

Study the Changes in Qualities of River Water According to Shad-Rutu W.S.R. to Sushruta Samhita

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Abstract:

Water is a basic need of human beings. It is essential either directly or indirectly to almost all activities of man. It has great role to play in socio-economic development of human population. It is most essential for agriculture, domestic animals, and poultry, for drinking purposes and for household purposes like cleaning utensils. Environmental changes may affect on water qualities according to Shad rutu. This changes in quality further guides us about what kind of treatment should be applicable for water to make it wholesome or pure or safe for drinking. So to find out the changes in qualities of water source according to shud rutu this topic has been selected.

Keywords: Shad Rutu, River, Water

INTRODUCTION

Water is a basic need of human beings. It is essential either directly or indirectly to almost all activities of man. It has great role to play in socio-economic development of human population. It is most essential for agriculture, domestic animals, and poultry, for drinking purposes and for household purposes like cleaning utensils.

The main functions of Jala are Jeevana, Tarpana, Hridya, Buddhi prabodhana, Sheet etc. Without water there is no acuity in both the healthy and the diseased person. Water is the sustainer of life for all living being. It is the principle chemical constituent of the body composing approximately 55-65% of the body weight of an adult.

Acharya Sushrut has mentioned two basic sources of water.

1. Divya Jala
2. Bhoumya Jala

In Divya Jala he explained changes in qualities of water according to Shad rutu in detail.

Bhoumya Jala is further divided into seven sources

तत् पुनः सप्त विधम् ॥

तद्यथा कौपं , नादेयं , सारसं , ताडाग् ॥

प्रास्त्रवणम् , औद्भिदं , चौण्ड्यमिती ॥ सु. सु.४५/७

He also defined the qualities of above seven sources of water in detail after this he mentioned the best source of water in Shud rutu

तत्र वर्षास्वान्तरिXऔद्विद् वा सेवेत, महामुण् त्वात् ॥

शरदि सर्व, प्रस्नत्वात् हेमते सारसम् ताडागम् वा; वसन्ते कौ प्रास्त्रव वा; ॥

ग्रीYmaopooयवम्; प्रावृपि चौण्ड्य मनभिवृYT\ma\ सर्वच्चेति ॥ सु.सु. ४५/८९

During Varsa rutu atmospheric water or water from spring may be used, because of their profound good qualities, during Sharad rutu all kinds of water may be used because of being clear, during Hemant Rutu water of either natural lake or artificial lake may be used, during Vasant water of artificial tank or a spring may be used & in Grishma also in the same manner, during Pravrutta water collected in burrows & all other kinds which are not from rain may be used.

But there is no explanation of changes in qualities of bhauma jala according to Shud rutu in Sushrut Samhita as well as any other ayurvedic text.

Pure uncontaminated water does not occur in nature, It contains impurities of various kinds that is natural & manmade. The natural impurities are dissolved gases & dissolved minerals. A more serious aspect of water pollution is that caused by human activity urbanization & industrialization. The sources of pollution resulting from these are sewage ,Industrial & trade wastes, Agricultural products and Physical pollutants.

Environmental changes may affect on water qualities according to Shud rutu. This changes in quality further guides us about what kind of treatment should be applicable for water to make it wholesome or pure or safe for drinking. So to find out the changes in qualities of water source according to shud rutu this topic has been selected.

For this Research project only 1 water source has been selected because use of these water source is maximum in India by population .

AIM :

❖ To study the changes in qualities of River water source according to Shad-Rutu.

OBJECTIVES :

❖ Comparative study of the qualities of River water according to Shad-Rutu.

MATERIAL & METHODOLOGY :

MATERIAL :

- ❖ Water – Raw water from River.
- ❖ Instruments –
 - Turbidimeter
 - Thermometer
 - Instruments for Titration
 - pH meter
 - Standard Glass fiber filter
 - Evaporation Apparatus
 - Instruments & reagents for MPN Method

INCLUSION CRITERIA

For water : River source will be taken.

EXCLUSION CRITERIA:

Other drinking water sources mentioned in samhita.

