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An Analytical Study to Assess the Effect of *Kalusha Prasadana Dravya* in Purification of Water W.S. R. to *Bisgranthi*

Dr. Shambhu Dayal¹, Dr. Kashinath Samagandi²

- 1- Dr. Shambhu Dayal, M.D.Scholar, P.G. Department of *Swasthavritta* and *Yoga*, National Institute of Ayurveda, Jaipur, India
- 2- Dr. Kashinath Samagandi, Assistant Professor, P.G. Department of *Swasthavritta* and *Yoga*, National Institute of Ayurveda, Jaipur, India

ABSTRACT: The whole world is covered with the water and nothing is possible without the water. Absence of clean water and sanitation are major risk for ill health. Water is said to be polluted or contaminated when it does not fill the safe water criteria that is free from physical, chemical and biological impurities. *Ayurveda* described the methods to identify the impure water and suggests many water purification techniques. *Ayurveda* especially *Sushruta Samhita* emphasize the various methods of purification of water on the basis of the amount of contamination. So, here an attempt made to evaluate the effect of *Bisgranthi* among the *Sapta Kalusha Prasadana Dravya* in yielding the potable water

Material and method: The Sample of untreated water was collected from the *Bisalpur* reservoir in 05 liter of sterilized water cane and the *Bisgranthi* was purchased from the shop

Result: There are significant changes seen in physical, chemical and biological parameters after the treatment of raw water with *Bisgranthi*.

Discussion & Conclusion: It is concluded that the *Kalusha Prasadana Dravya* specially *Bisgranthi* mainly worked on physical and Biological parameters of water.

Key Words: *Bisgranthi*, *Kalusha*, Purification, Physical and Biological Parameters, Water

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Corresponding Author : Dr. Shambhu Dayal,
M.D.Scholar, P.G. Department of *Swasthavritta*
and *Yoga*, National Institute of Ayurveda, Jaipur.
Email id: drshambhudayal1991@gmail.com

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INTRODUCTION

Water is an important component of environment and one of the basic needs of life on the earth. It has got influence on health of an individual both directly and indirectly. It is essential for everything on our planet to grow and prosper. Water is not only a vital environmental factor but it also has a great role to play in socioeconomic development of human population¹. Most part of the water on the earth is confined to the oceans and seas, only small fraction available in the form ice sheets, glaciers, rivers, lakes, reservoirs. But only three percent of the world's water is fresh water and roughly one third of it is inaccessible. The pure water is not available naturally. It has various type of impurities naturally and man-made. According to the American College Dictionary, pollution is defined as: “to make foul or unclean; dirty².” Water

pollution occurs when water is adversely affected due to the addition of large amounts of materials to the water. When water is unfit for its intended use, water is considered polluted. The health of an individual mainly depends upon the availability of the potable water. Unavailability of potable water or consumption of contaminated water is the cause of morbidity and mortality. It acts as a vehicle for transmission of many diseases like typhoid, diarrheal diseases, viral hepatitis A, poliomyelitis etc.³ Water also constitutes the breeding place for mosquitoes which transmit many diseases to human beings like malaria, filariasis, Japanese encephalitis, dengue fever etc. In developing countries water quality remains the major concern. The most water industries within developing nations are

incapable of supplying adequate and clean water to all citizens. Many methods are used to purify the water in household ranging from domestic filters like RO system, Katadyn water filters, Pasteur Chamber land filter, Berkefeld water filter to microfiltration. But debate is still ongoing on the usage of water from such purification technique. Certain research and news state that these methods of purification take out the essential minerals and bacteria which may leads to deficiencies.

So, here is an attempt made to evaluate the effect of '*Kalusha Prasadana Dravya*' specially *Bisgranthi* in purification of water.

