



COMPARATIVE STUDY OF TADAGJAL (ARTIFICIAL LAKE WATER) AND HANSODAKA (NATURALLY PURIFIED WATER IN SHARAD RITU) FROM THE SAME TADAG WITH RESPECT TO MICROBIOLOGICAL PROPERTIES.

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ABSTRACT Ayurveda is an ancient science dealing with attaining health and curing diseases of ill. Good health makes our life happy. For that one has to take Wholesome of food which includes pure water also. We should always use the pure water to maintain health. Our Acharyas have mentioned regarding *Hansodaka* in Samhitas. *Hansodaka* is purified water in *Sharad ritu* by natural resources like Sunrays, Moonrays and an additional effects of Agasti star rays at night and *kalprabhav* of *sharad ritu*. Efforts were made to compare such *Hansodaka* and simple *Tadagjal* in view of microbiological properties, considering W.H.O. guidelines for drinking water. *Hansodaka* was found better than the simple *tadagjal* with respect to microbiological properties. It may be due to combine effect of sunrays, moonrays and Agasti star rays in *sharad ritu*. But *Hansodaka* is not suitable for drinking purpose as per W.H.O. guideline. It may be due to increased population, pollution, industrialization in present era as compared to ancient era. Hence we can say water purification by other methods is must in present era.

KEYWORDS : Tadagjal, Hansodaka, microbiological properties, Water purification.

INTRODUCTION:

Water gives us life, satisfaction, helps in *dhatuvridhi* and *ojovridhi*¹. Satisfies the thirst, pacifies tiredness, exhaustion, intoxication, unconsciousness, drowsiness, sleep and burning sensation. It is *satmya* to all livings² and main factor for life. It is necessary for the digestion and absorption of food. It helps to maintain proper muscle tone, supplies oxygen and nutrients to cell. It helps in excretion of waste body products. It serves as natural air conditioning system by maintaining body temperature. We should always use the pure water³ to maintain the health and cure the disease. While talking about the pure water I have to mention here *Hansodaka*. Acharyas have mentioned regarding *Hansodaka* in *Samhitas*. *Hansodaka* is the water purified by natural resources like sun and moon rays and rays of Agasti star which rises in *Sharad Ritu*. According to Charakacharya⁴ water which is purified during day time due to Sunrays, moonlight, rays of different stars, and Agastirays at night time is called *Hansodaka*. It is pure and nontoxic. In *Samhitas* it is told that this Agasti star with sun and moon rays purifies the water in *sharad ritu*. In view of this, we tried here to study the microbiological properties of *tadagjal* and *Hansodaka* from the same *tadag*. The purpose of selection of this topic is, today there are so many water borne diseases which affect on public health adversely. To avoid these diseases and maintain health it is necessary to use pure water.

AIM AND OBJECTIVES:

- 1) To compare the microbiological properties of *tadagjal* and *Hansodaka*.
- 2) To explore the concept of *Hansodaka*.

MATERIALS:

Criteria for Selection of *tadag*:

Tadag should be away from the human residential area. It should be well protected by wall to avoid contamination by humans, animals etc. It should be away from the industrial drainage and disposal area of waste products. It should not be far away in the forest. Also it should be under surveillance.

In the present study, the *tadagjal* was collected from the Vilad ghat *tadag* located in the campus of Padmashree Dr. Vithalrao Vikhe Patil Foundation's educational institute, Ahmednagar, Maharashtra, having all above said criteria.

Samples were collected four times. Every time the *tadagjal* was collected in the sterilized glass bottles of 500ml capacity.

METHODOLOGY:

First sample was collected 15 days before the Agasti-darshan. Second sample was collected after 7 days of Agasti-darshan. Third and fourth samples were collected after 14 and 21 days of Agasti-darshan respectively.

Agasti darshan was on 9-08-2013 with reference of Date Panchang 2013-2014. Here second sample was collected after Agasti darshan but *sharad ritu* not started, so this sample was simple *tadag jal*. Like this first and second samples were simple *tadag jal*. Third and fourth samples were collected after Agasti darshan, here *sharad ritu* also started so these two samples were *Hansodakas*.

Method of sample collection:

Each and every time water collected in glass bottle of 500 ml capacity. Before collection of water the bottle with caps were sterilized with mild HCL acid and with boiling water. While collecting the water the precaution was taken that water will not get to much disturbed. The water was collected away from the edges with the help of long fibre rod. Every time temperature was measured immediately. Then sterilized caps well fitted to bottles. Every time this bottles were labelled with sample no, type of analysis, date, time, source of water collection. Bottles were kept in ice box and sent to Late Prin. B.V. Bhide Foundation's laboratory, Pune immediately. As Water analysis should be started within 6 hours of water collection.

The reports of water analysis were collected time to time, arranged in tabulated form and analyzed to learn microbiological properties of *tadagjal* and *Hansodaka*.

