



# Anti-Bacterial Possessions of Honey

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**Abstract:** *Worker bees have great contribution in making honey. To make honey, initially, the worker bee sucks nectar from flowers and stores it in its honey stomach. Once the worker bee returns to the hive, it vomits the nectar into a processor honeybee's mouth. In the processor bee's mouth and stomach, an enzyme called Invertase is added to the nectar. Invertase breaks some nectar into simple sugars like glucose and fructose (monosaccharides).[1] Then it vomits the partially converted nectar into another processor bee's mouth. Who also adds more Invertase helping breakdown more nectar. This process goes on until most of the nectar is converted into simple sugars. Then the mixture of simple sugars is stored in the honeycomb. At this point, the mixture is still watery. Hence, the bees flap their wings which evaporates water and thickens the mixture to eventually form honey.*

**Keywords:** Worker bee, Nectar, Invertase, Monosaccharides

## I. INTRODUCTION

Honey is basically a type of carbohydrate that is monosaccharide in nature. According to the recent studies, we could study 300 unique varieties of honey found in different countries. Honey is a viscous fluid in pure transparent form and it also has a slight odor. Depending upon the different geographical area of a particular region, the contrasting nectar of a flower resulting into contrasting varieties of honey. Honey has some enzymes which has anti-bacterial properties and contains acidity & some chemicals from the original plant nectar. Honey also contains Lactobacillus acidophilus which can be useful for health management.[2]

**There are two general forms of honey as follows:**

1. Raw honey: It is a direct form of honey harvested from a bee keeper and is in pure form. No artificial chemical or flavors are added to it.
2. Regular honey: It is indirect form of honey harvested from a bee keeper and is later subjected to manufacturing for marketing purpose. Meanwhile, artificial sweeteners and chemical are added to it, so as increase its marketing value. Hence, it is in impure form.

Largest production of honey is held by the country China nearly about 458K tons are put forward for the honey production. Entirely worldwide the total contribution to honey production gives a number about 1.6 million tons.

### 1.1 Properties

Antibacterial – Clears/heals infection of wounds as it is inflammatory in nature.

Improves tissue healing/ & makes new healthy cells.

It disrupts bacterial cell wall & cell membrane of bacteria.



Its hygroscopic nature can draw moisture out of the environment and dehydrate bacteria. High sugar content and low pH can also prevent microbes from growth.

B. Medicinal – Consists of vitamin C, magnesium, copper, zinc, riboflavin, folic acid, iron, Therefore, give relief in cough and cold.

Polyphenols and flavonoids acts as antioxidants fighting against various diseases like Cancer, Cardiovascular and Metabolic disorders it maintains oxidity level of the cells and oxidative stress.[3]

Hydrogen Peroxide compound kill microbes by destroying their cell wall.

As a result, it has been a medicinal source too.

C. Cosmetics – High viscosity of honey provide a protective barrier to skin prevent from infections Example:- Acne, pimples, white heads and ulcer, etc.

It contains various phytochemical which are organic and good for skin & body studies.

Hydrogen Peroxide is produced from Lucas oxidase an enzyme, which on breaking gives

Glucose oxidase an important component which is heat and light sensitive compound it shows exfoliating properties for skin.

## 1.2 Table of Contents

SR. NO.	Types of honey	Types of brands	Chemical composition of honey
1	Almond honey	Patanjali	Glucose oxidase
2	AlfaAlfa honey	Dabur	Fructose
3	Buckwheat honey	Nature's Nectar	Methyl glyoxal
4	Clover honey	Zandu	Hydrogen Peroxide
5	Manuka honey	Baidyanath	Polyphenols

## Requirements

Bunsen burner, cork borer, , Honey best quality brand

## Miscellaneous

1. Sterile test tubes ×4 ,
2. Sterile nutrient-agar plates ×4,
3. Sterile cotton swabs × 4,
4. Sterile micropipette tips
5. Alcohol

## Bacterial Samples

Pure culture suspension of– *Escherichia coli* (*E. coli*)



Media:- Nutrient-Agar

Sterile Nutrient-agar plates were used for detecting the properties of honey as it results in enumeration growth of specific bacteria and consists of many nutrients required for bacterial growth.

Preparation of sterile nutrient agar media:-

Suspend 28 g of Nutrient agar powder in 1L of distilled water

Mix and dissolve them completely

Sterilize by autoclaving at 121°C for 15 minutes

Pour the liquid into the petri-dish and wait for the medium to solidify.

