



## **Use of the Extracts of *Syzygiumcumini* and *Piper betal* Plant for Disinfection of Water**

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### **ABSTRACT**

Plant contains many bioactive chemical constituents in any of its part like root, stem, leaves, bark, fruit and seed which produces a definite curing physiological and pathological response in the treatment of various ailments in human. The plants used for the studies are the leaves of *Piper betal* and *Syzygium cumini*. Among them, *Syzygium cumini* shows the presence of flavonoids, alkaloids, steroids, phenol, terpenoids, saponin, etc. In present study the ethanolic extract of *Syzygium cumini* and *Piper betal* plant leaves was studied for the water treatment with its antimicrobial capacity testing. From the study it was observed that the *Syzygium cumini* and *Piper betal* plant both showed the antimicrobial capacity as after treatment of water the MPN value was found to be reduced. The *Syzygiumcumini* plant extract was found to be more effective as it reduced the other water parameter values also like chloride, hardness, total solids etc.

**Key words:** Water treatment, *Syzygiumcumini* and *Piperbetal* plant, ethanolic extract, antimicrobial activity.

Received 18.04.2023

Revised 20.05.2023

Accepted 11.06. 2023

### **INTRODUCTION**

Herbal medicine is traditionally used worldwide for the treatment of many infectious diseases. The use of medicinal plants as novel antibiotics have several other advantages related to safety, availability, and minimizing the risk of side effects and addiction. The World Health Organization (WHO) has adopted a major policy change in accepting that most developing nations would have to make use of more traditional medical practices for primary health care [1].

A wide variety of medicinal plants is known to decrease blood glucose levels and several hundred species from all over the world have been identified to do so [1, 2, 3, 4]. It could recently be shown that *Syzygium cumini* (L.) Skeels (syn. *Syzygium jambolanum* DC, *Eugenia jambolana* Lam., Jambul, Java plum) played an outstanding role among these, particularly in Western Europe in the three decades prior to the discovery of insulin [5].

*Syzygium cumini* and *Piper betel* are the plants of invaluable medicinal values where its leaves have been used for many medicinal purposes. *Piper betel*, a member of the Piperaceae, which is a large plant family, is also known Paan in India and Sirih in Malaysia and Indonesia. Betel leaf has been described from ancient time as an aromatic stimulo-carminative, astringent and aphrodisiac. The leaf produces an aromatic volatile oil which contains a phenol called chavicol which has a powerful antiseptic properties. The alkaloid arakene has properties resembling cocaine in some respect. Pharmacological effects of betel chewing include abundant flow of saliva, temporary dulled of taste perception, stimulation of muscular and mental efficiency [6, 7].

### **MATERIALS AND METHODS**

#### **Water Sample Collection**

Water sample of Krishna River was collected from different locations of Karad,

#### **Collection of leaves of *Syzygium cumini* and *Piper betal* plant**

The leaves of *Syzygium cumini* and *Piper betal* plant were collected from Karad city, Maharashtra, India.

#### **Analysis of Physicochemical Parameters of Collected Water Samples**

The collected water sample was analysed for the different physico chemical characteristics as below: [8, 9]

**a) Chloride:** The chloride content was analysed by titration method.

**b) Hardness:** The total hardness was calculated by titration method.

**c) Turbidity:** The turbidity of water was monitor by nephalometer.

**d) Total Solid content:** The Total solid content, Total Dissolved solid and Total suspended solid content was calculated.

**e) Most probable Number (MPN):** The MPN test is specifically for the detection of coliform group of bacteria. This test was performed to detect the coliform number in water sample.

**Treatment of *Syzygium cumini* and *Piper betal* Plant Extract with Water Sample**

The ethanolic extract was prepared by using the 10 g of leaves of *syzygium cumini* and *Piperbetal*plant in 100 mL of ethanol. The extract was used for the purification of water sample and for the analysis of antimicrobial activity. The 1 mL of ethanolic extract was used to treat the 100 mL of water sample in triplicates for the duration of 24 h.

