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## Different Fruit Peels - Anti Microbial Activity



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### ABSTRACT

Many of the fruits peel are thrown in the garbage or fed to live stock. These are having very rich bioactive compounds which are considered to have beneficial effects on health. But the study aimed to evaluate the anti- microbial activity. Here by we present the anti-microbial activity of different peels of fruits due to their numerous anti-oxidants and odd compounds. The peel powders were effective in anti-microbial activity. We aimed to evaluate the different fruit peel powders against Escherichia Coli. Were known to cause antibiotic-resistant infections. We performed the Agar well diffusion method and indicated the bactericidal action. We suggest that peels of fruits might be effective sources as they have numerous anti-oxidants.



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## I. INTRODUCTION

Numerous scientific investigations point at consecutive rich sources of antimicrobes, especially among fruits. But few of them involve the waste part of fruit peels. Fruits are considered as an important part of a good diet [1]. Besides, their delicious taste and flavour, they are known to reduce the risk of several chronic diseases. Fruit waste and its products are formed in great amounts during industrial processing and hence represent a serious problem, as they exert a harmful impact on the environment. So they need to be managed if they can be utilized. Consequently, the nutrients and beneficial compounds of some fruits are found in their skin. Although some peels are skin irritants, they are highly nutritious. However, make sure to consume peels of produce that are well washed and organic since they contain lower to zero traces of chemicals compared to non-organic and unwashed goods. Secondly, peels are best for skin whitening, scrubbing and cleansing. Different components having activities like antimicrobial, antioxidants etc, have been isolated from different fruit peels. Present review is written to present the antimicrobial status of fruits which are commonly used.

### AIMS & OBJECTIVES:

#### Aim:

The present study aims to determine the anti-microbial activity of different peels of fruits on micro-organisms.

#### The Objectives of this present study are:

- ❖ Procurement of fruits
- ❖ Procurement of microorganisms ( bacteria )
- ❖ Preparation of fruit peel powders
- ❖ Preparation of pure culture
- ❖ Determination of anti-microbial activity of different fruit peels on microorganism.

**Table No. 1: List of Fruit Peels**

S. No.	List of Fruits
1	pomegranate
2	Orange
3	Banana

**Fig No 01: pomegranate**



**Fig No 02: Orange peel**



**Fig No 03: Banana peel**



## II. MATERIALS AND METHOD

### Material:

### Sample:

The project work had carried out in the Mother Teresa Institute of Pharmaceutical Sciences. Fruits were obtained from the local market. Fruits were washed, cleaned of extraneous matter, and peeled it. The peels were dried at room temperature in a shaded region for a period of 1 week. The dried peels were ground in mortar and pestle.

**Microbial Cultures:** Pure cultures were collected from the department of microbiology, JNTUH University, Hyderabad.

**Culture Media:** For culturing of the microorganisms, nutrient agar medium was used. The nutrient broth was used for the incubation and standardization of the microorganisms. The culture used for the study: was *Escherichia coli*.

### Media:

The media employed for the study was Nutrient agar media, Nutrient broth.

**Preparation of Media:** The required quantities of nutrient agar (2.8 g 100ml<sup>-1</sup>) and nutrient broth (1.3g 100ml<sup>-1</sup>) were prepared by dissolving it in distilled water in conical flasks.

**Preparation of Nutrient Broth:** Broth was sterilized in an autoclave at 15psi pressure and 121° C for 15 min. After sterilization, some of the nutrient broth (approximately 20 ml test tube-1) was also poured into the test tubes.

### Microbial Strains:

The microbial strains employed for the study were *Escherichia Coli*.

### Antibacterial Activity:

The Antibacterial activity was assayed by Agar-well Diffusion method.

**Standard Reference Antibacterial Agent:** The reference antibacterial used is crude form of Rifampicin (1mg/ml), Gentamicin (1mg/ml), Ciprofloxacin (1mg/ml).

### **Agar well Diffusion method:**

Agar well diffusion method is widely used to evaluate the antimicrobial activity of plants, microbial extracts and also peels of different fruits. Similarly to the procedure used in disc-diffusion method, the agar plate surface is inoculated by spreading a volume of the microbial inoculum over the entire agar surface. Then, a hole with a diameter of 6 to 8 mm punched aseptically with a sterile cork borer or a tip, and a volume (20-100 µl) of the antimicrobial agent or extract solution at desired concentration is introduced into the well. Then, agar plates are incubated under suitable conditions depending upon the test microorganisms. The antimicrobial agent diffuses in the agar medium and inhibits the growth of the microbial strain tested.