METHODOLOGY :

Study Design - Experimental Study

- ❖ Minimum 2 liter Water will be collected from River water source.
- ❖ Raw water sample will be immediately brought into laboratory for the estimation of various physical – chemical- bacteriological parameters as per laboratory requirement.
- ❖ Same procedure will be done in every rutu according to Ayurveda i.e. Varsha, Sharad, Hemant, Shishir , Vasant & Grishma.

PARAMETER FOR ASSESSMENT :

1. Ayurvedic Parameters-

- a) Gandha
- b) Shitata / Ushata
- c) Shudhi (Avilata)
- d) Rasa

2. Modern Parameters-

▪ Physical –

- a) Colour
- b) Odour
- c) Turbidity
- d) Temperature

▪ Chemical-

- a) Hardness
- b) pH
- c) Total suspended solids.
- d) Total dissolved solids.

▪ Microbiological-

Bacteriological Indicator (MPN)

CRITERIA FOR ASSESSMENT :

Assessment of water sample will be done according to above parameters & textual references.

OBSERVATION & RESULTS

A) Ayurvedic Parameters

Table no 1) Gandha

RUTU	RIVER
Varsha	Sgandha
Sharad	Nirgnadha
Hemant	Nirgandha
Shishir	Nirgandha
Vasant	Nirgandha

Grishma	Nirgandha
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Table no 2) Shudhi

RUTU	RIVER
Varsha	Heen
Sharad	Pravar
Hemant	Madhyam
Shishir	Madhyam
Vasant	Madhyam
Grishma	Madhyam

Table no 3) Shitata

RUTU	RIVER
Varsha	Shit
Sharad	Shit
Hemant	Shit
Shishir	Shit
Vasant	Shit
Grishma	Shit

Table no 4) Rasa

RUTU	RIVER
Varsha	Avyakta
Sharad	Avyakta
Hemant	Avyakta
Shishir	Avyakta
Vasant	Avyakta
Grishma	Avyakta

B) Physical Parameters

Table No5) Colour

RUTU	RIVER
Varsha	Turbid

Sharad	colourless
Hemant	colourless
Shishir	colourless
Vasant	colourless
Grishma	colourless

Table No 6) Odour

RUTU	RIVER
Varsha	Unobjectionable
Sharad	Unobjectionable
Hemant	Unobjectionable
Shishir	Unobjectionable
Vasant	Unobjectionable
Grishma	Unobjectionable

Table No 7) Turbidity

Turbidity in NTU	
	River
Varsha	4.9
Sharad	3.1
Hemant	3.4
Shishir	3.5
Vasant	3.8
Grishma	3.6
AVERAGE	3.72

Table No 8) Temperature

Temprature in °F	
	River
Varsha	97.1
Sharad	97.2
Hemant	97.2
Shishir	97.2
Vasant	97.3
Grishma	97.7
AVERAGE	97.28

C) Chemical Parameters

Table No 9) Hardness

Hardness in mg/L	
	River

Varsha	315
Sharad	252
Hemant	308
Shishir	309
Vasant	307
Grishma	305
AVERAGE	299.33

Table No 10) pH

pH	
	River
Varsha	7.3
Sharad	7
Hemant	7.1
Shishir	7.2
Vasant	7.3
Grishma	7.2
AVERAGE	7.18

Table No 11) Total Suspended Solids

T.S.S. in mg/L	
	River
Varsha	11.9
Sharad	9
Hemant	9.6
Shishir	9.5
Vasant	9.1
Grishma	9.2
AVERAGE	9.7

Table No 12) Total dissolved solids

T.D.S. in mg/L	
	River
Varsha	280
Sharad	223
Hemant	238
Shishir	235
Vasant	233
Grishma	230
AVERAGE	239.83