Need of Study:

Safe drinking-water, as defined, it does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages⁴. It is estimated that 1.1 billion people worldwide do not have access to an improved water supply, and many more drink unsafe, contaminated water from improved sources⁵. The SDG baselines prepared by the WHO-UNICEF Joint Monitoring Programmed (JMP) states that in 2015, 2.1 billion people lacked water services reaching the new standards, including 159 million who still drank

untreated water directly from surface water sources such as streams or lakes. In the way to yield absolute quality of water many inventions are laid down, domestic filters like RO system, Katadyn filters, Pasteur Chamber land filter, Berkefeld water filter, Pure It, Microfiltration, Ozonation, Ultraviolet irradiation, chemical purification etc. are the outcome of such inventions. No doubt these all inventions precluding the entry of contaminants and pathogens mean while we are also preventing the essential minerals and bacteria which are needed for proper functioning of the body.

So, it is time to look over the natural ancient concept which was used thousand years ago. During the time of *Acharya Sushruta*, *Sapta Kalusha Prasadana Dravya* which are naturally found were used in the process of purification of water. So, here is an attempt to assess the effect of *Kalusha Prasadana Dravya* w.s.r. to *Bisgranthi* in purification of water.

AIMS AND OBJECTIVES:

1. Determine the role of *Kalusha Prasadana Dravya* W.S.R. to *Bisgranthi* in purification of drinking water and yielding the potable water by analytical study.

Review of *Bisgranthi***Synonym of *Kamala*⁶:**

Arvind, Nalin, Sahasrpatra, Shatpatra, Tamrasa, Rajeev, Ambhoruh

Properties of *Kamala*⁷:

Ras: Madhur

Guna: ruksha, sheeta

Virya: sheeta

Vipaka: Madhur

Leaves:

The leaves are bitter, cooling and diuretic. It is beneficial in burning sensation, hyperdipsia and leprosy.

Flowers:

The flowers are sweet, astringent, refrigerant and cardiotoxic. These are useful in fever, hepatopathy, internal injuries, diarrhea and bronchitis.

Root:

It is also called *kamal kand, shaluka, karhaataka*. The roots are used in retention of urine.

Seed:

It is sweet, cold, unctuous, aphrodisiac and astringent.

Stem:

It is sweet, cold, dry, aphrodisiac and astringent.

Chemical composition of *Bis Granthi*⁸

Kanda and *beeja* of *kamal* are rich in *raal*, glucose, metarbin, tannin, fat and nelumbine.

Modern Review of Lotus⁹:

Family: Nymphaeaceae

Latin Name: *Nelumbo Nucifera*

English Name: Lotus

Hindi Name: *Kamala*

Sanskrit Name: *Padma*

Description:

It is an aquatic plant with elongated, slender branched, creeping rhizome, sending out roots at the nodes. The leaves are peltate. 60-90 cm in diameter and raised out of water. The flowers are large, fragrant, pink or white with centrally located yellow. The fruits are ovoid.

Seeds:

The seeds of lotus are oval or spherical with sizes varying according to varieties. These

are generally 1.2- 1.8 cm long, 0.8 to 1.4 cm diameter and weight of 1.1-1.4 g. The lotus seeds are edible and rich in nutrients. The nutritional values differ due to culture environment and varieties. The seeds contain high quality protein and are rich in variety of essential amino acids including high content of albumin (42%) and globulin (27%) they also contain unsaturated fatty acids, carbohydrates, vitamins, calcium, iron, zinc, phosphorus and other trace elements.

Active Principles¹⁰:

Amino Acids: arginine, cysteine, glycine, alanine, histidine, isoleucine, lysine, proline, tryptophan, methionine

Vitamins: ascorbic acid, beta carotene, niacin, thiamine, riboflavin

Minerals: calcium, copper, iron, magnesium, phosphorus, potassium

Others: carbohydrates, fiber, glutathione, quercetin, kaempferol

Chemical Composition¹¹:

The flavonol miquelianin, as well as alkaloids (+)- (1R)- coclaurine and (-) -(1s)- norcoclaurine, can be found in the leaves of *Nelumbo nucifera*. The plant also contains nuciferine and aporphine.

