

## AN ASSESSMENT OF VEERYA BY EXOTHERMIC AND ENDOTHERMIC REACTIONS OF TRAYUSHANA:- SHUNTI RHIZOME (*ZINGIBER OFFICINALE ROSCOE*), MARICHA FRUIT (*PIPER NIGRUM LINN*), PIPPALI FRUIT (*PIPER LONGUM LINN*) CHURNA" AN EXPERIMENTAL STUDY

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## ABSTRACT

In *Ayurveda*, *Dravya* plays a vital role in the treatment and *Dravya* has been positioned in second prime place in the *Chikitsta Chatushpada*. The therapeutic efficacy of *Dravya* depends on its *Rasa-Panchaka*, especially *Veerya*. *Veerya* is the potency of a *Dravya* that allows the *Dravya* to exhibit its action. It is the ultra-chemical action of the drug and it can be found in two kinds: 1. *Usna Veerya* (Hot in potency), which is *Vata-Kapha Doshahara* and 2. *Shita Veerya* (Cold in power) is *Pitta Doshahara*. Hence *Veerya* of *Dravya* has significant role in treatment. To determine the potency of drug, the concept of Endothermic and Exothermic reactions play an imperative role. In this experiment, *Trayushana*: - *Shunti*, *Maricha*, *Pippali* also known as *Trikatu*, the three indispensable drugs used in *Ayurveda* were taken for the assessment of *Veerya*. Results of this study demonstrated the *Usna Veerya* property of *Shunti* and *Maricha* and *Anushna Veerya* property of *Pippali*.

**Key words:** *Dravya*, *Veerya*, *Trayushana*, Exothermic and Endothermic reactions

## INTRODUCTION

The potency of *Dravya* allows the *Dravya* to manifest its action which is known as *Veerya*<sup>1</sup>. If *Dravya* is *Nirveerya* then no pharmacological action in *Dravya* is observed. Hence in order to determine the *Veerya* in any *Dravya* the experimental knowledge of exothermic and endothermic reactions is essential.

*SHUNTI*, *MARICHA*, *PIPPALI* these three collectively are known as *TRAYUSHANA* (*Trikatu*). The botanical name of *SHUNTI* is *Zingiber officinale* Roscoe and belongs to family *Zingiberaceae*, It is an erect perennial herb with aromatic rhizome, having *Katu Rasa*, *Guru*, *Ruksha*, *Tikshna Guna*, *Usna Veerya*, *Madhura Vipaka*, *Vata-Kapha Doshahara Karma*<sup>2,3,4</sup>. Botanical name of *MARICHA* is *Piper nigrum* Linn and belongs to family *Piperaceae*. It is a climbing perennial shrub with stout branches, fruits are globose and grow in long clusters, green color when tender, bright red on ripening and black on drying. *Maricha* has *Katu Rasa*, *Laghu*, *Tikshna*, *Sookshma Guna*, *Usna Veerya*, *Katu Vipaka* and *Kapha Vata Doshahara Karma*<sup>5,6,7</sup>. Botanical name of *PIPPALI* is *Piper longum* Linn and belongs to family *Piperaceae*. It is an aromatic slender climber; fruits are yellowish orange, fleshy pink. Fresh fruit of *Pippali* has *Madhura Rasa*, *Shita Veerya*, *Madhura Vipaka*, *Shita*, *Snigdha Guru Guna* and is *Kaphakara*, *Pittashamaka*. Dry fruits of *Pippali* have *Katu Rasa*, *Laghu Snigdha Guna*, *Usna Veerya*, *Madhura Vipaka* and *Vata Kapha Doshahara Karma*<sup>8,9,10</sup>.

The Exothermic reactions are those chemical process that release energy as Heat, Light or Sound. Exothermic reaction can occur on instinct and result in the system possessing a higher level of unpredictability or Entropy ( $+\Delta S > 0$ ) in the laboratory, exothermic process produce heat or may even be explosive. They are denoted by a negative heat flow. Heat is lost to the environment, resulting in a drop in enthalpy ( $+\Delta H < 0$ ) in the laboratory.

