

## Some Natural Herbs in India and Their Effectiveness in Water Purification

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**Abstract:** In Ayurveda from ancient time *Ocimum Sanctum*, *AzadirachtaIndica*, *TriticumAestivum*, *PhyllanthusEmblica*, *StrychnosPotatorum* etc. natural herbs areproved tobe very useful medicines. Inthe present study effectiveness of these herbs in water purification because of their antibacterial activity is studied.Leaves and fruits of these herbs were dried, extracted and activity was tested by Disc Diffusion Method (Kirby-Bauer Method). In all these herbs maximum removal of *E.coli* was found at maximum 1% onwards.From the percentage removal of *E.coli* *Ocimum Sanctum* was found most effective. 82.15% removal of *E.coli* was observed for 1% and onward concentration of *Ocimum Sanctum*.

**Keywords:** Herbs, Extract, Antibacterial Activity, *E.coli*.

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### I. Introduction

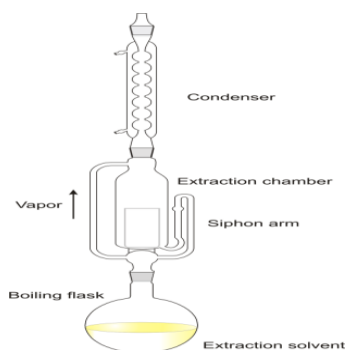
Water is an important compound useful to give life to plants and animals. It is universal solvent used in many of the chemical and biological reactions. It regulates the body temperature. Due to various human activities, we are experiencing the scarcity of water and scarcity of pure drinking water. Human activities are polluting the water. Water is getting polluted not only chemically but also biologically. In rural areas, water used by people from their own source or public water supplies is mostly without any treatment of purification. As a result in rural areas people are facing to various water borne diseases. It is very important to remove harmful micro-organisms from drinkingwater as they affect the human physiology. Various methods such as ultraviolet treatment, chlorine, chlorine dioxide and ozone [White (1992), Gagnon et.al. (2005), Chand et.al.(2007)] treatment are used for water purification. But these are costly and chemical disinfectants generate various unwanted chemicals known as disinfection by-products (DBPs) in water. These DBPs are harmful to human which may cause hemolytic anemia, cancer risk, nervous system effect and liver effects, So it is essential to find alternative method for antibacterial activity [Schoenen(2002)].

Therefore, there is an urgent need for development and widespread promotion of simple disinfection technique of water purification for rural/tribal area [Somani et.al,(2011)].

Herbs like *Ocimum Sanctum*, *AzadirachtaIndica*,*TriticumAestivum*, *PhyllanthusEmblica*, *StrychnosPotatorum*, etc. can be used for water purification and are easily available in India.

### II. Materials And Methods

The materials (leaves/fruits) [Joshi et.al.(2009), Biswas et.al.(2002), Shirude A.A.(2011), Bole ey.al.(2010), Mallikharjuna et.al.(2009)] of *Ocimum Sanctum*, *AzadirachtaIndica*, *TriticumAestivum*, *PhyllanthusEmblica* and *StrychnosPotatorum* were collected, dried at the temperature of 105°C to 110°C in drying oven for 12 hours and then grinded into powder and stored at room temperature.The extracts of these powders were prepared with 50% ethanol by Soxhlet extractor [Somani et.al.2011)]. The extracts were collected and distilled off on water bath at atmospheric pressure. Extracts were stored in refrigerator for antimicrobial studies. Stock solution was 20 % ( w/v) of dried plant materials in solvent [Gunaselvi et.al.(2010)].



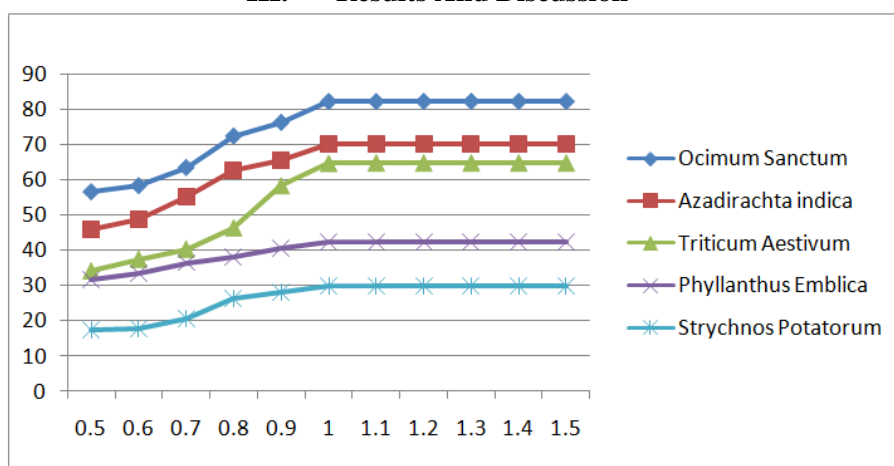
**Fig1:** Soxhlet Extractor used for Extraction

