low fever. Oral temperature in cohort ranged from 35.6°C (96.0°F) to 38.5°C (100.8°F) with a mean of 36.8± 0.4°C (98.2±0.7°F). Rectal temperature are generally 0.6°C (1.0°F) higher than oral readings. The normal daily temperature variation is typically 0.5°C (0.9°F).

Effectiveness is explained on the basis of *Rasa*, *Veeriya*, *Vipaka*, action and properties of selected plant. According to Siddha, derangement of *Pitha* causing fever. The plant *Plectranthus vettiveroides* has the properties of bitter taste, cold potency, and sweet resultant. The plant is *seethaveeriyam* and sweett *vipakam*. *Seetha Veerya* which helps in pacification of aggravated *Pitha*, and reduced the body temperature. Sweet resultant also helps in pacify th e pitham and made the body temperature to normal level. Suram reduced under the condition of cold potency and sweett resultant of this plant. Above explanations has been supported by the results obtained from this study.

Conclusion

The *Plectranthus vettiveroides* root infusion showed marked antipyretic activity compared to control group. Through the result the quotation which was mentioned in the *Porutpanpu nool* (part 1) about *Plectranthus vettiveroides* was proven by the experimental study.

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None.

Conflicts of interest

Author declares that there are no conflicts of interest.

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