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Endothermic reaction for *Veerya* analysis of *Patranga* (*Caesalpinia sappan* linn.) - An Experimental Study

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ABSTRACT

Background: *Patranga* (*Caesalpinia Sappan* Linn.*)* is having *Kashaya, Tikta, Madhura Rasa, Ruksha Guna, SheetaVeerya, Katu Vipaka, Kapha Pitta Shamaka. Kaiyadeva Nighantu* mentions it under *Chandanadi Varga* and is useful in diseases like *Vrana* (wound) and *Daha* (burning sensation). Among *Rasa, Guna, Veerya, Vipaka, Karma- Veerya* is important factor in deciding therapeutic efficacy of the drug. *Veerya* means the potency of a *Dravya* which enables the *Dravya* to show its action. It is considered as the active principle of a *Dravya*. If the potency of the drug is less, it results in poor therapeutic action. So *Veerya* of the drug plays important role in Ayurvedic treatment principles. **Objective:** To analyze the *Veerya* of the drug by endothermic reactions. **Materials and Methods:** An experimental trial is done to decide the *Veerya* of *Patranga* (*Caesalpinia Sappan* Linn.*)* by using endothermic *Veerya* analysis method. **Result:** *Patranga* (*Caesalpinia Sappan* Linn.*)* being *Sheeta Veerya Dravya* shown endothermic reaction when mixed in water. **Conclusion:** Endothermic chemical reactions occur which reduce temperature. The theory behind decrease in the temperature can be stated due to *Sheeta Veeryata* of the *Dravya*.

Key words: *Patranga, Caesalpinia sappan linn., Sheeta Veerya, endothermic.*

INTRODUCTION

The etymology of the word *Veerya* is from "*Veera Vikrantau Dhatu*".[1] The energy which performs an action via drug is *Veerya* (potency) of the drug. *Veerya* acts as an instrument by which the drug action is observed.[2] The substance can exert no action in absence of *Veerya* and as such all actions are exerted due to *Veerya.*[3] Many chemical reactions release energy in the form of heat, light, or sound and some reactions must absorb energy in order to proceed. Chemical reactions that absorb (or use) energy are called endothermic. In endothermic reactions, more energy is absorbed when the bonds in the reactants are broken than is released when new bonds are formed in the products. When energy is absorbed in an endothermic reaction, the temperature of the reaction mixture decreases. One can monitor changes in temperature by placing a thermometer in the reaction mixture.

Enthalpy is the heat content of a system. The heat that is absorbed or released by a reaction at constant pressure is the same as the enthalpy change and is given the symbol ΔH. If the reaction is endothermic then the enthalpy change is positive. This is because less energy is released when the products are formed than the energy is used to break up the reactants.

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ΔH = energy used in reactant bond breaking + energy released in product bond making.

Patranga (*Caesalpinia sappan* Linn.*)* is mentioned under *Chandanadi Varga* in *Kaiyadeva Nighantu.* It is having *Kashaya, Tikta, Madhura Rasa, Ruksha Guna, Sheeta Veerya, Katu Vipaka, Kapha Pitta Shamaka* action and is useful in diseases like *Vrana* (wound), *Daha* (burning sensation), *Raktapradara* (menorrhea) *Kushtha* (skin ailments), *Rakta Pitta* (bleeding disorder).[4] Hence this drug is selected to check the relation of *Sheeta Veerya* and endothermic reaction.

Materials and Methods

Endothermic reaction for *Veerya* analysis

Procedure

In two beaker of 200 ml capacity, 100 ml of distilled water taken and initial temperature of each beaker was noted down by using thermal scanner. *Patranga* heart wood powder of 25 grams is added to first beaker and stirred well with the help of a glass rod for proper mixing of powder in water and changes in the temperature of both beakers along with atmosphere temperature were noted down after 1 minute, 5minute, 20minute 30minute, 1 hour.

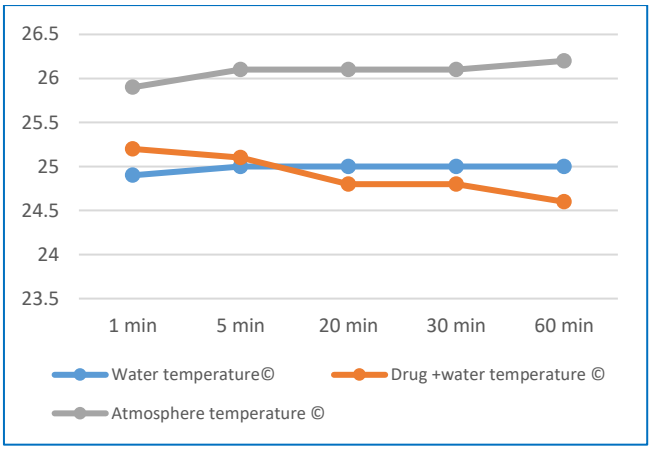
Observations and Results

Any changes in the temperature of distilled water and drug + distilled water along with atmosphere temperature is seen and noted.

Table 1: Endothermic reaction of *Patranga* (*Caesalpinia Sappan* Linn.)

Time	Water temperature (°C)	Drug + water temperature (°C)	Atmosphere temperature (°C)
1 min	24.9	25.2	25.9
5 min	25.0	25.1	26.1
20 min	25.0	24.8	26.1
30 min	25.0	24.8	26.1
60 min	25.0	24.6	26.2
Total change	+0.1	-0.6	+0.3

Figure 1: Temperature variation during the reaction.



Discussion

It is observed that there is decrease 0.1 °C temperature within 5 minutes of mixing *Patranga* with water. And from 5th minutes till 30th minute 0.3°C temperatures was decreased. Temperature of 0.2°C was decreased in between 30 minutes to 1 hour from the mixing. Total decrease of temperature is 0.6 °C. There is increase in 0.1 °C in comparator media and increase of 0.3 °C in atmosphere temperature.

In the initial 5 minutes there was least decrease in temperature, from 5th minutes till 30th minute there was maximum decrease in temperature and in last 30 minutes lowering of temperature was less. Even though temperature of atmosphere and comparator is increased, it is observed that the temperature of reactant mixture (*Patranga* with water) is decreasing. This can be understood as the reactant mixture is undergoing endothermic reaction. Which can be corelated to *Sheeta Veerya* of *Patranga.*

Conclusion

In the experimental study of endothermic reaction of *Patranga* (*Caesalpinia sappan* Linn.*)* following conclusions were drawn. The study shows that *Sheeta Veerya Dravya Patranga*, shows decrease of temperature significantly, that proves the presence of endothermic reaction, Hence the result parameter and observation data obtained by study is match with reference of classical *Ayurvedic* text. So, in last with

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completion of the aim and objective of study, hypothesis is proved.

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