OBSERVATION AND RESULT:

Table no. 1: Date, No. of samples and time of samples collected.

Date	Sample No and type	Time of collection	Period
26.7.2013	1(simple <i>tadag jal</i>)	8.00 am	15 days before rising of Agasti star (<i>varsha ritu</i>)
16.8.2013	2(simple <i>tadag jal</i>)	8.00 am	7 days after rising of Agasti star (<i>varsha ritu</i>)
23.8.2013	3(<i>Hansodaka</i>)	8.00 am	14 days after rising of Agasti star (<i>sharad ritu</i>)
30.8.2013	4(<i>Hansodaka</i>)	8.00 am	21 days after rising of Agasti star (<i>sharad ritu</i>)

Table No. 2: Microbiological (Bacteriological) analysis report of sample no. 1

Date	Sample No.	Parameters(MPN/100 ml)	
26.07.2013	1	Total coliform	16
		Thermotolerant	5
		E. coli	Nil

Table No. 3: Microbiological (Bacteriological) analysis report of sample no 2

Date	Sample No.	Parameters (MPN/100ml)	
16.08.2013	2	Total coliform	5
		Thermotolerant	NIL
		E. coli	NIL

Table No. 4: Microbiological (Bacteriological) analysis report of sample no 3

Date	Sample No.	Parameters(MPN/100 ml)	
23.08.2013	3	Total coliform	5
		Thermotolerant	NIL
		E. coli	NIL

Table No. 5: Microbiological (Bacteriological) analysis report of sample no. 4

Date	Sample No.	Parameters(MPN/100ml)	
30.08.2013	4	Total coliform	4
		Thermotolerant	NIL
		E. coli	NIL

Table No. 6: Common table showing microbiological (bacteriological) reports of all samples

Sr. no.	Parameters	Samples			
		I	II	III	IV
1	Total coliform (MPN/100ml)	16	5	5	4
2	Thermotolerant (MPN/100ml)	5	NIL	NIL	NIL
3	E.coli (MPN/100ml)	NIL	NIL	NIL	NIL

DISCUSSION :**1) Microbiological parameters****1) Coliform bacteria:**

The most common group of indicator organisms used in water quality monitoring are coliform. The coliform organisms include all aerobic and facultative anaerobic gram negative, nonsporing motile and nonmotile rods. The coliform group include both faecal and nonfaecal organisms.

Coliform bacteria are characterized by their ability to ferment lactose into acids and gas at 35-37 within 48 hours. They include E.coli, enterobacter, citrobacter and klebsiella species. Coliform organisms are derived from faeces as well as vegetation and soil. So their presence does not confirm faecal contamination.

In present study in first sample total coliforms are 16MPN/100ml and in second sample 5MPN/100ml. In third sample total coliforms are 5MPN/100ml and in fourth sample they are 4MPN/100ml.

The guideline value of total coliform bacteria of drinking water is that it must not be present in 100ml of water. In case of large supplies where sufficient samples are examined, must not be present in 95% of samples taken throughout the year.

However in this study total number of coliform reduces from 16 to 4MPN/100ml which indicates combine positive effect of sunrays, moonlight, Agastirays and kalprabhav in sharad ritu.

2) Thermotolerant:

Thermotolerant are group of coliform which are able to ferment lactose at 44 to 45°C. They include mainly E.coli which is specifically of faecal origin of human, other mammals and birds rarely found in water and soil. Thermotolerant also include enterobacter, citrobacter and klebsiella species which are non-faecal in origin. They may originate from decaying plant materials, soils, and vegetation. So detection of thermotolerant is a confirmatory test of contamination of faecal origin coliform as thermotolerant comprises E.coli mainly. The guideline value by W.H.O. for drinking water is thermotolerant must not be present in any 100ml.

In this study thermotolerant in first sample are 5MPN/100ml, while they are not present in next three samples. Like this there is definitely positive combine effect of Agasti star rays intensive sunlight of daytime and moonlight at night during this period.

3) E.coli:

The presence of E.coli indicates contamination by human faecal matter. These E. coli are characterized by their ability to produce indole from tryptophan present in peptone. Presence of E.coli in the water indicates faecal contamination which needs water treatment.

The guideline value of drinking water is that E.coli must not be detectable in any 100 ml of water.

In this study E.coli are absent in tadagjal as well as in Hansodaka.

CONCLUSION:

The properties of *Hansodaka* are better than the properties of *Tadagjal*.

There are definitely positive changes in almost all microbiological parameters in Hansodaka due to combine effect of intensive sunlight during the daytime, soothing effect of moon light during night time and Agasti star rays and *kalprabhav* in *Sharad ritu*.

Till we cannot say that Hansodaka is fit for drinking. Further study is required with respect to physical and chemical properties as per the guideline values given by W.H.O. for drinking water.

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