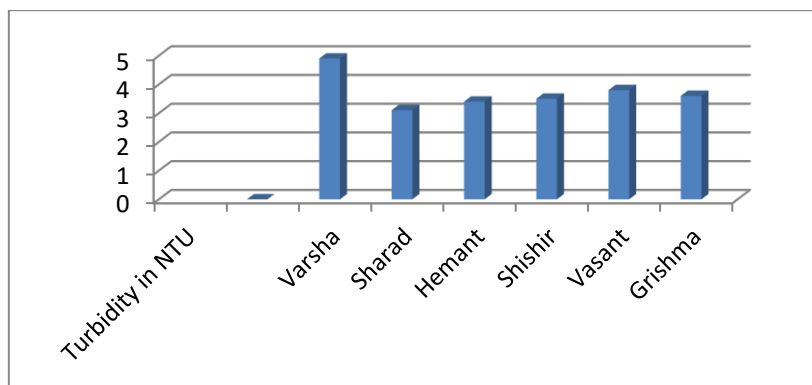
Table No 13) Microbiological – Bacteriological Indicator (MPN)

MPN / 100 ml	
	River
Varsha	595
Sharad	221
Hemant	395
Shishir	396
Vasant	400
Grishma	455
AVERAGE	410.33

Results –

1) Turbidity of River water in shad rutu

Turbidity in NTU	
	River
Varsha	4.9
Sharad	3.1
Hemant	3.4
Shishir	3.5
Vasant	3.8
Grishma	3.6
AVERAGE	3.72

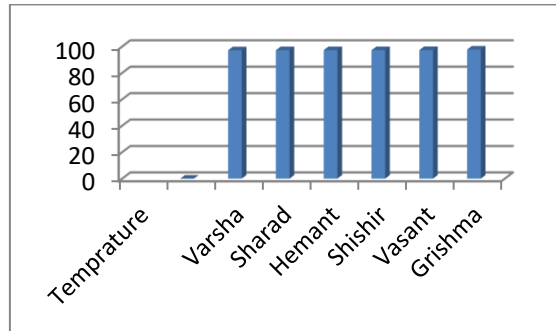


The Turbidity of River water is more in Varsha rutu and less in Sharad rutu.

2) Temperature of water according to three sources in shad rutu

Temprature	
	River
Varsha	97.1

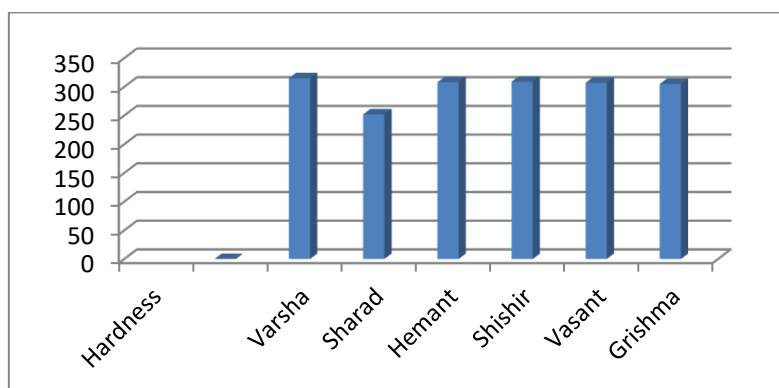
Sharad	97.2
Hemant	97.2
Shishir	97.2
Vasant	97.3
Grishma	97.7
AVERAGE	97.28



1) The Temperature of River water is more in Grishma rutu and less in Varsha rutu.

3) Hardness of water according to three sources in shad rutu

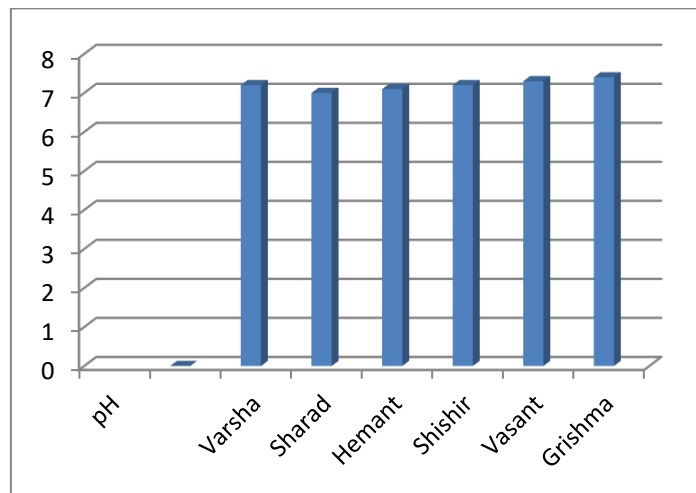
Hardness	
	River
Varsha	315
Sharad	252
Hemant	308
Shishir	309
Vasant	307
Grishma	305
AVERAGE	299.33