**Positive Controls:** For gram-negative bacteria Rifampicin, Gentamicin, and Ciprofloxacin (1mg/ml), was used.

### **Anti-Microbial Activity:**

The sensitivity of peel extract against *Escherichia coli* was performed. Mueller Hinton Agar (MHA, Hinton-Media) was prepared, autoclaved, and poured into sterile Petri plates. The Orange peel extracts, which were tray-dried at 35°C, were dissolved in respective solvents in the ratio of 2:1 and 10 µl of extract solution was dropped onto petri plates swabbed with bacterial inoculum. The controls, which consisted of respective solvents for extracts, was set up next to the extract and 10 µl of control was dropped adjacent to the spot of the extract. The plates were then incubated for 24 hours at 37 °C. The clear zone around the drop of the extract was

noticed. Different microbial species were used to screen the possible antimicrobial activity of different peels of fruits. To determine antimicrobial activity, peels were tested against different organisms. This was assumed to be sufficient for the antimicrobial screening. Very clear differences were found between the effects of different peels in the study. The results of the antimicrobial screening assay of different peels are shown in table. Antimicrobial activity was observed with different peels of fruits against gram negative bacteria. The different resistant patterns are likely to be related to bacteria cell wall structures and protein synthesis. Antibacterial activity and was carried out using standard drugs like Rifampicin, Gentamicin, Ciprofloxacin respectively with concentrations of 1mg/ml.

### III. RESULTS AND DISCUSSIONS:

The different peels of fruits were subjected for anti-bacterial activities and the results were investigated, the peel powders were revealed the presence of antibacterial activities. The results of antibacterial activity by agar plate method indicate the activity on Pomegranate, Orange, and Banana against E. coli. Peels powder showed good activity of organisms like E. coli. Standard antibiotic of inhibition. The results of the investigation showed that peels of different fruits have good antibacterial activity against E. coli.

**Table.2 Diameter of Zone of inhibition at MIC of extract**

Diameter of ZI for	Escherichia coli
Methanol	4.38±0008 <sup>a</sup>
Ethanol	5.88±0.012 <sup>c</sup>
Petroleum ether	2.76±0.092 <sup>b</sup>
Acetone	7.75±0.12 <sup>b</sup>

**Table.3: The antimicrobial activities of the ethanol extract of the musa sapientum peels.**

Con.(mg/ml)	Escherichia coli
1025	26
512.5	23
256	18
128	12
64	08
32	0
16	0
8	0
4	0

Fig no 04: Anti-microbial Activity of Pomegranate peel Extract against the E.coil

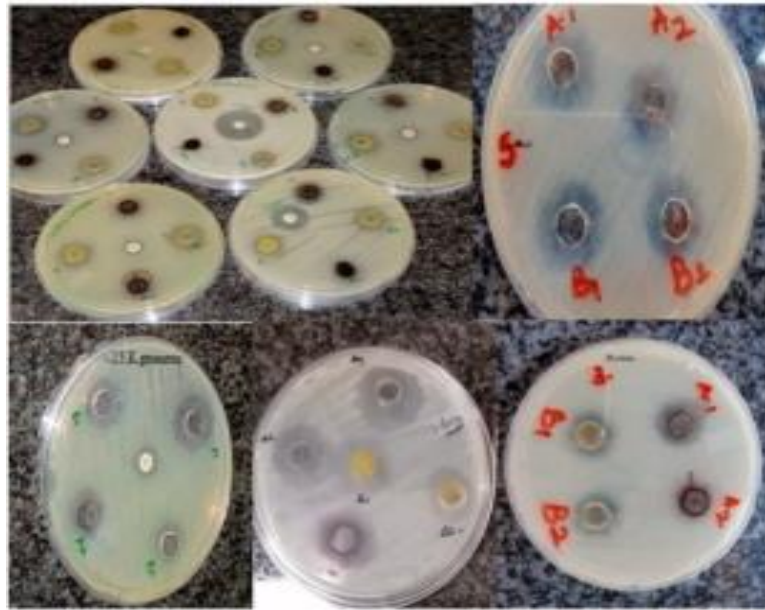
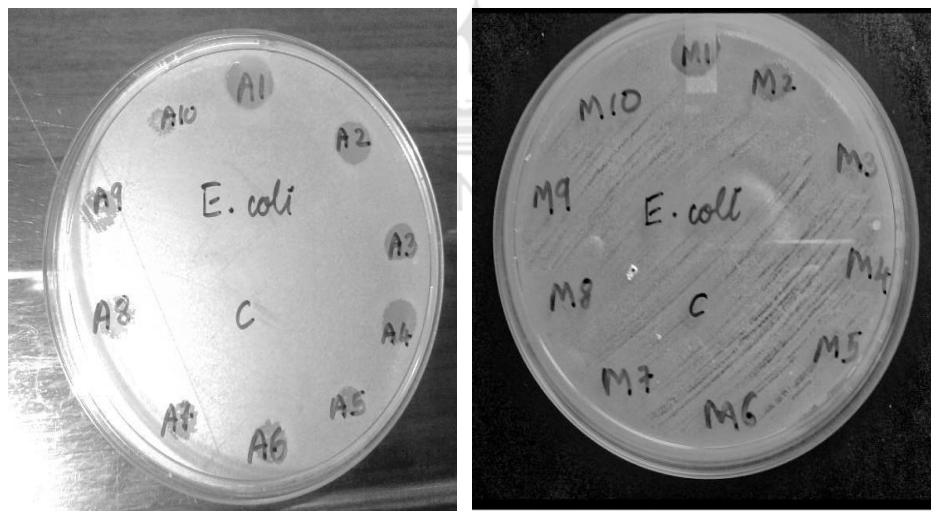
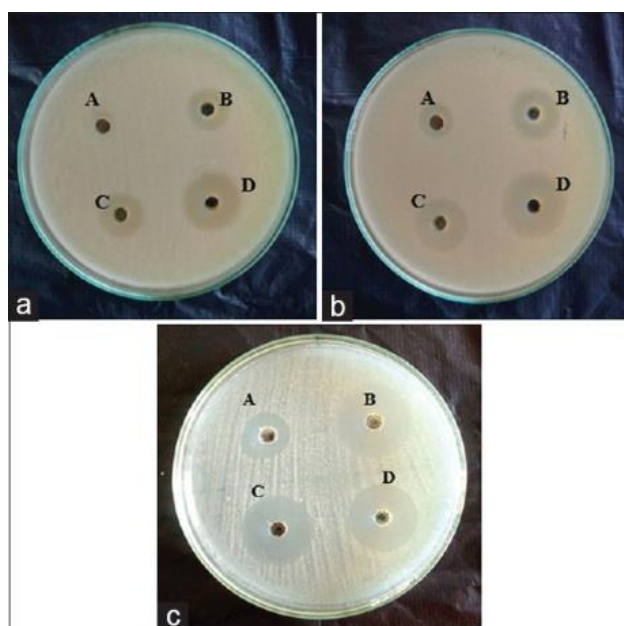