MATERIAL AND METHOD

This study was meant to assess the efficacy of *Bisgranthi* which is mentioned under *Sapta Kalusha Prasadan Dravya* for purification of water in *Sushruta Samhita*. Before conducting the study, the procedure which to be followed was confirmed. A new study was designed and *Bisgranthi* was immersed in water for 12 hours and then changes in water was analyze by testing the water sample in Water Testing Unit.

Potable Water Quality assessment is according to BIS/ISO

Physical parameters

Color, Odor, Taste, Turbidity, Total dissolved solids, pH

Chemical parameters

Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Fluoride, Lead, Manganese, Mercury, Nickel, Nitrate (NO₃), Nitrite (NO₂), Selenium

Biological Parameters

Total bacteria count, E. coli

Methodology: -**In house Experiment**

Exact dose of *Dravya* for purification of appropriate water was nowhere mentioned in Ayurveda classics. So, to decide the amount of *Dravya* we adopted following criteria. Initial logical criteria we drawn that, water should be free from visible contaminants especially the color, odor and suspended contaminants before it was submitted to the water testing Unit.

According to the norms of the water testing unit, minimum water sample accepted for the testing is 1 liter. Accordingly, samples were prepared and submitted to the unit. Before submitting, the water was treated with *Bisgranthi*. Then the treated water was sent to Water Testing Unit, Jaipur for overall Water Quality Assessment.

Materials Used:

1 Liter of Raw / Untreated water – *Bisalpur*
Reservoir

1 Liter capacity sterilized glass beaker

1 kilogram – 75g of *Bisgranthi*

Waiting Period: 12 hours for every sample

Initial dose experimented is 1:1 i.e. 1kg of

Bisgranthi in 1 lit of raw water. After keeping the mixture for 12 hours, we noticed water quality concerned to the appearance, color and odor was totally vitiated which indicated water is not safe for consumption.

Next dose decided was 500gm: 1lit in which same changes were noticed, in the same way we started reducing the dose of *Bisgranthi* in the ratio of 250gm: 1lit, 125gm: 1lit, 75 gm: 1lit 35 gm: 1lit respectively. Finally, we were able to decide the dose as 75gm per 1 liter. In this ratio water was physically free from contaminants like color and odor and this sample is submitted to Water Testing Unit, Jaipur to analyze physical, chemical and Biological parameters before and after treatment of water

RESULT AND OBSERVATION:

After the treatment of raw water with *Bisgranthi* significant changes seen in physical, chemical and Biological

parameters of water. Sample No.1 and 2 shows the different value of parameters in Table No.1 and 2 of raw water and treated water respectively.

Table:1- Bacteriological Quality of Drinking Water Before and After Treatment with *Bisgranthi*

Sr. No	Test	WA S: Clause	Observed Value		Specific Requirements	Test Protocol
			Sample 1	Sample 2		
1.	Total Coliform in per 100 ml	4.1	Present	Absent	Absent	WAS 1622:1981 (RA-1996)
2.	<i>Escherichia Coli</i> in per 100 ml	4.1	Present	Absent	Absent	WAS 1622:1981 (RA-1996)

Table:2- Change in Physical & Chemical Parameters of Drinking Water After Treatment with *Bisgranthi*

Sr. No	Test	WAS: Clause	Observed Value		Specific Requirements (Acceptable Limit)	Test Protocol
			Sample 1	Sample 2		
1.	Color, Hazen units	4.0	2	3	5.0 max.	WAS: 3025(part-4)
2.	Odor	4.0	Agreeable	Agreeable	Agreeable	WAS: 3025(part-5)
3.	Turbidity, NTU	4.0	0.4	1.8	1.0 max.	WAS: 3025(part-10)
4.	pH	4.0	7.70	6.60	6.5 to 8.5	WAS: 3025(part-11)
5.	Total Dissolved Solids, mg/l	4.0	228	218	500 max.	WAS: 3025(part-16)
6.	Manganese (as Mn), mg/l	4.0	<0.01	0.01	0.10 max.	WAS: 3025(part-59)
7.	Barium. (as Ba), mg/l	4.0	<0.01	0.01	0.7 max.	WAS: 3025(pt-2)
8.	Nitrate, (as NO ₃), mg/l	4.0	0.31	1.38	45 max.	WAS: 3025(pt-34)
9.	Nitrite, (as NO ₂), mg/l	4.0	<0.01	<0.01	0.02 max.	WAS: 3025(pt-34)

