



## ISOLATION AND ANTIMICROBIAL ACTIVITY EVALUATION OF SOME HERBAL EXTRACT

Tejaswini Sunil Karande<sup>1\*</sup>, Nilam Pawar<sup>1</sup>, Tushar Katkar<sup>1</sup>, Monika Karanjkar<sup>1</sup>,  
Pawar Bhushan, and Swapnali Khade

<sup>1</sup>Gourishankar Institute of Pharmaceutical Education and Research, Limb, Satara.

<sup>2</sup>Satara College of Pharmacy Satara.

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### \*Corresponding Author

Tejaswini Sunil Karande

Gourishankar Institute of  
Pharmaceutical Education  
and Research, Limb, Satara.

### ABSTRACT

**Background:** Medicinal plant Garlic (*Allium sativum*) and onion (*Allium cepa*) and Honey (*Apis mellifera*) in which one or more substance or active constituent are present. This constituent are responsible for the chemotherapeutic use. The use of plants in treating ailments has been in practice since a long time ago. **Aims:** To study antibacterial activity of garlic, onion, honey and garlic-onion-honey combination. **Methods:** The antibacterial effect of garlic, onion, honey and Garlic-onion-Honey combination against gram positive and gram negative and fungi. Isolates including staphylococcus aureus, Escherichia coli, candida albicans all of them use to study antimicrobial

activity. **Result:** Antibacterial activity of these compounds checked by Agar well diffusion method against gram positive and gram negative and fungi. Garlic-Onion-Honey combination has more antibacterial activity, than individual extract of garlic, onion and Honey. Honey shows less antibacterial activity than Garlic and Onion. **Conclusion:** natural garlic, onion and honey shows antimicrobial activity against bacterial pathogen. The combination of garlic, onion, honey shows higher growth reduction.

**KEYWORDS:** garlic, onion, honey, garlic-onion-honey combination mixture, antimicrobial activity,

### 1. INTRODUCTION

Allium is the important representative genus of the Alliaceae or Amyrllidaceae family consist of 450 species. Onion (*Allium cepa*) is a bulbous plant widely cultivated in almost every

country of the world. Onion consist of the protein, carbohydrate, sodium, potassium and phosphorus.<sup>[1]</sup> During the earliest Olympics in Greece, garlic was fed to the athletes for increasing the stamina.<sup>[2]</sup> Family of garlic and onion is Amyrllidaceae. The antibacterial effect of garlic and onion was firstly described by the Louis Pasteur.<sup>[3-4]</sup> Garlic has ability to inhibit or prevent the growth of microorganism like bacterial and fungi.<sup>[5,6]</sup> Garlic used to treat tumor, cardiovascular disorder and liver damage.<sup>[7]</sup> Also used to treat asthma, cold, diabetes.<sup>[8]</sup> Onion shows antibacterial, antifungal, antihypertensive, Hypoglycemic, antifungal and antioxidant activity, antitumor, antiallergic.<sup>[9,10]</sup> Onion consist secondary metabolites such as Flavonoids, tannin, alkaloids and terpenoids, these compound are responsible for antimicrobial activity.<sup>[11]</sup>

Onion bulb contain more amount of phytochemicals most of which are hydrocarbon and their derivatives. These includes Dipropyldisulphide which is used as a flavour compound. Allicin which has antidiabetic antihypertensive, antibiotic and antithrombotic activity, diethyl disulphide which is used as a gas odorant and in chemical synthesis. Onions are used as a food and food condiments. It is used to treat instestinal infection.<sup>[12,13]</sup>

Honey shows antibacterial activity used to treat bed sores and ulcer, burns and wounds.<sup>[14,15]</sup> Hydrogen peroxide and gluconic acid is responsible for antimicrobial activity of honey.<sup>[16,17]</sup> Honey, Onion and Garlic shows broad spectrum activity.<sup>[18,19,20]</sup>

In these present study evaluated the antimicrobial activity of garlic, onion, honey and garlic-onion-honey combination against two bacterial and one fungal pathogen.

## 2.MATERIALS AND METHODS

### 2.1Collection of Plant material

**Type of Garlic and Onion:** The garlic and onion which was used in this study was desi obtained from the local market of satara distinct, Maharashtra and Authenticated by department of Botany, Y.C.I. S. Satara Maharashtra, India.

