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, Buddhhiprabodhana, 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 Shadrutu 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 Va-sant 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-
According 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:
- 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.e. River, 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 Environmental 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 (Southern branch of westanghat) produseleprosy, of those arising from Mahendra mountains (Northan range of Westanghat) produsefilariasis and abdominal enlargement; of those arising from Himvat (Himalaya) mountain produse heart disease, dropsy, disease of the head, filariasis and goiter.  

Water of rivers of provinces such as prachya (central Bengal and North Orissa) Avanti (round about city of Ujjain) and Aparvantya (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, covered with algae and dirt is said to be heavy (not easily digestible)  

Generally, water of rivers of desert 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 kupais sweet is in nature then it acts as a tridoshana-shaka, good for health and light one but if it is salty in nature acts as a kaphavatana-shaka, agnipradepaksha, but more pittakraka. The water of tadaka is madhura and kashyain taste and katupeki acts as vatakara-kaand pitta, kaphanashak.  

**SUSRUTAS OPENING REGARDING PEYA JALA**  
Regarding peyajala Susruta explains that eater which has no smell, no prominent taste, quenches thirst, clean cold (cool), light (easy for digestion) and pleasing to the mind to be best in qualities (suitable for drinking).  

Vagbhta 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 considered 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 neutralizing factors in that season.  

During asvya 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 is easily accessible, adequate in quantity, free from contamination, 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-
Environmental 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 resource exploitation and hydrogeology. In 1980, the United Nation General Assembly launched the international Drinking Water supply and sanitation Decade, 1981-1990. The aim being to provide all people with adequate supplies of safe water and sanitation by 1990. In 1981, the 34th World Health Assembly in a resolution emphasized that safe drinking water is a basic element of “Primary Health Care” which is the key to the attainment of “health for all by the year 2000 AD.” Water is also integrated with other PHC components because it is an essential part of health education, food, and nutrition, and also MCH.

**Safe and wholesome water**

Water intended for human consumption should be both safe and wholesome. This has been defined 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 fulfill 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 Shishir-rutu. The Temperature of Tube well water is more than River & Lake water. The Temperature 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 compared 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 and 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 according 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.

**REFERENCES**


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