Innovative Proposal
Water purification prescribed in Ayurveda

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Abstract
Authors present here water purifying methods for drinking purpose by employing few kinds of flowers, a traditional knowledge available in India from the classics of Ayurveda, the oldest system of medical practices. A simple method is designed to conduct a study for finding out the efficacy of the said method.

Key words: Ayurveda, flower, purification, water

Introduction
Water is sacred in all religions. Hindus, sprinkle water on new born child. Muslims feed a drop of “Zam Zam” holy water from Mecca. Christians perform Baptism. Their recognition of water is important as shown “By means of water God gives life to every living thing”, (Islam: Quran 21:30). “The iota of life is created in water” (Hinduism: Atharvaveda, Asthagarideyam). “Whoever believes in me, stream of living water will pour from within him” (Christianity: John 7:38).

Since 2000, United Nations Committee on economic, social and cultural rights elaborated the necessity of drinking water and included this as a person’s right to it. The right to water is the right of a person which entitles everyone to sufficient, safe, acceptance, physically accessible and affordable water and enjoyed without discrimination and equally by men and women. Access to safe water is fundamental human need and a basic human right declared Kofi Annan former United Nations Secretary General.[1]

After fifteen days of the worst natural calamity in Japan, tsunami, 1 million homes were still without drinking water.[2] It is calculated that 1.1 billion people out of 6 billion populations on the earth have no access to clean drinking water such as protected springs and wells.[3] Economically a country is pulled back when drinking water supply is not proper. The number of hours of manpower employed for collecting water is at the cost of the development. Usually the burden is on women and children. Carrying water loads on head by women and children may cause spinal injuries also.[4] Children miss their schools as remain in search of water, a great loss to a nation. A recent report showed that attendance in school improved when water supply to the region was improved.[5] Absence of clean water and sanitation are major risk factors for ill health.[6] Some of the water borne diseases are given below.

Arsenicosis, Lymphobacteriosis, Cholera, Cyanobacterial toxicoses, Dengue, Dengue Haemorrhagic fever, Diarrhoea, Fluorosis, Guinea worm disease (Dracunculiasis), Infectious Hepatitis, Japanese Encephalitis, Lead poisoning, Leptospirosis, Malaria, Malnutrition, Methaemoglobinemia, Onchocerciasis (River Blindness), Paratyphoid enteric fever, Ringworm (Tinea), Scabies, Schistosomiasis, Spinal injury, Trachoma and Typhoid.

Clean drinking water is the majority remedy of all. Clean water is shown to have reduced water trachoma and eye infection.[7] It was shown that improvement in drinking water quality through household treatment like chlorination could reduce diarrhoea to an extent.[8] A recently published study had shown that supply of clean drinking water reduced diarrhoea, morbidity by 25%.[9] In a latest study report from UNICEF (2005) showed that improvement in community water supply increased the primary school attendance. We are in need of a procedure, which can purify water at house to safeguard health[9] and increase the contribution of all to the development of a nation.[10]

Some chemical impurities present in drinking water causing health problem was studied by few groups of workers. Rahman et al.[8] showed that ground water samples of 21 villages of Gagarapura village area, contained arsenic above 50μg/l. Many of the villagers suffered from arsenic skin lesions. Arsenic was detected above normal level in their hair, nail and urine. In another study fluoride was considered. Fluoride in water in limit is good for teeth. However, above this level it is harmful. A high level of fluoride in ground water was seen in some parts of Assam, India.[9]

A major task in front of authorities in developing and underdeveloped countries is providing drinking water to their people. In many countries like India, villages are geographically

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Apart and inhabitants may have to walk kilometers to fetch water. On such situation, supplying clean drinking water remains a major problem.[3]

**Purification**

Several methods for purification of water are given elsewhere.[10] WHO (2003) had elaborated simple filtration method by using fabric mesh of stainless steel or polyester (aperture 50-45 um), which was sufficient for removing algae cells and large protozoa. Chlorine is commonly used as a disinfectant. Probably these two measures would be easily adopted by villagers. This could be supplied to public by government with minimum financial expenditure. However, the purity of drinking water from this process alone is not sufficient. WHO (2002) recognized the difficulty in purifying and supplying water especially to a small group of people who are geographically away from the main stream of land.