**Type of Honey:** Natural honey was collected from the honey comb.

### 2.2Preparation of garlic and onionextracts

Garlic, Onion were washed, uncovered, dried in sunlight and then weighed (20gm). By the use of electric blender garlic and onion were blended and placed in cleaned container.<sup>[21]</sup> Ethanolic extract of onion and garlic were prepared by using soxhlet apparatus. In 20gm of

garlic or onion add the 250 ml of ethanol and connected to soxhlet apparatus. The soxhlation was done in 16hrs and sterilized by filtration by using whatmann filter paper. Then these extract are evaporated to give solidified extract.<sup>[21,22]</sup>

### **2.3 Phytochemical screening**

Garlic and onion were extracted with ethanol. The preliminary test of garlic, onion and Honey were carried out according to the standard procedure mentioned in the Kokare<sup>[23]</sup> and Horborne.<sup>[24]</sup>

### **2.4 Antimicrobial activity**

#### **2.4.1. Collection of microbes**

In these study gram positive staphylococcus aureus, gram negative E. coli and fungi candida were used. These collected microorganisms were maintained in nutrient agar media. (Hi Media (P) Ltd Mumbai.

#### **2.4.2. Preparation of the medium**

Nutrient agar medium was prepared by dissolving 2.8 g of nutrient agar in 100 ml of distilled water. The solution was sterilized in an autoclave at 121°C for 15 min. It was cooled and poured into sterile Petri dishes to solidify. The agar depth of the medium was maintained (10mm).<sup>[25]</sup>

#### **2.4.3. Preparation of sample**

The sample preparations were carried out by 50 mg of compound dissolving into the 1ml of Dimethyl sulphoxide (50mg/ml) and 100 mg of of compound dissolving into the 1ml of Dimethyl sulphoxide(100mg/ml). Ciprofloxacin was used as standard in these study.

#### **2.4.4. Determination of antimicrobial activity**

Agar well-diffusion method was followed to determine the antimicrobial activity. Nutrient agar (NA) plates were swabbed (sterile cotton plug) with 8 hour old-broth culture of respective bacteria. Three wells (10mm diameter) were made in each of the plates using sterile cork borer. About 0.3 ml of different concentration of plant solvent extract were added using sterilized dropping pipettes in to the wells and allowed to diffuse at room temperature for two hours. The plates were incubated at 37°C for 18-24hrs for bacterial pathogen. Respective proper controls of solvent plant extracts were also maintained. Diameter of the inhibition zones and the values were recorded.<sup>[26]</sup>

### 3. RESULT AND DISCUSSION

In the present study the inhibitory effect of different compound against certain gram positive, gram negative, and fungi by using agar well diffusion method. The antimicrobial potentiation of garlic, onion and honey was evaluated according to their zone of inhibition against various pathogen. Phytonutrient obtained from the compound which is less toxic and responsible for controlling the growth of microorganism.<sup>[27]</sup> These compounds have antimicrobial activity against gram positive, gram negative bacteria and fungi. Allicin is main chemical constituent of garlic which is responsible for antimicrobial activity. Allicin is control and kill the staphylococcus aureus.<sup>[28]</sup> Garlic, onion and honey shows the antimicrobial activity against staphylococcus aureus, E. coli and candida albicans.<sup>[29,30]</sup>

#### Phytochemical screening

Results of phytochemical screening are mentioned in the following table no.1.

**Table no.1: Phytochemical investigation of compound.**

Sr. No.	Name of the test	Garlic	Onion	Honey
1	Steroids	+	+	-
2	Terpenoids	+	+	-
3	Glycoside	+	+	+
4	Corbohydrates	+	+	+
5	Alkoloids	+	+	+
6	Flovonoids	-	+	+
7	Tannins	+	+	-
8	Fats	+	+	+
9	Proteins	+	+	+
10	Amino Acids	+	+	+
11	Volatile Oils	+	-	-

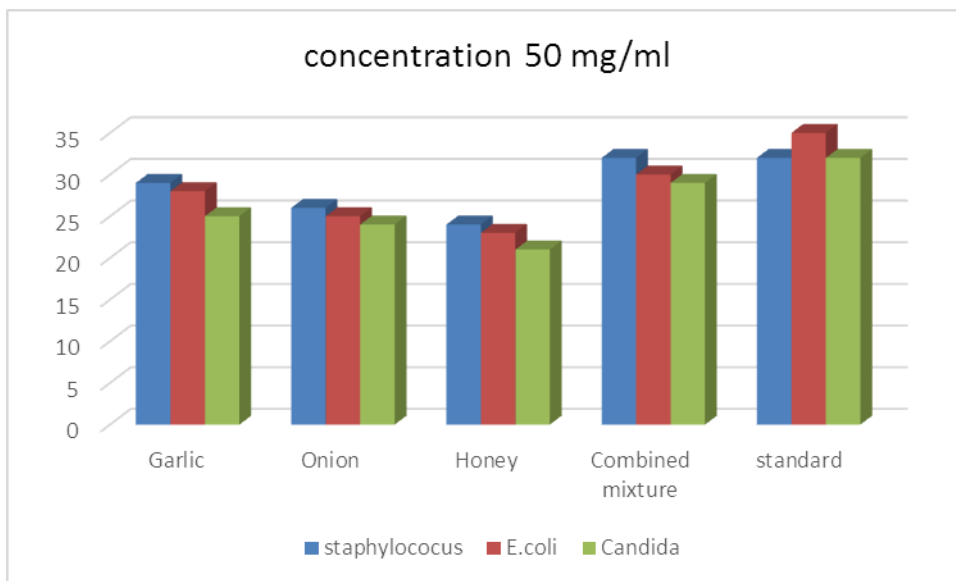
#### Antimicrobial study

Results of antimicrobial study showed in following table no. 2.

