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Research Article

ASSESSMENT OF ANTIBACTERIAL ACTIVITY OF INDIAN TRADITIONAL SUBSTANCES

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ABSTRACT

There are various health benefits of Tulasi, yellow camphor, ajwain, etc., that have been used in different ayurveda techniques. They help combat diseases, overcome variegated problems, weight loss and to prevail over various issues. This research studies the retention of anti-bacterial activity in six different water samples, which have been stored over a period of time. Tulasi, cardmom & yellow camphor sample, holy water, regular water stored in tupperware container, regular water stored in plastic container. oma/ajwain water are such samples. These have been subjected to bacterial growth studies by two techniques (colorimeter-turbidity and colony counting). The results obtained showed that ajwain water has been the most effective one as it had the least amount of growth of bacteria, owing to its immense medicinal properties; followed by traditional theertham of hindu temples and holy water obtained from a church.

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INTRODUCTION

Tulasi, scientific name *Ocimum sanctum*, is a recognized holy herb from Indian mythology. Tulsi or Tulasi (Holy basil) or Vrinda is a sacred plant in Hindu belief. Hindus regard it as an earthly manifestation of the goddess Tulsi/Vrinda; she is regarded as a great worshipper of the god Vishnu. The offering of its leaves is mandatory in ritualistic worship of Vishnu and his forms like Krishna and Vithoba. Many Hindus have tulsi plants growing in front of or near their home, often in special pots or a special masonry structure known as Tulsi Vrindavan as this is related to their culture. Traditionally, Tulsi is planted in the center of the central courtyard of Hindu houses. The plant is cultivated for religious and medicinal purposes, and for its essential oil. It has many health benefits as well. Perhaps, such significance comes from the actual health applications of the herb. Its use is recommended as a first aid in the treatment of respiratory, digestive and skin diseases. Apart from these common ailments, Ayurveda also recognizes its use for the diseases ranging from common infections up to tumorous growths.

Cardamom is a spice made from the seeds of several plants in the genera *Elettaria* and *Amomum* in the family *Zingiberaceae*. Cardamom is a spice with an intense, slightly sweet flavor that some people compare it to mint. It originated in India but is available worldwide today and used in both sweet and savory recipes. The seeds, oils and extracts of cardamom are thought to have impressive medicinal properties and have been used in

traditional medicine for centuries. Cardamom may be helpful for people with high blood pressure.

Cinnamomum camphora is a species of evergreen tree that is commonly known under the names camphor tree, camphorwood or camphor laurel. The species contains volatile chemical compounds in all plant parts, and the wood and leaves are steam distilled for the essential oils. Camphor laurel has six different chemical variants called chemotypes, which are camphor, linalool, 1,8-cineole, nerolidol, safrole, and borneol.

Ajwain or carom seeds are the best thing to have ever happened to mankind, especially to those of us who suffer from digestive problems on a regular basis. They have other health benefits apart from just curing an upset stomach. Traditionally it is chewed raw to aid stomach ache or acidity. It is also added in many dishes to give aromatic and pungent taste.

Whether Tupperware is good for our health or not, it is being used widely by the people and some have started their own house hold business of this item and selling to people. That way we can see Tupperware available at every home. Everybody is using Tupperware because they are airtight containers and are spill proof. But, storing items in Tupperware is not good for health. There are many draw backs in using it. When we store food in Tupperware for more than one or two days even in refrigeration conditions, the food will not be fresh.

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The food stored is similar to the ones we store in normal plastic containers.

Bisphenol A (BPA), an organic synthetic compound widely used as a starting material in plastics; the suggestion is that it seeps out of the bottle into the water and causes issues such as diabetes, obesity, high blood pressure and cancer, amongst many others. The chemical is an endocrine disruptor which mimics the effect of oestrogen in the human body. Critics suggest that this can make it harder to conceive and that its presence in children's products - including feeding bottles - causes adverse effects in children. Despite plastics undergoing rigorous testing to ensure they abide by legislation, the use of BPA has been banned in many countries, especially where used in children's products, with many manufacturers replacing it with chemicals such as fluroene-9-bisphenol (BHP).

The six water samples analyzed are tulasi, cardmom & yellow camphor sample, holy water, regular water stored in tupperware container, two samples of regular water stored in plastic container, oma/ajwain water.

Objective

The aim is to examine the various water samples that have been stored for one and half year; to see if the water retains anti-bacterial property or becomes a hub for their growth.

METHODOLOGY

Colorimetric Optical Density values were measured to check the amount of bacterial growth in the samples incubated and CFU (colony forming units) were counted to estimate the growth by agar plating.

In case of the former, a broth bacterial medium had been prepared in sterile conditions. Six test tubes were autoclaved and 9 ml of broth was poured into them and are labeled. 1 ml of stored sample was introduced into each of the test tubes using an autoclaved pipette in sterile conditions (in a laminar air flow). These test tubes were then put in an incubator overnight. The following day, the optical density values of each of these was known with the help of a colorimeter, set at 540 nm. Both the control and the sample values observed were noted down. A graph was plotted between the sample type and the Optical Density value.

The latter method utilizes the agar medium for the growth of bacteria. Agar medium was prepared and then transferred into six petri plates that have been sterilized (autoclaved). After the agar has set, 1 ml of the water sample has been poured onto the agar medium and had been spread-plated using a spreader. The petri dishes were then incubated for 24 hours. After 24 hours, the colonies that appeared in each of the petri dish were counted.

A comparative study between the growth of bacteria in stored tulasi water and freshly prepared tulasi water has been done by obtaining the Optical Density values using the colorimeter.

