



Research Article

SCREENING OF HEAVY METALS IN *THURUSU VAIPPU* (COPPER SULPHATE) - A SIDDHA PREPARATION

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ABSTRACT

The Siddha system of medicine is one of the six recognized systems in the Indian system of medicine. The medicines comprise herbals, minerals, metals, and animal origins. *Thurusu* (Copper Sulphate) is a naturally occurring inorganic compound, but it can be prepared synthetically as per the procedures present in the Siddha literature as *Vaippu muraigal*. It is used in Siddha medicine as a single drug or in combination drugs after the detoxification process, which is termed as "*Suthimurai*" particularly incorporated for Schedule E drugs, which are listed in the Drugs and Cosmetics Act of 1940. Therapeutically, administered in the form of *Parpam*, *Chenduram* and externally applied to cure even chronic wounds. In this study, *thurusu* prepared as per *Vaippu murai* to assess the concentration of heavy metals present in the drug. The preparations are based upon the Siddha literature "*Bogarsarakkuvaippu-800*". The heavy metals present in the *Thurusu vaippu* were analysed and the results showed the presence of heavy metals below the detection limit, but copper (350.125mg/l) and sulphur (471.204 mg/l) are present above the limit of the pharmacopoeial laboratory for Indian medicine (PLIM) guideline. Further processing of *Suthimuraigal* determines the concentration level of *Thurusu vaippu* for therapeutic purposes. Further research on *Thurusu vaippu* which paved the way to standardize the *Thurusu vaippu muraigal*.

INTRODUCTION

The Siddha system of medicine is one of the prehistoric medical systems practiced in the southern part of India, especially in Tamil Nadu. The system was established by the Siddhars by their divine nature. The Siddha system is one of the six recognized systems in the Indian system of medicine. Herbs, minerals, metals, and animal origins are used in the medicines, which are derived from the natural environment. The raw materials (plants, metals, minerals) were a mixture of impurities, toxins and unwanted substances. Hence, to promote and introduce their use for medicine, such materials are purified and detoxified as per Siddha literature. Metals have been used as therapeutics to cure acute and chronic diseases, since time immemorial. [1]

*Thurusu* is a Siddha term, also known as copper sulphate (CuSO<sub>4</sub>), used after detoxification as a single drug or one of the ingredients in some metallo mineral formulations. It is widely used for external applications and internal medicine. *Thurusu parpam* and *Thurusu chenduram* are used for internal administration to treat a various diseases.[2] *Mathan thailam* (external application) is used for diabetic ulcerative wound healing.[3] *Thurusu* is an inorganic compound naturally found in the environment. If the substance is not available in nature, it can be artificially prepared as per Siddha literature. This methodology was named "*Vaippu muraigal*" in the Siddha system of medicine. The present study aimed to assess the heavy metals present in the *Thurusu vaippu* to determine a further process of detoxification as per the Siddha concept.

MATERIALS AND METHODS

*Thurusu vaippu* is mentioned in the Siddha literature "*Bogarsarakkuvaippu-800*" written by Siddhar "*Bogar*". The measurements of the contents of *Thurusu vaippu* are mentioned as per the literature.

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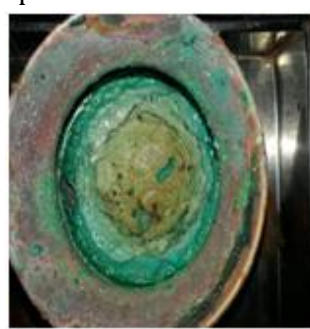
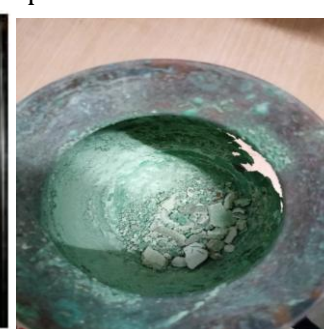
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**Table 1: Contents of *Thurusu vaippu***