10.	Fluoride (as F), mg/l	4.0	0.33	0.24	1.0 max.	WAS: 3025(pt-60)
11.	Copper (as Cu), mg/l	4.0	0.01	0.01	0.05 max.	WAS: 3025(part-42)
12.	Selenium (as Se), mg/l	4.0	<0.01	<0.01	0.01 max.	WAS: 3025(pt-56)
13.	Iron (as Fe), mg/l	4.0	0.01	0.04	0.3 max.	WAS: 3025(part-53)
14.	Antimony (as Sb), mg/l	4.0	<0.005	<0.005	0.005 max.	WAS: 3025(pt-2)
15.	Borates (as B), mg/l	4.0	0.05	0.06	5.0 max.	WAS: 3025(pt-2)
16.	Mercury (as Hg), mg/l	4.0	<0.0005	<0.0005	0.001 max.	WAS: 3025(pt-48)
17.	Cadmium (as Cd), mg/l	4.0	0.002	0.002	0.003 max.	WAS: 3025(pt-41)
18.	Arsenic (as As), mg/l	4.0	<0.01	<0.01	0.01 max.	WAS: 3025(pt-37)
19.	Chromium (as Cr), mg/l	4.0	<0.01	<0.01	0.05 max.	WAS: 3025(pt-2)
20.	Lead (as Pb), mg/l	4.0	<0.01	<0.01	0.01 max.	WAS: 3025(pt-47)
21.	Nickel (as Ni), mg/l	4.0	0.01	<0.01	0.02 max.	WAS: 3025(pt-2)

DISCUSSION:**Color**

The value of total color unit increased after treatment of water. The initial value of color in raw water was 2 HU and after treatment it increased to 3 HU. There was no significant change in colour that's why even it was not visible by naked eye. The small change may be due to pigments present in *Bisgranthi* or may be due to the excess amount of *Bisgranthi*.

Turbidity:

The turbidity value was increased after treatment of water with *Bishgranthi*. The value of turbidity was 0.4 NTU before treatment and 1.8 NTU after treatment of raw water with *Bishgranthi*. Although the *Bisgranthi* which is used in this process is well washed but there are many too small pores in *Bisgranthi* it is supposed that those pores may not be properly washed. So, it assumed that the increase in turbidity may be by the waste present in those small pores.

It also may be due to excess amount of *Bisgranthi* because in ayurvedic literature, the dose of *Bisgranthi* for water purification is not mentioned. If we use *Bisgranthi* in less amount, it can decrease turbidity of

water. Due to *Madhur Ras* and *Sheeta guna* *Bisgranthi* has predominant of *Prathvi* and *Jala mahabhut*. Hence it might have increased the turbidity of water.

pH:

The value of pH partially decreased after treatment of raw water with *Bishgranthi*. The value of pH of raw water was 7.70 before treatment and after treatment of raw water with *Bishgranthi* its value was 6.60. It may be due to alkaloids present in *Bisgranthi*.

Total Dissolved Solids:

The value of total dissolved solids decreased after treatment of water. The initial value of total dissolved solids of raw water was 228 mg/L and after treatment of raw water with *Bishgranthi*, the value of total dissolved solids was 218 mg/L.

Bisgranthi has the water absorption capacity. It is assumed that the decrease of total dissolved solids may be due to water absorption capacity of *Bisgranthi*.

