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# To Evaluate The Role of *Tamra Patra* on Changing The Quality Of Drinking Water

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## ABSTRACT: -

From the time immemorial, man has been interested in trying to control disease. Long and healthy life is the basic need of human being to attain the *Dharma* (righteousness, moral values), *Artha* (prosperity, economic values), *Kama* (pleasure, love, psychological values) and *Moksha* (liberation, spiritual values). i.e. the *Chaturvarga*. Disease or ill health is the main impediment to achieve this goal. The need of *Ayurveda* is to promote and preserve health of the healthy person and to restore health when it is impaired. According to *Ayurveda*, these determining factors are *Dincharya* (daily regimen), *Ratricharya* (night regimen), *Ritucharya* (seasonal regimen) And *Sadvritta* (code of conduct) etc. Safe water is fundamental to better health, alleviating poverty and community development. The aim of this study was to look into the facts surrounding the traditional use of *Tamra Patra* (copper vessel) for water storage and to assess its function in changing the quality of drinking water. In this study effect of Copper in purification of drinking water.

**Keywords**: *Ayurveda*, *Tamra Patra*, Drinking Water, Copper, Health.



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## INTRODUCTION

The need of *Ayurveda* is to promote and preserve health of the healthy person and to restore health when it is impaired. The aim of modern allopathic medicine is not different. It is factual that human being is not immortal, but disease is preventable. According to medical science health is worldwide social goal and fundamental human right. The ultimate goal is to lead a socially and economically productive life, not merely the increment of life span without quality of life. Two main aims of *Ayurveda*, is prevention of disease and promotion of health is considered as best due to many reasons.[1] *Swastha* (health) is characterised as a state of health free of disease, a state of harmony among the *dosha, dhatu* (tissue), *and mala* (waste) within the body; and "*Swasthvritta*" refers to all measures that help to maintain this homeostasis and promote health. These deciding factors, according to Ayurveda, are *Dincharya* (daily regimen), *Ratricharya* (night regimen), *Ritucharya* (seasonal regimen) And *Sadvritta* (code of conduct) among others. Some households in developing countries including India, obtain drinking water from unprotected or semi-protected open wells or bore well, lakes and canals that get easily contaminated by unhygienic water-drawing practices and through contamination of ground water after rain. The study has been conducted for finding safe and cost-effective method of drinking water purification. The study was also focused on use of water stored in copper pots *(Tamra Patra).* Different type of utensils are advised in *Ayurveda* for storage of drinking water. Out of these utensils copper pots *(Tamra Patra)* are used from very beginning. Several studies have been done successfully to find out the antimicrobial activity of Copper *(Tamra).* Hence this study mainly focused on the physiochemical changes occurring in water due to storage in Copper Pots *(Tamra Patra).*[2]

## AIMS & OBJECTIVE

- Main Aims & Objective of this paper is the finding safe and cost-effective method of drinking water purification.
- Role of *Tamra Patra's* storage drinking water in Health effects.

**Water Purification in traditional knowledge:**

Exploring traditional knowledge methods provides a connection between cultural or social significance and implementation or adaptability. In many cases, it has been observed that connecting the importance of protecting water quality to the cultural or religious significance has made difference in increasing the use of a technology and are more likely to be sustained.[3]

*Ayurveda* recommends many methods of water storages and purification. The methods of water treatment including boiling, exposure to sun rays and moonlight and using herbs, stones, metals and minerals.[4] Till todays, herbs such as bark of *Caesalpinia sappan L*. and seed of *Cuminium cyminum (Jeera)* is routinely added to drinking water as a part of their local health tradition in the state of Kerala.

One of the recommendations in *Ayurveda* includes storing water in copper pots overnight. Overnight storage of drinking water in copper pots *(Tamra Patra)* was believed to impart health effects.

**What is Safe water?**

Water that is intended for human consumption must be both healthy and nutritious. It should have following properties;

- It should be free from any kind of pathogenic agents.
- It should be free from any kind of harmful chemical substances.

- Taste of this water should be pleasant and it should not have any color and odor.

When water does not meet the above conditions, it is said to be polluted or tainted. Human activity has made water pollution an increasing threat in many developing countries.

**Requirement of Water:**

The basic physiological needs for drinking water have been calculated to be about 2 litres per person per day. This is just for survival. But from the stand point of public health and improvement of the quality of life, water should be provided in adequate volume. It will help to reduce the incidence of many water related diseases among the people most at risk. The amount of water consumed, on the other hand, is determined by the environment, the standard of living, and the behaviors of the people.

**Water Pollution:**

The contamination of water sources is known as water pollution (e.g., lakes, rivers, oceans, aquifers and groundwater). When contaminants are pumped into bodies of water, either directly or indirectly, without sufficient treatment to eliminate harmful substances, this type of environmental degradation occurs.