RESULTS

From the Optical Density values observed, Ajwain (Oma) water was seen to be having the least amount of bacteria that was present, even after a storage period of one and half years, suggesting that it retained its anti-bacterial activity, followed

by theertham (a mixture of cardamom, tulasi and yellow camphor), holy water, water stored in Tupperware, water stored in plastic container. Overall, oma water, theertham, and holy water are found to be better in anti bacterial activity than water stored in Tupperware and plastic containers.

From the agar plating method, it had been observed that the oma water did not show even a single colony whereas holy water showed a single colony as compared to other samples where moderate to confluent growth was observed indicating again strong anti bacterial activity of oma water which is proved to have medicinal and ayurvedic properties.

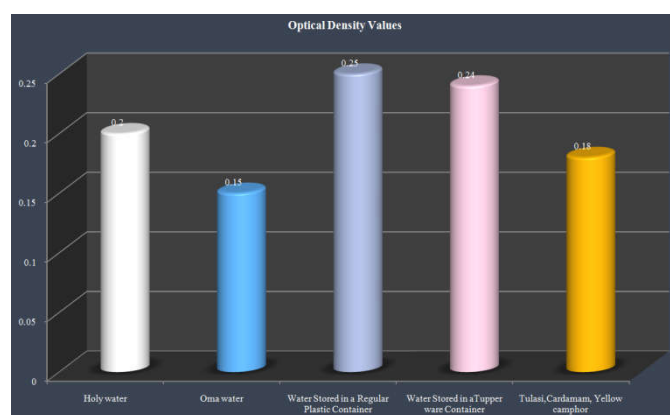
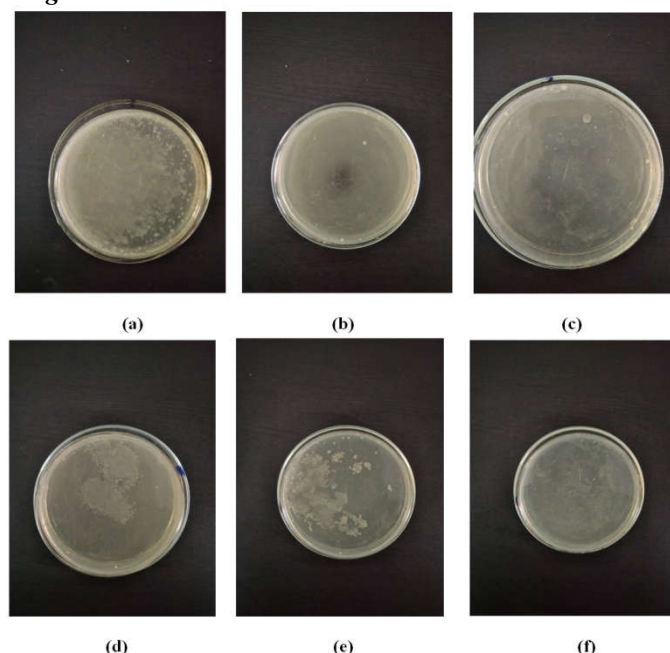


Table 1 OD values of different samples of traditional substances

S.No	Water Samples stored for 1.5 years	Value of optical density
1	Holy water	0.2
2	Oma water	0.15
3	Water Stored in a Regular Plastic Container	0.25
4	Water Stored in a Tupperware Container	0.24
5	Tulasi, Cardamom, Yellow camphor	0.18

Images



The images above show the growth of bacteria in the various water samples-(a) Tulasi, cardmom & yellow camphor sample (thick growth of bacteria); (b) Holy water (less growth of bacteria); (c) Regular water stored in Tupperware (moderate growth); (d) Regular water stored in plastic container 1

(moderate growth); (e) Regular water stored in plastic container 2 (moderate growth); (f) Ajwain water (no growth).

DISCUSSION

A few articles ^(ref 6) recently showed that Tupperware uses LDPE [low-density polyethylene plastic] or PP [polypropylene plastic]. These are the plastics which are recycled. So recycled plastic containers are not so safe to use. They will surely lead to some health problems. There are several known side effects of polyethylene in humans. One of these is it may cause slight skin irritation. When inhaled, it caused proximal scleroderma, Raynaud phenomenon, joint involvement, pulmonary manifestation, and esophageal involvement in some people. Moreover, it may cause asthma. The chemical was also found to be toxic to the immune system. In addition, it was found to be a potential carcinogen.

In a recent study ^(ref 6), bottled water users were twice as likely as non-users to cite health for their choice of beverage. 56% of bottled water users cited taste and 55 percent cited convenience as the strongest influences on their decision to drink bottled water. It is advisable to people not to store bottled water in places that have a significant amount of heat, like a garage or a car parked outside. When you heat things up, the molecules jiggle around faster and that makes them escape from one phase into another. So the plastic leaches its component chemicals out into the water much faster and more with heat applied to it.

Experimental studies ^(ref 1) identify tulasi to be a highly promising immunomodulator, cytoprotective and anticancer agent – when used immediately. In another study ^(ref 2), researchers gave three grams of cardamom powder a day to 20 adults who were newly diagnosed with high blood pressure. After 12 weeks, blood pressure levels had significantly decreased to the normal range. But in the long storage, they may lose such essential qualities, hence fresh intake is always advised.

CONCLUSION

Any cultural or religious practice will definitely has a scientific basis which became a part of life with long years of human civilization and experience which needs to be explored in depth for their metabolic property in particular and biological property in general.

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