

## Role of some Natural Herbs in Water Purification

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**Abstract:** Natural herbs like Tulsi, Neem, Amla, Wheatgrass etc. are effective in water purification because of their antibacterial activity. Also these herbs are widely used as medicine for human with no side effects. Hence this study was done to evaluate effectiveness of Tulsi, Neem and Amla in water purification; especially with antibacterial activity. 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 32 minutes contact time for individual. But the mixture in 3:1:1 ratio required 28 minutes contact time for maximum removal of *E.coli*. The percentage removal of *E.coli* was found 82.15%, 70.22% and 42.38% by using 1% concentration of extract of Tulsi, Neem and Amla respectively at 32 minutes contact time. The mixture gave 84.14% removal of *E.coli* at 28 minutes contact time.

**Key words :** Herbs, Extract, Antibacterial Activity, *E.coli*.

### I. Introduction

Water Is An Important Compound Which Plays Many Roles. It Gives Life To Plants And Animals. It Is Universal Solvent Used In Many Of The Reactions. It Regulates The Temperature. Due To Less Rain Fall And Increased Population, We Are Experiencing The Scarcity Of Water. Also Human Activities Are Polluting The Water. Water Is Getting Polluted Not Only Chemically But Also Biologically. It Is Very Important To Remove Harmful Micro-Organisms 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. Chlorine Is Most Widely Used. The 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)].

In Villages, Water Used By People From Their Own Source Or Public Water Supplies Is Mostly Without Treatment. 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 Tulsi (*Ocimum Sanctum*), Neem (*Azadirachta indica*) And Amla (*Phyllanthusemblica*) Can Be Used For Water Purification 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 Tulsi (*Ocimum Sanctum*), Neem (*Azadirachta indica*) And Amla (*Phyllanthusemblica*) 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 Disyllled 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)].

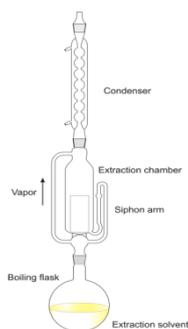


Fig1: Soxhlet Extractor Used For Extraction

**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 MI Of Water.

### III. Results and discussion

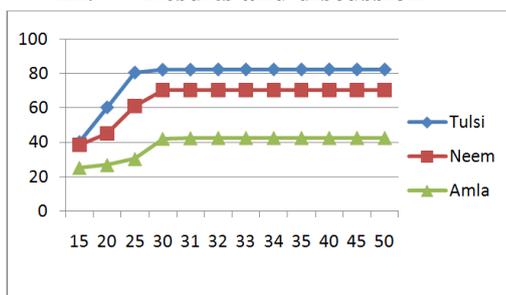


Fig 2: Plot Of Contact Time (Min) Verses % Removal Of Ecoli

The Extracts Of Herbs; Tulsi, Neemand Amla Separately Was Tested For Removal Of Ecoli For Various Contact Times Initially With The Difference Of 5 Minutes. The Effect Of Contact Time On Removal Of Ecoli Was Noted. After 30 Minutes The Contact Time Was Varied With 1 Minute And % Removal Of Ecoli Was Tested Up To 35 Minutes. Then The Time Was Varied With 5 Minutes Up To Total Contact Time Of 50 Minutes. Result (Fig 2) Showed That Maximum Removal Of Ecoli Was For 32 Minutes Onwards For All Herbs Extract. The Percentage Removal Of Ecoli Was Found 82.15%, 70.22% And 42.38% For Tulsi, Neem And Amla For The Concentration Of 1%.

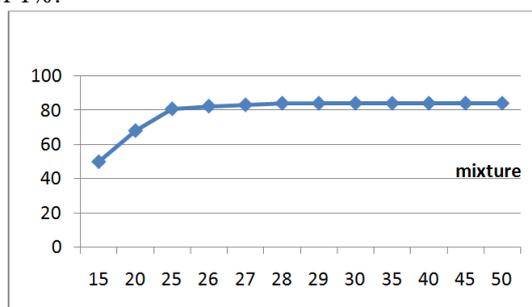


Fig3: Plot Of Contact Time (Min) Verses % Removal Of Ecoli

Mixture Of Herbs; Tulsi,Neem And Amla In The Ratio Of 3:1:1 Was Taken For Study Of Removal Of Ecoli For Various Contact Times. Result (Fig 3) Showed That Maximum Removal Of Ecoli Was 28 Minutes Onwards And The % Removal Was Found 84.14% For The Concentration Of 1%.

### IV. Conclusion

From Present Study And Results It Is Concluded That The Extract Of Herbs Like Tulsi, Neem, Amla Or 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 Contained coli As Harmful Microorganism. These Effective Herbs Are Easily Available In The Rural/Tribal Area And Can Be Used For Killing The Bacteria.

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