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# STUDY THE CHANGES IN QUALITIES OF DRINKING WATER SOURCES 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.Environmental changes may affect on water qualities according to *Shudrutu.* 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 sources according to *shudrutu.*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.

**Key words:** *Shad rutu*,Water,River,Lake,Tube well

## 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, Buddhiprabodhana, 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. *DivyaJala*
2. *BhoumyaJala*

In *DivyaJala* he explained changes in qualities of water according to *Shad rutu* in detail.

*BhoumyaJala* is further divided into seven sources. He also defined the qualities of above seven sources of water in detail after this he mentioned the best source of water in *Shudrutu*

During *Varsarutu* atmospheric water or water from spring may be used, because of their profound good qualities, during *Sharadrutu* all kinds of water may be used because of being clear, during *Hemant Rutu* water of either natural lack 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 *bhaumajala* ac-

cording to *Shudrutu*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 & man-made. 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 *Shudrutu*. 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 sources according to *shudrutu*this topic has been selected.

For this Research project only 3 water sources has been selected because use of these three water sources is maximum in India by population .

**AIM:**

- ❖ To study the changes in qualities of water sources River, Lake & Tube well according to *Shad-Rutu.*

**MATERIAL:**

For this Research project only 3 water sources has been selected because use of these three water sources is maximum in India by population .

- ❖ Water – Raw water from 3 sources i.e. River, Lake & Tube Well.
- ❖ Instruments –
- Turbiditimeter
- Thermometer
- Instruments for Titration
- pH meter
- Standard Glass fiber filter
- Evaporation Apparatus
- Instruments & reagents for MPN Method

**Methodology**

Study Design - Experimental Study.

For this study we had choose 3 sources i.eRiver , Lake & Tube well. In whole year study chosen 6 season i.e*Varsha ,Sharad , Hemant, Shishir, Vasant &Grisma* which is explained in *Sushrut-samhita.*In Each season collection of sample done by following method. In *Varsha , Sharad , Hemant, Shishir, Vasant &Grisma* testing was done in Environemental Science Dept. of renowned university.Sample are collected from River , Lake & Tube well water sample from GRAM PANCHAYAT area HAPSI NO. 32 so, after that sample marking & coding done & sample are reaches at laboratory.

Detail about testing:

**1.** Physical parameter - **a)**Colour
**b)**Odour
**c)** Turbidity
**d)** Temperature
**2.** Chemical parameter **-**Hardness
**b)** pH
**c)** Total suspended solids
**d)** Total dissolved solids.
**3.** Bacteriological parameter - Bacteriological Indicator (MPN)

**INCLUSION CRITERIA** For water: River, Lake &Tubewell these three sources will be taken.

*Rutus :* All six rutus.

**EXCLUSION CRITERIA:** Other drinking water sources mentioned in *samhita.*

**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)

**REVIEW OF LITERATURE**

Water of rivers arising from *Sahya* (Southrn branch of westanghat )produseleprosy,of those arising from Mahendra mountains (Northan range of Westanghat) produsefilariasic and abdominal enlargemtens;of those arising from *Himvat* ( Himalaya) mountain produse heart disease,dropsy,diseaseof the head,filiariasis and goiter.

Water of rivers of provinces such as prachya (centralBengal and North Orrisa) Avanti (round abiut city of Ujjain)andAparvantya (Kokan ) produce haemorrhoids;of the Pariyatra (Westan ranges of vindhya mountains) are healthy,bestow strength and health.Water of swift flowing river and which is clear is said to be light,while that of rivers slow,covred with algae and dirt is said to be heavy ( not easily digestible)

Generally, water of rivers of disert regions will be slightly bitter mixed with salt in taste,light slightly sweet,aphrodisiac and good for strength.

**THE PROPERTIES OF JALA OBTAINED FROM THE *KUPA, SARASA***

In the rainy season the water gets admixed with soil,worms,snakes,rats and their excreta.This joins the river water.This in turn contaminates the river water.Therefore in rainy season especially it is not good health.This water will increase the tri doshas.If the water of *kupa*is sweet is in nature then it acts as a *tridoshanashaka*,good for health and light one but if it is salty in nature acts as a *kaphavatanashaka,agnipradepaka,*but more *pittakraka*. The water of *tadaka* is *madhura* and *kashyain* taste and *katupaki* acts as *vatakaraka*and *pitta,kaphanashak.*

***SUSRUTAS* OPENION REGARDING PEYA JALA**

Regarding *peyajalaSusruta* explains that eater which has no smell,no prominent taste, quenches thirst,clean cold (cool),light (easy fir digestion ) and pleasing to the mind to be best in qualities (suitable for drinking).

*Vagbhtta* says only that rain water which neither makes the cooked Sail rice kept in a clean silver plate too moist (slimy)nor change its color is to be considerd good for drinking.

The rain water falling in the month of *Ashwina* (September-October) is stated to be free From the dust,position,etc,Even if there is some contamination with dust etc. it does not so pollute water by virtue of the neurtralizing factors in that season.