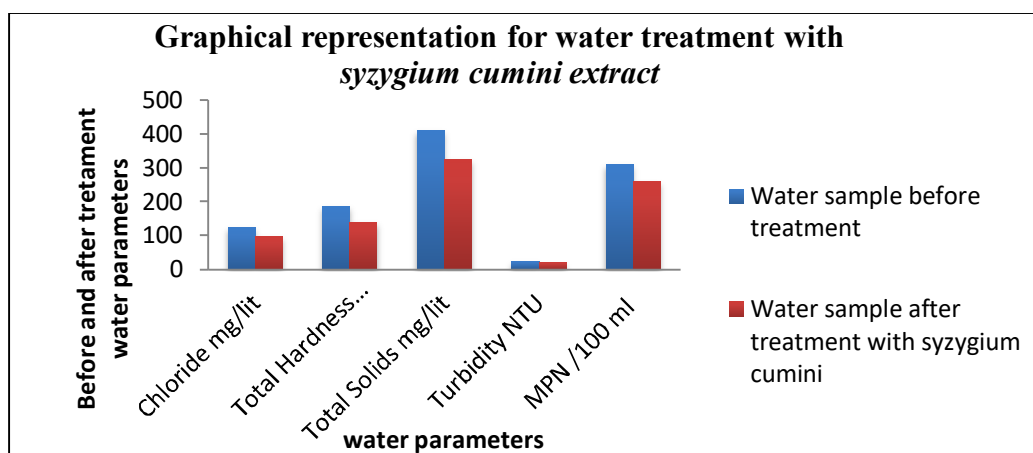
**RESULTS AND CONCLUSION**

The water sample in triplicates were collected and tested for different physico chemical parameters and then treated with the *Syzygium cumini* extract and *Piper betal* extract. The treatment was for the duration of 24 h.after treatment following results were obtained:

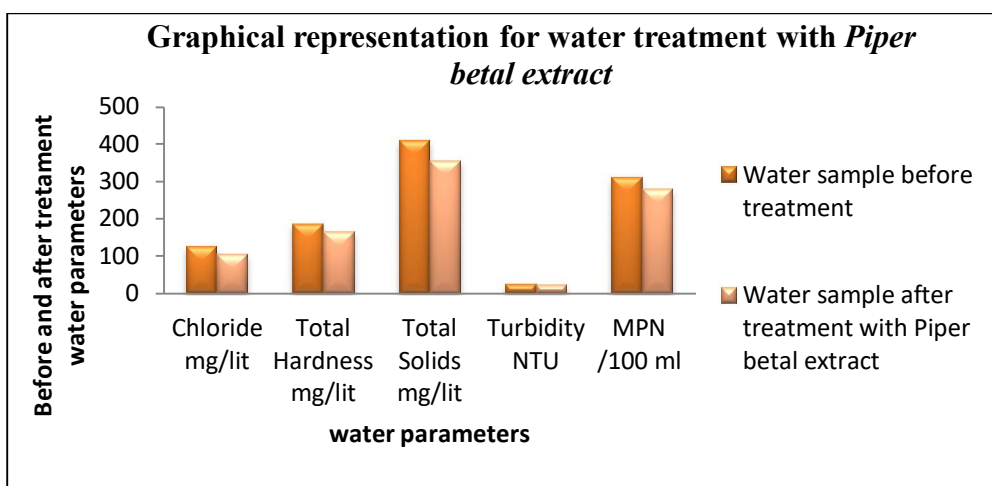
From the treatment with the *Syzygium cumini* extract and *Piper betal* extract it was observed that the *syzygium cumini* extract was found to be more effective for treatment of water than *Piper betal* extract as the water parameters chloride, hardness, turbidity and MPN were reduced in more amount. The treatment with *Syzygium cumini* extract effectively showed the decrease in values of Chloride before treatment which was 125 mg/lit and after treatment it was reduced upto 98 mg/lit. The Hardness value was observed before treatment as 180 mg/lit and after treatment it was reduced upto 140 mg/lit. Also, the MPN value is reduced from 310 coliforms/100 mL to 260 coliforms/100 mL which indicated that the extract of *Syzygium cumini* was found better to *Piper betal*.

**Table 1. Treatment of Krishna River water sample in triplicates with *Syzygium cumini* extract and *Piper betal* extract**

Sr. No	Physico chemical parameters	Water sample before treatment (Average of triplicate sample)	Water sample after treatment with <i>Syzygium cumini</i> extract (Average of triplicate sample)	Water sample before treatment (Average of triplicate sample)	Water sample after treatment with <i>Piper betal</i> extract (Average of triplicate sample)
1.	Chloride mg/lit	125	98	125	105
2.	Total Hardness mg/lit	186	140	186	165
3.	Total Solids mg/lit	410	325	410	356
4.	Turbidity NTU	25.07	21	25.07	23
5.	MPN coliforms /100 mL	310	260	310	280



**Fig- 1: Water treatment with *syzygiumcumini* extract**



**Fig-2: Water treatment with *Piper betal* extract**

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### CITATION OF THIS ARTICLE

Chonde Sonal G., Belekar Neha K., Yadav Kajal S. And Pathade Girish R. Use of the Extracts of *Syzygium cumini* and *Piper betal* Plant for Disinfection of Water. Bull. Env. Pharmacol. Life Sci., Spl Issue [2]: 2023: 023-025.