Water contamination has an effect on the entire biosphere, including the plants and animals that live in these bodies of water. The effect is almost always harmful to not only individual organisms and populations, but also natural biological ecosystems.[5]

**Importance of this study:**

Most of earth water is sea water. About 2.5% of the water is fresh water that does not contain significant levels of dissolved minerals or salt and two third of that frozen in ice caps and glaciers. Just 0.01 percent of the planet's total water is suitable for human use. Humans need clean drinking water as a basic need. Unfortunately, in the developing world, more than one in every six people still lacks reliable access to this valuable resource.[6]

According to the Centre for International Trade Development, India's total water market is estimated to be worth more than USD 4 billion, and growing by 10-12 %. Given India's well-publicized economic growth, rising disposable income, and rising wealth, it's no surprise that the demand for water treatment products is projected to be worth nearly 843 million euros, with an annual growth rate of about 18 percent.[7]

On the basis of above data one can conclude that in recent years awareness of Indian people increased for safe drinking water. To achieve above mentioned goal a purification method is must which is easy to implement, cheap and easily approachable to all communities of country.

Use of *Tamra Patra* for storage of drinking water stored in copper pots overnight and drinking the same imparts beneficial health effects. These methods are cost effective and easily approachable to everyone. But before their large scale propagation, proper standardization and researches are must to improve and assess the efficacy of these system[8].

The aim of this paper was to investigate the facts behind the conventional use of *Tamra Patra* for water storage and to assess its function in changing drinking water quality.

**Analysis of the study :**

Three types sample each of two litter of drinking water were collected from different sources including government water supply, ground water from hand pump and distil water. The sample were kept in *Tamra Patra* for overnight from 8pm to 6am. After that they were collected in a standard sterilized container before sending it to analysis. Pre and post experiment analysis of water have been according to international standards from an ISO certified lab. The quality of water was assessed on the following parameters;

1. **Physical Parameters :**
   Colour
   Odour
   Taste
   Turbidity
   Total Dissolved solids
   pH

2. **Chemical Parameters :**
   Test for Copper, Iron, Calcium, Alkalinity, Potassium, Sodium etc.
3. **Biological Parameters :**
   Total Bacterial count
   E. coli etc.

Each sample was of 4 litter and was divided into two parts of 2 litter each. One group was collected in sample transfer vessel without keeping in Copper vessel. The other group of samples was kept in Copper vessel overnight. Next day these two samples were transferred in to collecting vessels for physical and chemical analysis and sterile sample collection bottles for bacteriological analysis. These samples were marked with separate and specific coding system depicting before and after samples. Separate system of marking was adopted for samples as collected from sources and the samples collected after keeping water in copper vessels overnight.

**Importance of Copper *(Tamra)* in *Ayurveda* :**

Copper, according to Ayurveda, has a scraping effect *(Lekhana)*, heals, and nourishes when used in small doses. It balances *Pitta and Kapha* by being astringent, soft, bitter, and sour. It has a pungent *Vipaka* (post-digestive property) with a cold potency.[9]

It is recommended to be used in treatment in *Pandu* (Anaemia). Copper can also play a role in improving water quality physiologically.[10]

Copper is an important micronutrient that is required for the synthesis of haemoglobin and is a component of many enzymes, according to recent research. It is also essential in embryo development, mitochondrial respiration, hepatocyte and neural function, regulation of haemoglobin.[7]

**Leaching of Copper into water :**

According to WHO, demonstration of leaching of metals within safety limits is acceptable method to demonstrate the safety of a PoU method .[11]

The Copper content in water after storing in Copper Pots *(Tamra Patra)* is well within the WHO limits. This guideline is based on the protective effect against acute gastrointestinal effects of Copper homeostasis.

Therefore for adults with normal homeostasis, this guideline value permits consumption of 2-3 litters of water per day, use of a nutritional supplement and Copper from foods without exceeding the a tolerable upper intake level of 10mg/day or causing a gastrointestinal reaction.

## DISCUSSION

- The study has demonstrated that the Copper pot not only changed the physical chemical properties of water but also inactive bacteria, thus demonstrating its potential as a PoU water purifier.
- Copper pots *(Tamra Patra)* for treating one litter water would cost INR. 500-600/- for life timeIts operation is independent of power, energy, replaceable filters, sunlight intensity, and so on. to operate or maintain it. It is also reduces recontamination due to handing. It is simply a passive storage of water.[12]
- This is one time investment is similar to the direct and indirect cost for treating several water borne diseases.
- It is suitable for developing countries like India where there is frequent intermittent supply of drinking water, necessitating storage of drinking water for days. In such conditions

Copper utensils can be introduced during storage of drinking water.

## CONCLUSION

- Safe water is fundamental to better health, alleviating poverty and community development.
- Copper leaching occur in water stored in Copper pot *(Tamra Patra)* in significant levels.
- Odour and colour of water improved after storage in Copper pot *(Tamra Patra).*
- pH changes occur in water after storage in Copper pot *(Tamra Patra).*
- Quality of water improves.
- Microbial contamination reduced as an effect of Copper on water.

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