During *asvyuja* month there will be the appearance of *Agastya nakshatra* (the star Conopus) which is said to remove the poisonous properties of water by virtue of the poisonous properties of water and other things of the earth.

**Water literature review according to modern science :**

Much of the ill health which affects humanity,especially in the developing countries can be traced to lack of safe and wholesome water supply.Water that easily accessible,adequate in quantity,free from contanmination,safe and readily available throughout the year.There can be no state of positive health and will being without safe water. Water is not only a vital envi-

ronmental factor to all forms of life,but it has also a great role to play in socio economics development of human population.Each country should develop its own water resources agency which would collect all pertinent data on water resourse exploitation and hydrogeology.In 1980,the United Nation GenralAssembly launched the international Drinking Water supply and sanitation Decade,1981-1990 the aim being to provide all people with adequate supllies of safe water and sanitation by 1990 In 1981,the 34th World health Assembly in a resoulution emphasized that safe drinking water is basic element of "Primary Health Care"Which is the key to the attainment of "health for all by the year 2000AD" Water is also integrated with other PHC components because it is an essential part of health education food and nutritions and also MCH.

**Safe and wholesome water**

Water intended for human consumption should be both safe and wholesome.This has been defind as water that is

a. Free from pathogenic agents;

b. Free from harmful chemical substance;

c. Pleasant to the taste i.e. Free from color and odor; &

d. Usable for domestic purpose.

Water is said to be polluted or contaminated when it does not fulfil the above criteria. Water pollution is a growing hazard in many developing countries owing to human activity.Without ample & safe drinking water, we cannot provide health care to the community.

## DISCUSSION

The Turbidity of River water is more in *Varsharutu* and less in *Sharadrutu*.The Turbidity of Lake water is more in *Varsharutu* and less in *Sharadrutu*.The Turbidity of Tube well water is more in *Varsharutu* and less in *Sharadrutu*.*Sharadrutu* is very good rutu for all sources.The Temperature of River water is more in *Grishmarutu* and less in *Varsharutu*. The Temperature of *Lake* water is more in *Vasant rutu* and less in *Sharadrutu*. The Temperature of Tube Well water is more in *Grishmarutu* and less in *Varsharutu* as well as *Hemant* and *Shishirrutu*. The Temperature of Tube well water is more than River & Lake water.TheTemperature of Lake water is less.The Hardness of River water is more in *Varsharutu*and less in *Sharadrutu.*The Hardness of Lake water is more in *Varsharutu* and less in *Sharadrutu*. The Hardness of Tube well water is more in *Varsharutu* and less in *Sharadrutu*.The Hardness of Tube well water is more than River and Lake water.The Tube well water hardness is high as compare to River and Tube well.The Hardness of River water is less.The pH of River water is more in *Grishmarutu* and less *in Sharadrutu*.The pH of Lake water is more in *Vasant rutu* and less in *Sharadrutu.*The pH of Tube well water is more in *Vasant rutu*and less in *Sharadrutu*.The pH of Lake water is more than River and Tube well water.The pH of River water is less.The T.S.S. of River water is more in *Varsharutu* and less in *Sharadrutu.*The T.S.S. of Lake water is more in *Varsharutu* and less in *Sharadrutu*.The T.S.S. of Tube well water is more in *Varsharutu* and less in *Sharadrutu*.The T.S.S. of Lake water is more than River and Tube well water.The T.S.S. of Tube well water is less.The T.D.S. of River water is more in *Varsharutu* and less in *Sharadrutu*.The T.D.S. of Lake water is more in *Varsharutu* and less in *Sharadrutu*.The T.D.S. of Tube well water is more in *Varsharutu* and less in *Sharadrutu*.The T.D.S. of Tube well water is

more than River and Lake water.The T.D.S. of River water is less.The MPN of River water is more in *Varsharutu a*nd less in *Sharadrutu*.The MPN of Lake water is more in *Varsharutu* and less in *Sharadrutu*.The MPN of Tube well water is more in *Varsharutu* and less in *Sharadrutu*.The MPN of Lake water is more than River and Tube well water.The MPN of Tube well water is less.

## CONCLUSION

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

- The experimental study uphold the Susrutas statements i.e., Qualities of drinking water sources changes accourding to *shad rutu*.
- Qualities of River water is good in *Sharadrutu* and qualities are less in *Varsharutu.*
- Qualities of Lake water is good in *Sharadrutu* and qualities are less in *Varsharutu.*
- Qualities of Tube well water is good in *Sharadrutu*and qualities are less in *varsharutu.*
- Qualities of River water,Lake well water and Tube well water is good in *Sharadrutu.*
- On the basis of water qualities as a source, Tube Well water is good for drinking as compare to River and Lake water,but River water is not that much good as Lake water.
- Todays period and Samhita period environmental factors are very different, so in *Samhita* period water of any source during *sharadrutu* was used without any treatment for drinking but now a days its not safe because, todays environmental factors are different, lots of increasing population, Water pollution, Industrialization is going on so water of any of these sources in any *rutu* for drinking purpose should not be used without appropriate treatement.

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