1) The Hardness of River water is more in Varsha rutu and less in Sharad rutu.

4) pH of water according to three sources in shad rutu

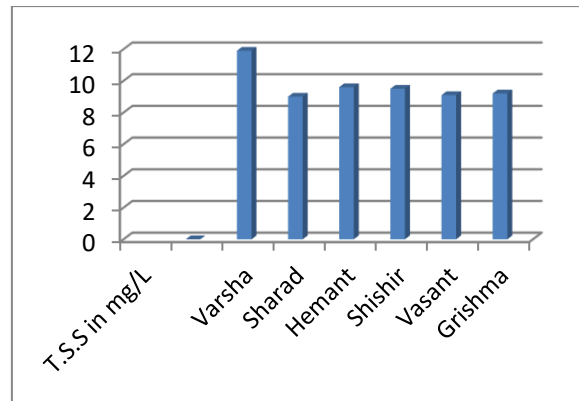
pH	
	River
Varsha	7.2
Sharad	7
Hemant	7.1
Shishir	7.2
Vasant	7.3
Grishma	7.4
AVERAGE	7.20



1) The pH of River water is more in Grishma rutu and less in Sharad rutu.

5) Total Suspended Solids of water according to three sources in shad rutu.

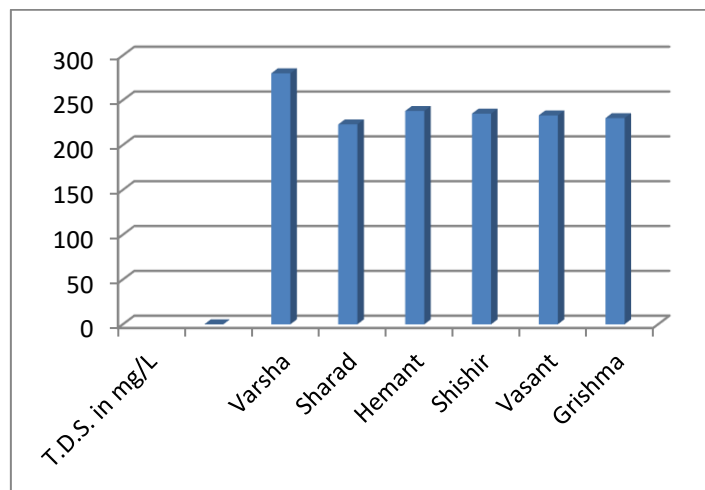
T.S.S in mg/L	
	River
Varsha	11.9
Sharad	9
Hemant	9.6
Shishir	9.5
Vasant	9.1
Grishma	9.2
AVERAGE	9.7



1) The T.S.S. of River water is more in Varsha rutu and less in Sharad rutu.

6) Total dissolved Solids of water according to three sources in shad rutu.

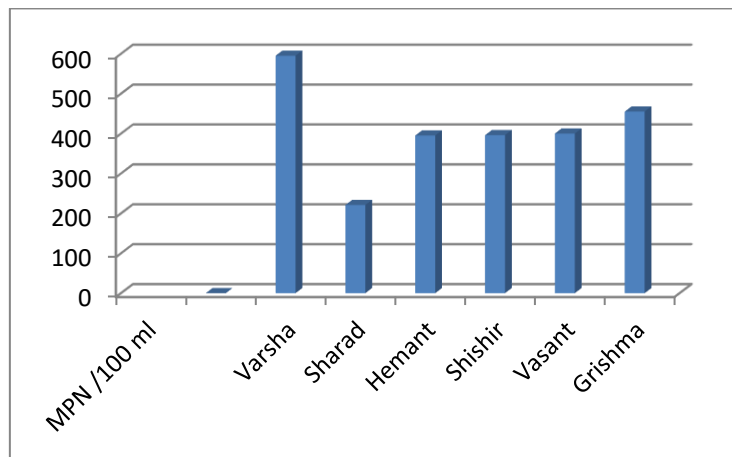
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	River
Varsha	280
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AVERAGE	239.83



