

AN EXPERIMENTAL STUDY TO EVALUATE ENDOTHERMIC, EXOTHERMIC REACTIONS OF SHEETA AND USHNA VEERYA DRAVYA AND COMPOUNDS OF AYURVEDA

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ABSTRACT

Ayurveda drugs are selected for treatment based on the Rasa, Guna, Veerya, Vipaka and Prabhava. Ayurveda drugs shows Endothermic (Sheeta veerya Dravya) or exothermic reactions (Ushna veerya Dravya) when they come in contact with Jatharagni. Some dravya release energy making them exothermic reactions and become Ushna veerya dravya and on the contrary some dravyas exhibit endothermic reactions exhibiting Sheeta veerya. Chandana churna (sheeta veerya), Bhallataka churna (Ushna veerya), were single drug and Trikatu churna (Ushna veerya), usheera-lodhra (sheeta veerya) were compound selected for the study. Chandana churna (single drug) and Usheera- Lodhra (compound) exhibited endothermic reaction of total 1 degree and 0.7 Celsius decreases respectively. Bhallataka churna (single drug) and Trikatu churna (compound) exhibited exothermic reaction of total 1 degree and 0.7 Celsius increase respectively.

KEYWORDS: Sheeta veerya Dravya, Ushna veerya dravya, Endothermic reactions, Exothermic reactions.

INTRODUCTION

The fundamental principle of drug administration is based on the principles of rasa, guna, veerya, vipaka and prabhava in Ayurveda. Sheeta dravyas cause sthambhana in the body. Substances with cold potency generates pleasure (hladana), is arresting (stagnating/ sthambana) and are indicated in thirst fainting, burning sensation and excessive sweating in the body. Ushna dravyas cause dizziness, thirst, sweating and burning sensation and rapid digestion¹. The potency of a drug by which it performs its actions right from its ingestion till excretion is called as veerya.² From pharmacological point of view, cold substances are generally

anabolic whereas hot substances are catabolic¹. Sheeta dravyas by nature supposed to carry endothermic action and ushna veerya dravyas will carry exothermic reaction. The term endothermic process describes the process or reaction in which the system absorbs energy from its surroundings, usually in the form of heat. An exothermic reaction is a chemical reaction that releases energy by light or heat.³

OBJECTIVE OF THE STUDY

To evaluate endothermic and exothermic reactions of Sheeta veerya Dravya and Ushna

veerya dravya of Ayurveda medicinal drugs and compounds.

MATERIALS AND METHODS

Sl No	Name Of The Drug	Single Drug / Compound	Veerya
1	Chandana Churna ⁴	Single Drug	Sheeta Veerya
2	Bhallataka Churna ⁵	Single Drug	Ushna Veerya
3	Usheera ⁶ – Lodhra ⁷	Compound	Sheeta Veerya
4	Trikatu Churna ^{8,9,10}	Compound	Ushna Veerya

The following drugs of Sheeta veerya and Ushna Veerya, were selected for analysing the exothermic and endothermic reactions. The raw drugs were procured from Anamaya herbals, Udupi and authenticated in Department of Dravya guna, Shri Dharmasthala Manjunatheshwara college of

Ayurveda, Hassan. All drugs were powdered and stored in air tight containers.

Experimental study

Plain water method- 25ml plain water mixed with 25 grams of Drug to see the changes in temperature in normal conditions. Considering the acidic media of the digestive system, the experiments were also conducted with following acidic conditions.

1. 0.5 Hcl method- 25ml 0.5hcl mixed with 25 grams of Drug.

2. 1 Hcl method- 25ml 1 Hcl mixed with 25 grams of Drug.

The changes in the temperature were measured with digital thermometer in Celsius degree changes. The changes in the environment temperature and a standard comparator were also recorded for comparison and to obtain proper conclusions.