Contents	Quantity
Copper vessel	211grams
<i>Padigaram</i> (Aluminium potassium sulphate (Alum))	106 grams
<i>Vediuppu</i> (Potassium nitrate)	106 grams
<i>Kalluppu</i> (Sodium chloride)	106 grams
<i>Thayir</i> (Curd)	½ litre
<i>Elumitchai saaru</i> (Lemon juice)	200ml

**Method of Preparation**

The copper vessel, weighing about 211 grams, is taken for the preparation. Fig.1 shows the ingredients of purified *Padigaram*, purified *Vediuppu*, purified *Kalluppu*, *Thayir*, and *Elumitchai saaru*. Fig. 2 shows the top of the vessel closed with a copper lid. Enough care is taken to seal it tightly with *Seelai* (a soil smeared cloth) rolled up into seven layers. Then it was placed beneath the surface of the ground and covered entirely with soil for six months. Fig.3 shows the preparation was taken out of the ground after six months. Fig. 4 shows the end product of *Thurusu vaippu*. Further, the compound was included in the process of *Suthi murai* as per the Siddha literature.

**Fig.1****Fig.2****Fig.3****Fig.4****RESULTS**

The content of macro, micronutrients and trace elements were analysed and the results of each element are listed in Table 2.

**Table 2: Heavy metal analysis report of *Thurusu vaippu***

Heavy metals (nm)	Concentration
As 188.979	BDL
Cd 228.802	BDL
Cu 327.393	350.125 mg/L
Fe 238.204	BDL
Hg 253.652	BDL
Ni 231.604	BDL
Pb 220.353	BDL
P 213.617	36.307 mg/L
S 180.731	471.204 mg/L

**DISCUSSION**

The Siddha system of medicine uses heavy metals and minerals in the preparation of medicines after purification and detoxification.<sup>[4]</sup> It is termed *Suthimurai* (purification), particularly incorporated for Schedule E drugs, which are listed in Drugs and Cosmetics Act of 1940.<sup>[5]</sup> The Siddha system of medicine uses lead, arsenic, gold and mercury heavy metals more predominately than other Indian systems.<sup>[6]</sup> Some heavy metals such as manganese, zinc, copper and iron are required by the human body in which they interfere with the metabolic function of the body through various means.<sup>[7]</sup> A *Thurusu* (copper sulphate) is a metallo mineral compound used internally in the form of *Parpam*, *Chenduram*, to cure

diseases. It is one of the ingredients in external medicines such as *Kayathirumeni* oil and *Mathan thailam*, which are used to treat arthritis pain and diabetic foot ulcers.<sup>[3,8]</sup> It is evidenced from previous studies that topical copper sulphate stimulates closure of excisional murine dermal wounds by the healing process.<sup>[9]</sup> *Thurusu* was predominantly used in Siddha for medicine preparations. The *Thurusu* compound was prepared synthetically named as *Thurusu vaippu* by the process of *Vaippu muraigal* to compensate for insufficiency of the naturally occurring *Thurusu* compound. The present study evaluated heavy metal analysis of *Thurusu vaippu*, the result showed the concentration of copper and sulphur was beyond the

detection limit and other heavy metals were below the detection limit as mentioned in the pharmacopoeial laboratory for Indian medicine (PLIM) guideline.<sup>[10]</sup> It is evidenced from the previous literature that unpurified *Thurusu* has an increased level of copper and sulphur when compared to purified *Thurusu*, the level was altered after the process of *Suthimuraigal* mentioned in the Siddha literature.<sup>[11]</sup>

### CONCLUSION

According to the findings of the study, heavy metal analysis of *Thurusu vaippu* revealed that the concentrations of heavy metals copper and sulphur were above the detection limit, while other heavy metals were below the detection limit according to PLIM guidelines. Further process of *Suthimuraigal* should be carried out to reduce the concentration of heavy metals for the use of medicinal preparations. The study recommended further studies should be conducted in the future to standardize *Thurusu vaippu muraigal*.

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