There are other chemical reactions are known as Endothermic reactions, which requires an absorption of energy to continue. Endothermic reactions do not

occur by themselves, they need power to happen. A temperature drop is observed during endothermic reactions when they absorb energy; the unique features of endothermic reactions are positive heat flow (into the reaction) and an increase in enthalpy ( $++\Delta H$ )<sup>11</sup>.

## OBJECTIVE:

To assess *Shita Veerya Dravya* on the basis of endothermic reactions and *Usna Veerya Dravya* by exothermic reactions and compare observed parameters obtained by experiment.

## MATERIALS AND METHODS

### EXOTHERMIC AND ENDOTHERMIC REACTIONS FOR VEERYA ANALYSIS PROCEDURE:

Dry samples of *Trayushana*; *Shunti*, *Maricha*, *Pippali* were procured and authenticated from the Department of *Dravyaguna*, GAMC Bengaluru-09. 50ml of Distilled water was taken separately in 3 identical glass beakers and initial temperature of the same were noted down at a gap of 2 minutes for three times in each beaker. Then 5 grams of each *Shunti* (*Kanda*), *Maricha*(*Phala*), *Pippali*(*Phala*) *Sukshma Churna* were added to beakers respectively and kept soaked for 2 minutes and change in temperature was noted after soaking at 2 minutes intervals i.e, 2 min, 4 min and 6 min.

### METHOD OF OBSERVATION

A handheld digital thermometer of ST-9283B ‘Multi-Thermometer’ was selected for the measurement of temperature as it gives an accurate reading. It had a stainless-steel sensor probe with 100cm wire. 10ml of distilled water taken first in all beakers, probe of thermometer introduced in water sample and instrument switched on at different time interval at 2min, 4min, 6min. and initial temperature was noted at mentioned time. Further samples were added to three separate water containing beakers, kept soaked for 2 minutes and then probe of thermometer was introduced, the reading of temperature of each sample were noted at difference of 2min, 4min and 6min<sup>12</sup>

**TABLE 1:-**

Change in temperature upon immersion of Trayushana: - Shunti, Maricha, Pippali.

Sample	Temperature of medium [Distilled water] ( <sup>0</sup> c)			Temperature of Medium + soaked sample ( <sup>0</sup> c)		
	After 2minutes	After 4 minutes	After 6 minutes	After 2 minutes	After 4 minutes	After 6minutes
<i>Shunti</i>	26.9	26.9	26.9	26.9	27.1	27.1
<i>Maricha</i>	26.9	26.9	26.9	26.9	26.9	27.2
<i>Pippali</i>	26.9	26.9	26.9	26.5	26.9	26.9

**FIGURES:-**

Digital thermometer and its readings of samples in the experiment

1. *Shunti*



a.2min



b.4min



c.6min

2. *Maricha*



a.2min



b.4min



c.6min

3. *Pippali*



a.2min



b.4min



c.6min

**RESULT:**

- Sample of *Shunti* showed constant temperature as that of medium at 2 min and an increase of 0.2<sup>0</sup> C at 4 min and 6 min.
- Sample of *Maricha* showed constant temperature at 2 min and 4 min as that of medium and increase of 0.3<sup>0</sup>C at 6 min.
- Sample of *Pippali* showed initial decrease in temperature of 0.4<sup>0</sup>C at 2 min when compared to the medium and remained constant as that of medium at 4 min and 6 min.

## DISCUSSION

Considering the above-shown results, this experiment demonstrates the *Usna Veerya* property of the *Dravya Shunti* and *Maricha*. The results of the *Dravya Pippali* also demonstrate its *Anushna Veerya*, which signifies that it is neither hot nor cold in its potency. Initial decrease of  $0.4^{\circ}\text{C}$  at 2 min and slight increase in the readings of the soaked sample of *Pippali* at 4 min and 6 min (to the temperature of medium i.e.,  $26.9^{\circ}\text{C}$ ) indicated its *Anushna Guna*. This experiment can be taken as supportive data for the classical description of *Veerya* and decoding the concept of *Veerya* based on modern scientific parameters, so this study can be proposed to other *Usna Veerya Dravya*, which may also exhibit exothermic reaction and *Sheetha Veerya Dravya* exhibit endothermic reaction. Evaluation of *Veerya* of other pharmacopoeial drugs and extra-pharmacopoeial drugs can be elicited from this particular method of *Veerya* analysis experiment.

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