**Kirby-Bauer** method, one of the standard laboratory methods was used to check the antimicrobial activity of an agent.

**MPN Test** was used to determine the most probable number (MPN) of coliforms (E.coli) present per 100 ml of water.

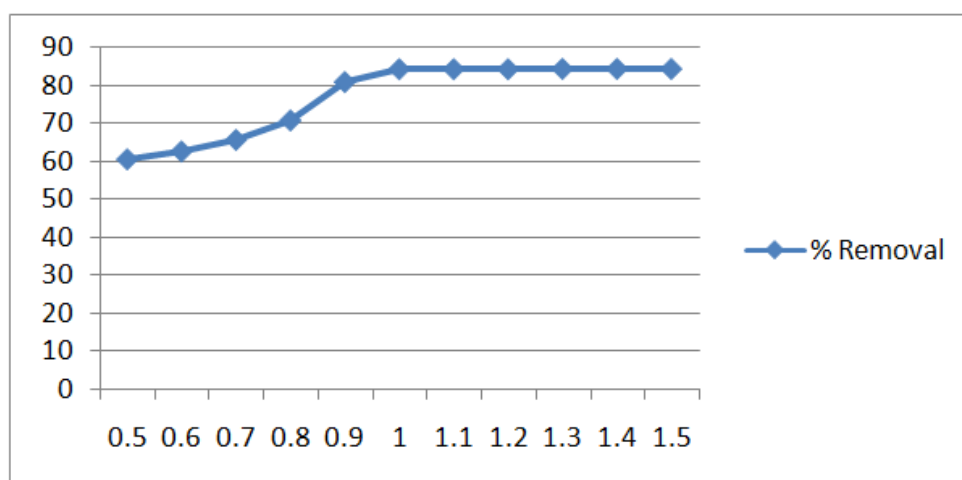
Various concentrations from 0.5% to 1.5% of Ocimum Sanctum, Azadirachta indica, Triticum Aestivum, Phyllanthus Emblica, and Strychnos Potatorum herbs were tested for effectiveness to percentage remove of E.coli. All these tests were performed for the contact time of 30 minutes. Mixture of herbs; Ocimum Sanctum, Azadirachta indica, Phyllanthus Emblica in the ratio of 3:1:1 was taken for study of removal of E.coli for various contact times from 25 minutes to 30 minutes for 1% concentration of each.

### III. Results And Discussion



**Fig 2:** Concentration of Herbs extract (%) versus % removal of E. coli

The extracts of herbs; Ocimum Sanctum, Azadirachta indica, Triticum Aestivum, Phyllanthus Emblica and Strychnos Potatorum separately was tested for removal of E. coli for various concentration with the difference of 0.1% from 0.5% to 1.5% for contact time of 30 minutes. The effect of concentration on removal of E. coli was noted. For the removal of E. coli 1% concentration was found to be optimum concentration for all herbs in this study. Result (Fig 2) showed that maximum removal of E. coli was for 1% onwards for all herbs extract. The percentage removal of E. coli was found 82.15%, 70.22%, 64.62%, 42.38% and 29.84% respectively for Ocimum Sanctum, Azadirachta indica, Triticum Aestivum, Phyllanthus Emblica and Strychnos Potatorum for the concentration of 1% and contact time of 30 minutes.



**Fig3:** Plot of concentration of herbs mixture versus % removal of E. coli

Mixture of herbs; Ocimum Sanctum, Azadirachta indica and Phyllanthus Emblica in the ratio of 3:1:1 taken for study of removal of E. coli for contact time of 28 minutes for 1% concentration of each showed that maximum removal of E. coli was 84.14% (Fig 3).

#### **IV. Conclusion**

From present study and results it is concluded that the extract of herbs like Ocimum Sanctum, Azadirachtaindica, TriticumAestivum, PhyllanthusEmblica and StrychnosPotatorumor their mixture can be used for water purification. In rural/tribal area people use the water from well or any other sources of water without any treatment. This water mostly containEcoli as harmful microorganism. These effective herbs are easily available in the rural/tribal area and can be used for killing the bacteria. Ocimum Sanctum is most effective amongst Ocimum Sanctum, Azadirachtaindica, TriticumAestivum, PhyllanthusEmblica and Strychnos Potatorum for removal of E.coli.

#### **Acknowledgement**

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