WHO estimated that a large number of people (3-5 million) were deprived of safe drinking water as a result of South Asia tsunami. A report of 2002 from WHO showed that the total number of people who were served drinking water was 5150169 when compared to unserved people 1074706. If simple measure to purify water is known to affected population, they must have escaped from water borne diseases.

Recognizing an economic and easily accessible system for improving water quality remains as essential for a community especially when it is isolated from mainland. UN and UNICEF (2005) promote household water treatment and safe storage. Some places community may have their own simple purification method. If such traditional knowledge made available will be useful to others in own country as well as in other countries. Recently Babu and Chaudhry (2005) reported a filtration method using natural coagulant.[11] This method could be preferred by rural people.

Ayurveda, the oldest health caring system prescribed water for drinking purpose. Agnivesha (1998) compared water to nectar or vital breath.[12] Sushruta Samhita (2002), an Ayurveda classic had written water purification method for drinking purpose by using following flowers.[13]

1. Utpala (Nelumbo nucifera)
2. Naga (Mesua ferrea)
3. Champaka (Michelia champaca) and
4. Patala (Stereospermum suaveolens)

Among different communities this is stated as an accepted method for purifying water. According to the method, keep one of these flowers in water to be purified after period of time decant for portability. However, a standard measure for this is not known. Also a scientific study on this aspect is not done. We present here, a plan of study on this aspect to find out the efficacy of the plant flowers in purifying water. If proved correct the method will be useful to millions of people.

**Proposed Plan of Study**

The flowers mentioned in Sushruta Samhita (2002) are being regularly used by people in different parts of our country as well as other countries.[13] However, it is not known whether water is fully purified by this simple procedure. To overcome this lacuna, we propose a study to be conducted, in the following pattern.

Each flower – Utpala, Naga, Champaka, Patala is coded as A,B,C or D [Table 1]. Subgroups 1, 2, 3, 4 and 5 are for using its parts [Table 2]. One subgroup each is individually placed in one of the containers a,b,c or d. These different types of containers are in common use in this country. For example flowers of Utpala (group A) in whole (subgroup 1) is placed in earthen vessel (a) [Table 2].

In this proposed study, the effect of either whole flower or a part of it on contaminated water present in different containers shall be studied. Before and after the experiment; the water is analyzed for details of contamination. This includes routine chemical analysis for various chemical substances present in water; microscopically for protozoans and other unicellular organisms, microbiologically for the presence of any bacteria.

Five liters of contaminated water is taken into each container (a, b, c and d) as shown in Table 2. To each container whole flower (A) or its one part (subgroup 1, 2, 3, 4 or 5) is added after weighing it. The weight may be an important criterion, depending on the age or its growth. The whole set up is kept for 24 hours. Clear water is withdrawn for study purpose. An anticipated change in result when compared to the previous result is solely due to the presence of the subgroup (1, 2, 3, 4 or 5) added into the container. They study will also shown which type of container is more useful for water storing purpose.

The study could be further expanded by changing the weight of subgroups (1, 2, 3, 4 or 5) or changing the age of the flower. Each may have its own role in purifying the water.

The purity of water (cleanliness of water) in terms of time may be studied by repeat analysis of samples after 1, 2, 4, and or more days. This is essential as storage water may lose its purity on standing. Also it is a responsible source of spreading disease.[3]

In conclusion, Using the traditional knowledge, we are able to purify water in each house. Using one of four flowers, mentioned

### Table 1: Coding of flowers

| Group | Flower                        |
|-------|-------------------------------|
| A     | Utpala (Nelumbo nucifera)    |
| B     | Naga (Mesua ferrea)           |
| C     | Champaka (Michelia champaca)  |
| D     | Patala (Stereospermum suaveolens) |

### Table 2: The proposed plan of study for water purification

| Subgroup | Parts | Contaminated water in containers |
|----------|-------|---------------------------------|
|          |       | Earthen (a) | Brass (b) | Stainless steel (c) | Plastic (d) |
| 1        | Whole flower | 10^n | 10 | 10 | 10 |
| 2        | Petal | 10 | 10 | 10 | 10 |
| 3        | Stamen | 10 | 10 | 10 | 10 |
| 4        | Pedicel | 10 | 10 | 10 | 10 |
| 5        | Sepal | 10 | 10 | 10 | 10 |

n: number
in Table 1, and using it in whole or parts, a study is proposed to find out the purifying effect of the same in contaminated water in different type of containers. Once proven the efficacy it shall be introduced to population.

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