Bisgranthi possesses *Ruksh Guna* which is responsible for *Soshan* karma. Here, *Soshan* of dissolved solids may be the mode of action through which the value reduced.

Chemical Parameters

Some of the chemicals viz. Manganese, Barium, Nitrate, Iron, Borates are found to be increased and Fluoride, Nickel are decrease and some of the chemical constituents viz. Chromium, arsenic, cadmium, mercury, antimony, selenium, copper, nitrite remained constant during treatment of water by *Bisgranthi*. It is difficult to formulate the rationale behind the increase and decrease of chemical parameters with *Bisgranthi*. It may be assumed that changes are due to presence of some chemical compound in *Bisgranthi*.

Bacteriological Parameters:

After treatment with *Bisgranthi* Total Coliform and Escherichia coli are absent in per 100 ml of water. It is supposed that this change in Bacterial count in water is due to *Jal Prasadana Guna* of *Bisgranthi* i.e. mentioned in *Sushruta Samhita*. It may be due to antibacterial properties of *Bisgranthi* that is also established in some previous research. Previous Research on lotus leaf and rhizome established that the antibacterial properties. The leaf of the lotus has both antiviral and antibacterial properties due to presence of (+) -(R)- Coclaurine, (-)-1(S)-norcoclaurineliensinine and some other alkaloids such as nuciferine,

liensinine, negferine and isoliensinine¹². It is assumed that the antibacterial property of *Bisgranthi* is may be due to presence of same alkaloids such as nuciferine, liensinine, negferine and isoliensinine.

CONCLUSION:

After the treatment of raw water with *Bisgranthi*, we can conclude that:

After the treatment of raw water with *Bisgranthi*

- There was no change in the value of nitrite, copper, selenium, antimony, mercury, cadmium, arsenic, chromium and lead.
- It increased the value of color, turbidity, manganese, barium, nitrate, iron, borates and
- Decreased the value of pH, TDS and nickel.

Finally, it is concluded that the *Kalushya Prasadana Dravya* mainly *Bisgranthi*, worked on physical and biological parameters of water.

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REFERENCES-

1. Park, Park's textbook of preventive and social medicine, 23rd edition, Jabalpur: bnarsidas bhanot; 2015. P.I. 706
2. Terry, LA Water Pollution ENVIRON. LAW PRACT., vol. 4, no. 1, pp. 19-29, 1996
3. A.H. Suryakantha, Community medicine with Recent advances, 4th edition, new delhi:jaypee brothers medical publishers; 2017. P.I.24
4. Universal asses to safe water and sanitation by WHO- UNICEF JOINT Programmed page no 3
5. Corinne J. Schuster-Wallace, Velma I. Grover, Zafar Adeel, Ulises Confalonieri, Susan Elliott, safe water as the key of global health, united nation university, UNI-INWEH international network on water, environment and health
6. Shashtri brahmshankar Bhavmishra, bhavprakash, vidhoytni tikka, Nighantu yukt, varanshi: chaukhamba Sanskrit bhawan. Purva khand,pushp varg varga, shloka no. 25,; 2017, P.I. 640
7. Shashtri brahmshankar editor.Bhavmishra, bhavprakash, vidhoytni tikka, Nighantu , varanshi: chaukhamba Sanskrit bhawan; yukt, Purva khand,pushp varga, shloka no. 29, 2017, P.I. 642
8. Shashtri brahmshankar editor Bhavmishra, bhavprakash, vidhoytni tikka, Nighantu yukt, varanshi: chaukhamba Sanskrit bhawan. Purva khand,pushp varg varga,; 2017, P.I. 641
9. Preliminary assessment of lotus: an underutilized aquatic vegetable crop by Xu Wang
10. Preliminary assessment of lotus: an underutilized aquatic vegetable crop by Xu Wang
11. Preliminary assessment of lotus: an underutilized aquatic vegetable crop by Xu Wang
12. Preliminary assessment of lotus: an underutilized aquatic vegetable crop by Xu Wang