Antimicrobial activity of

**Table no. 2: Concentration 50 mg/ml.**

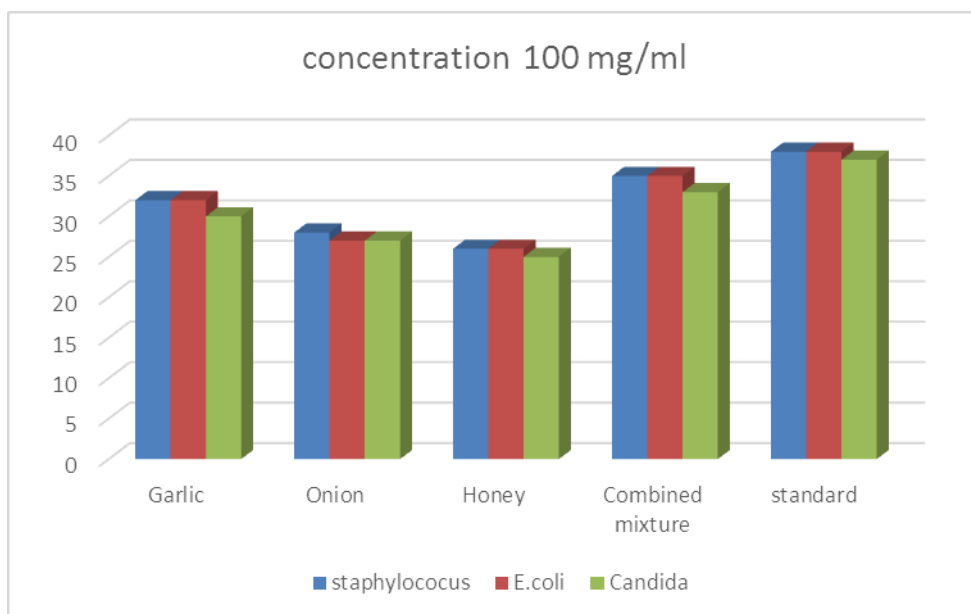
Sr. No	Organism	Nutrient Media	Inhibition Zone				
			Garlic	Onion	Honey	Combined mixture	standard
1	StaphylococcusAureus	Nutrient Agar	29mm	26mm	24mm	32mm	32mm
2	E.coli	Nutrient Agar	28mm	25mm	23mm	30mm	35mm
3	Candida	Nutrient Agar	25mm	24mm	21mm	29mm	32mm



**Fig no. 1: Antimicrobial inhibition zone diameter (mm) compound of concentration of 50 mg/ml.**

**Table no.3: Concentration 100 mg/ml.**

Sr. No	Organism	Nutrient Media	Inhibition Zone				
			Garlic	Onion	Honey	Combined Mixture	standard
1	Staphylococcus Aureus	Nutrient Agar	32mm	28mm	26mm	35mm	38mm
2	E. Coli	Nutrient Agar	32mm	27mm	26mm	35mm	38mm
3	Candida	Nutrient Agar	30mm	27mm	25mm	33mm	37mm



**Fig no. 2: Antimicrobial inhibition zone diameter (mm) compound of concentration of 100 mg/ml.**

#### 4. CONCLUSION

The result obtained in this study showed an explanation for the plant materials. Garlic, onion and Honey have antimicrobial activity on both (gram positive, gram negative bacteria) and fungi. Garlic has antibacterial effect because it contain organosulphur compound like allicin. It is most important chemical compound responsible for medical activity of Garlic. Onion has antimicrobial activity because it consist of flavonoids, protein, carbohydrates, sodium, potassium and phosphorus. Onion have been capacity to treat intestinal infections. Honey also has antimicrobial effect because it is rich source of phenol, fatty acid, lipid, amylase, ascorbic acid and fructose.

Garlic, onion and honey has excellent nutrition values and would be increase the immunity power against the bacterial infection. The combination of garlic-onion-honey mixture have more antimicrobial activity than the individual extract. Honey-Garlic-onion combination increase or improves the shelf life of each other.

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