### 1.3 Method/Procedure

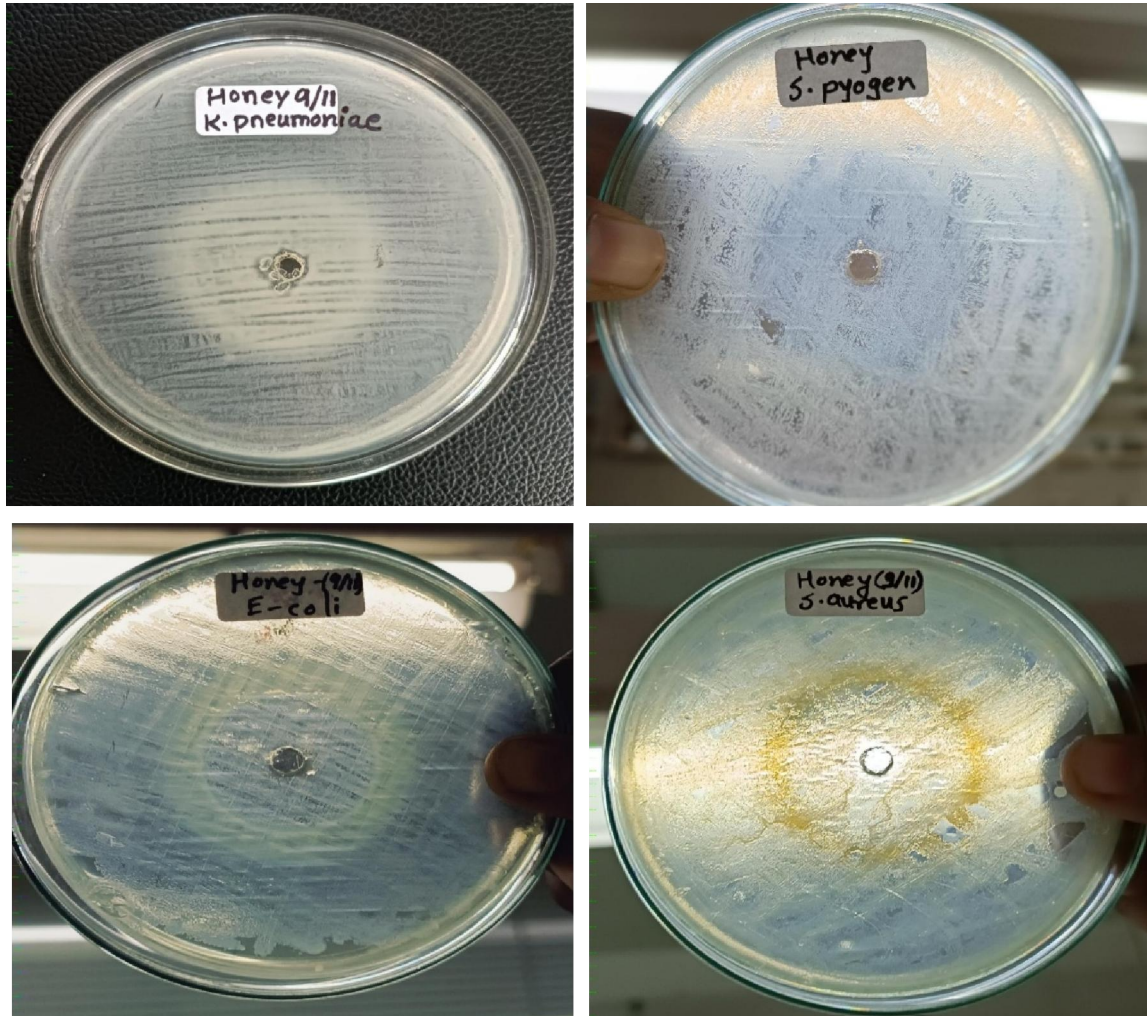
1. Clean the floor where you are performing the practical with the help of disinfectant and cotton.
2. On the flame of bunsen burner with the help of match sticks and make sure that the flame is oxidized.
3. Take sterile nutrient agar media plate and place it between your burners.
4. Now, take the suspension culture of *E.coli* and simultaneously sterile cotton swab, inserinate the test tube in which the suspension is kept.
5. Insert the sterile cotton swab in the test tube suspension, now, hold the st. NA plate and start swabbing gently in a stripping way and do ensure you are rotating the swab.
6. Once the swabbing process is done properly, use sterile cork borer to make a hole at the center of your media so as to add the honey in it.
7. Before using borer makes sure you are dipping it into the alcohol and sterilize it for a min by keeping it onto the flame.
8. Now, using micropipette allow to take 0.05ml of honey in it & add the drops into the hole which you have made hence fill the space.
9. Further do the same process with the other bacterial suspensions
10. Now, keep all the experimented plates in incubator to observe the growth or result in a particular temperature i.e. 37°C for 24 hours.

### 1.4 Observation/Results

1. The purpose of studying on Honey was to determine the Anti-bacterial activity and it's effective against a particular bacteria. After performing this we could see a clear zone of inhibition around the surface of honey's hole. The zone differs according to the bacterial species:-
2. The species of bacteria named *E.coli* has shown a zone of inhibition about 42 mm
3. The species of bacteria named *S. aureus* has shown a zone of inhibition about 39 mm
4. The species of bacteria named *S. pyogen* has shown a zone of inhibition about 40 mm
5. The species of bacteria named *K. pneumonia* has shown a zone of inhibition about 41 mm.



## 1.5 View



## II. CONCLUSION

As honey has shown great contribution to Antibacterial properties against tested organisms by stopping the growth of organisms in a particular zone of inhibition. It has also shown properties like Antioxidants and exhibits Antimicrobial activity against pathogenic bacteria's based on the different brand products the honey. The specific zone is been observed as the best quality gives the best result so it is necessary for every individual to use honey at their homes as it is reliable for every person to maintain their metabolic system of the body and in terms of proper diet. Among all properties it can be used as medicinal purposes and for skin too.

## REFERENCES

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