1) The T.D.S. of River water is more in Varsha rutu and less in Sharad rutu.

7)MPN of water according to three sources in shad rutu.

MPN /100 ml	
	River
Varsha	595
Sharad	221
Hemant	395
Shishir	396
Vasant	400
Grishma	455
AVERAGE	410.33



1) The MPN of River water is more in Varsha rutu and less in Sharad rutu.

DISCUSSION

Water is lifeblood of the environment, essential to the survival of all living things Plant , animal and human and we must do everything possible to maintain it’s quality for today and the future.

DISCUSSION ON RESULTS

In the present study water sample were collected from River to assess their Physical, Chemical and Bacterial status.

As concern with ayurvedic parameters **table no 1 showed**

Gandha. During Varsha rutu River water contaminated a lot that’s why river water have gandha.

Table no 2 showed Shudhi during Varsha rutu River water is more contaminated because of rain so in Varsha rutu heen shudhi is seen and in Sharad rutu pravara shudhi is seen and in remaining rutus madhyam shudhi is seen.

Table no 3 showed Shitata. In every rutu all water become shit so River water in each rutu is shit.

Table no 4 showed Ras. Our samhita mentioned qualities of good water in that they mention Madhur and Kashya ras is good ras for drinking water. During Sharad ritu River water ras is madhur. Above mention ayurvedic parameters are subjective parameters. Now below mention parameters are objective parameters.

Table no 5 showed Colour. The colour of River water in Varsha ritu is turbid because in Varsha ritu lots of rain is going on so water of river is contaminated highly in other ritus colour of river water is colourless.

Table no 6 showed Odour. The odour of river water in all ritu is unobjectionable.

As concern with Turbidity in **table no 7** showed

The Turbidity of River water is more in Varsha ritu and less in Sharad ritu. From the above we can say that River water is so many contaminated. Varsha ritu lot of rain is going on so that during Varsha ritu river water contaminated highly. In Sharad ritu our samhita said that because of Agastya star all water become amrut like and in Sharad ritu sun rays in day time are perpendicular and in night time the moon rays are very cold so the water which is hot in day time it become very cold in night time. Sharad ritu is very good ritu for River water source.

As concern with Temperature in table no 8 showed. The Temperature of River water is more in Grishma ritu and less in Varsha ritu.

As concern with Hardness in table no 9 showed. The Hardness of River water is more in Varsha ritu and less in Sharad ritu.

As concern with pH in table no 10 showed. The pH of River water is more in Grishma ritu and less in Sharad ritu.

As concern with T.S.S. in table no 11 showed. The T.S.S. of River water is more in Varsha ritu and less in Sharad ritu.

As concern with T.D.S. in table no 12 showed. The T.D.S. of River water is more in Varsha ritu and less in Sharad ritu.

As concern with MPN in table no 13 showed. The MPN of River water is more in Varsha ritu and less in Sharad ritu.

CONCLUSION

By an intensive literary review and based on experimental work following conclusions are drawn

1. The experimental study uphold the Susrutas statements i.e., Qualities of drinking water sources changes according to shad ritu.
2. Qualities of River water is good in Sharad ritu and qualities are less in Varsha ritu.
3. Today's period and Samhita period environmental factors are very different, so in Samhita period water of any source during sharad ritu was used without any treatment for drinking but now a days its not safe because, today's environmental factors are different, lots of increasing population, Water pollution, Industrialization is going on so water of River source in any ritu for drinking purpose should not be used without appropriate treatment

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