RESULTS

Sheeta Veerya Dravya - Chandana Churna

Table 1 – Temperature Changes observed in Celsius for Drug Chandana churna

	Drug + water	Drug + 0.5 HCl	Drug + 1 HCl
Immediately	24.2	24.4	24.7
After 5 min	24	24.3	24.6
After 30min	24	23.8	23.9
After 60min	23.5	23.6	23.7
Total temperature change	-0.7	-0.8	-0.9

	Atmosphere			Comparator		
	Water	0.5 HCl	1 HCl	Water	0.5 HCl	1 HCl
Immediately	24.1	24.1	24.1	23.5	23.6	23.7
After 5 min	24.1	24.1	23.9	23.5	23.6	23.8
After 30min	23.9	24.1	23.9	23.6	23.6	23.8
After 60 min	23.8	23.8	23.8	23.4	23.4	23.5
Total temperature change	-0.3	-0.3	-0.3	-0.1	-0.2	-0.2

USHNA VEERYA DRAVYA - BHALLATAKA CHURNA

Table 2 – Temperature Changes observed in Celsius for Drug Bhallataka churna

	Drug + water	Drug + 0.5 HCl	Drug + 1 HCl
Immediately	24.5	24.6	24.8
After 5 min	24.7	24.6	24.7
After 30min	24.7	25.1	24.9
After 60min	25.2	25	25.1
Total temperature change	+0.7	+0.4	+0.3

Time	Atmosphere			Comparator		
	Water	0.5 HCl	1 HCl	Water	0.5 HCl	1 HCl
Immediately	27.1	27.1	27	25.1	24.8	24.3
After 5 min	27.1	27.1	27.1	25	24.7	24.3
After 30min	27.1	27.1	27	25.2	24.8	24.4
After 60 min	27	27	26.9	25.2	24.8	24.5
Total temperature change	-0.1	-0.1	+0.1	+0.1	0	+0.2

SHEETA VEERYA COMPOUND - USHIRA-LODHRA

Table 3 – Temperature Changes observed in Celsius for Usheera- Lodhra compound

	Drug + water	Drug + 0.5 HCl	Drug + 1 HCl
Immediately	23.9	24.2	24.5
After 5 min	23.6	23.9	24.2
After 30min	23.3	23.8	23.9
After 60min	22.9	23.3	23.6
	-1.0	-0.9	-0.9

Time	Atmosphere			Comparator		
	Water	0.5 HCl	1 HCl	Water	0.5 HCl	1 HCl
Immediately	24.1	24.1	24.1	23.5	23.6	23.8
After 5 min	24.1	24.1	24.1	23.5	23.6	23.8
After 30min	24	24	23.9	23.6	23.6	23.7
After 60 min	23.9	23.9	23.9	23.5	23.6	23.7
Total temperature change	-0.2	-0.2	-0.2	0	0	-0.1

USHNA VEERYA COMPOUND - TRIKATU CHURNA

Table 3 – Temperature Changes observed in Celsius for Trikatu churna compound

	Drug + water	Drug + 0.5 HCl	Drug + 1 HCl
Immediately	24.8	24.9	25.1
After 5 min	25.0	25.0	25.2
After 30min	25	25.1	25.2

After 60min	25.1	25.0	25.5
	+0.3	+0.1	+0.4

	Atmosphere			Comparator		
	Water	0.5 HCl	1 HCl	Water	0.5 HCl	1 HCl
Immediately	25.9	25.8	25.7	24.6	24.6	24.8
After 5min	25.6	25.9	25.9	24.7	24.7	24.8
After 30min	26.2	26.2	26.2	25.0	25.0	25.0
After 60 min	26.1	25.8	26.1	25.2	25.2	25.1
	+0.2	0	+0.4	+0.6	+0.6	+0.3

DISCUSSION

Sheeta Veerya Draavya – Chandana

It was observed that there was 0.2degree decrease in temperature of the drug after 5min of mixing Chandana churna with plain water, after 30 min had same temperature as previous and 0.7 degree after 60min of mixing. There is decrease in 0.3degree in the atmospheric temperature and 0.1 decrease in the comparator temperature in 60min.

It is observed that there was 0.1degree decrease in temperature of the drug after 5min of mixing with 0.5 HCL, after 30 min 0.6degree decrease in the temperature and 0.8degree after 60min of mixing. There is decrease in 0.3degree in the atmospheric temperature and 0.2degree increase in the comparator temperature in 60min.

It is observed that there was 0.1degree decrease in temperature of the drug after 5min of mixing with 1.0 HCL, after 30 min 0.8degree decrease in the temperature and -1degree after 60min of mixing. There is decrease in 0.3degree in the atmospheric temperature and 0.2degree increase in the comparator temperature in 60min.

It is noticed that there is gradual decrease in the temperature of drug mixture in which maximum decrease is noticed in last 30min. whereas there is minimum decrease in the atmospheric temperature and comparator

temperature. It implies that the drug has endothermic action.

Ushna Veerya Draavya –

It is observed that there was 0.2degree increase in temperature of the drug after 5min of mixing Bhallathaka churna with plain water, after 30 min 0.2degree increase in the temperature and 0.7degree after 60min of mixing. There is decrease in 0.1degree in the atmospheric temperature and 0.1degree increase in the comparator temperature in 60min.

It is observed that there was no change in temperature of the drug after 5min of mixing with 0.5 HCL, after 30 min 0.5 degree increase in the temperature and 0.4degree after 60min of mixing. There is decrease in 0.1degree in the atmospheric temperature and no change in the comparator temperature in 60min.

It is observed that there was 0.1degree decrease in temperature of the drug after 5min of mixing with 1.0 HCL, after 30 min 0.1degree increase in the temperature and 0.3degree after 60min of mixing. There is increase in 0.1degree in the atmospheric temperature and 0.2degree increase in the comparator temperature in 60min.

It is noticed that there is gradual increase in the temperature of drug mixture in which maximum decrease is noticed in last 30min

whereas there was decrease in the atmospheric temperature and minimum increase comparator temperature. It implies that the drug has exothermic action.

Sheeta Veerya Compound - Ushira-Lodhra

It is observed that there was 0.3degree decrease in temperature of the drug after 5min of mixing Usheera - Lodhra churna with plain water, after 30 min 0.6degree decrease in the temperature and 1degree decrease after 60min of mixing. There is decrease in 0.2degree in the atmospheric temperature and 0degree change in the comparator temperature in 60min.

It is observed that there was 0.3degree decrease in temperature of the drug after 5min of mixing Usheera - Lodhra churna with 0.5HCl, after 30 min 0.4degree decrease in the temperature and 0.9degree decrease after 60min of mixing. There is decrease in 0.2degree in the atmospheric temperature and 0degree change in the comparator temperature in 60min.

It is observed that there was 0.3degree decrease in temperature of the drug after 5min of mixing Usheera - Lodhra churna with 1HCl, after 30 min 0.6degree decrease in the temperature and 0.9degree decrease after 60min of mixing. There is decrease in 0.2degree in the atmospheric temperature and 0.1degree decrease in the comparator temperature in 60min.

This implies endothermic reaction of the drug. It is noticed that there is gradual decrease in the temperature of drug mixture in which maximum increase is noticed in last 30min whereas comparatively there was less decrease in the atmospheric temperature and in the comparator temperature. It implies that the drug has endothermic action.

Ushna Veerya Compound - Trikatu Churna

It is observed that there was 0.2degree increase in temperature of the drug in the initial 30min of mixing Trikatu churna with plain water, after 60 min 0.3degree increase in the temperature. There is increase in 0.2degree in the atmospheric temperature and 0.6degree increase in the comparator temperature in 60min.

It is observed that there was 0.1degree increase in temperature of the drug after 5min of mixing Trikatu churna with 0.5HCl, after 30 min 0.2degree increase in the temperature and 0.1degree increase after 60min of mixing. There is decrease in 0.3degree in the atmospheric temperature and 0.1degree increase in the comparator temperature in 60min.

It is observed that there was 0.1degree increase in temperature of the drug after 5min of mixing Trikatu churna with 1HCl, after 30 min 0.1degree increase in the temperature and 0.4degree increase after 60min of mixing. There is increase in 0.4degree in the atmospheric temperature and 0.3degree increase in the comparator temperature in 60min.

It is noticed that there is gradual increase in the temperature of drug mixture in which maximum increase is noticed in last 30min. there was increase in atmospheric temperature and comparator temperature also. It implies that the drug has exothermic action.

CONCLUSION

1. Chandana churna (Single drug) and Usheera- Lodhra (compound) showed endothermic reactions.
2. Bhallataka churna (Single drug) and Trikatu churna (compound) showed exothermic reactions.

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