Fig no05: Anti-microbial Activity of Pomegranate peel Extract against the E.coil

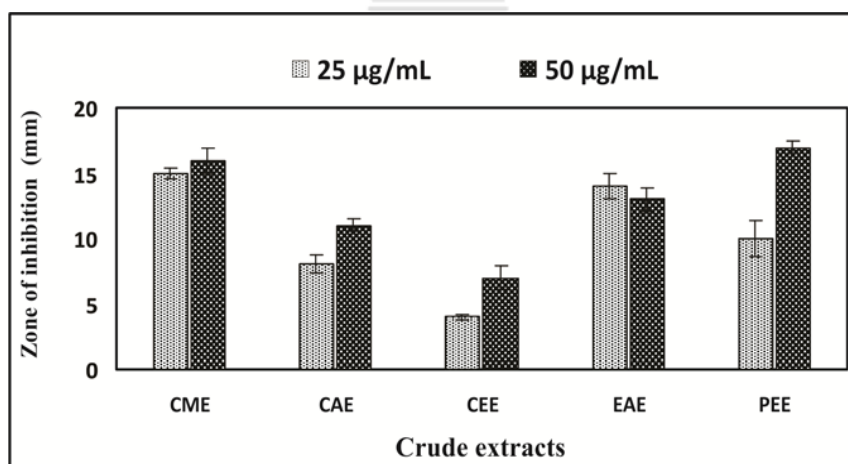


**Fig no 06: Zones of inhibition at different dilutions of Acetone and Methanol Extract against Escherichia coli**



**Fig no 07: The antimicrobial activity of banana peel extract against E.Coli**

(a) First experiment, (b) Second experiment, (c) Third experiment



**Fig no 8** Activity of various *P. granatum* extracts against *E. coli*. **CME:** Crude Methanolic extract; **CAE:** Crude aqueous extract; **CEE:** Crude ethanolic extract; **EAE:** Ethyl acetate extract; **PEE:** Petroleum ether extract.



#### IV. CONCLUSION:

We conclude that the present study suggests the soil surrounding the medicinal plants is highly rich in microbial species and are very useful. The isolated microbial strains were Gram-negative i.e., E.coli. The isolated microbial strains were useful to perform antimicrobial activity on different vegetable peels. For this study different fruits such as **Pomegranate, Orange, and Banana** were collected from the local market where the fruits were washed, cleaned off extraneous matter, and peeled it. The peels were dried at room temperature in a shaded region for one week. The dried peels were ground with the help of a motor and pestle. The work states that the peels of different fruits are responsible for antimicrobial activity. Various extraction methods such as Soxhlation and Maceration were used. The extracts of these peel powders exhibit a maximum zone of inhibition against E.coli. The Microbial activity of the peel extracts of **Pomegranate (*Punica granatum*), Orange (*Citrus*), and Banana (*Musa sapientum*)** was judged by Agar well diffusion method. The extracts of these peel powders exhibit a maximum zone of inhibition against E.coli. Peel extracts of **Pomegranate (*Punica granatum*) Orange (*Citrus*) Banana (*Musa Sapientum*)** showed the presence of various phytochemicals of which include alkaloids, tannins and flavanoids, saponins and terpenoids.

At the end of the conclusion we knew about significant antimicrobial activity of the peel extracts when estimated with standards. So after lots of tests, decisions and thoughts it was found that the Minimum Inhibitory Concentration (MIC) of the peel extracts of Pomegranate 25µg/ml & 50µg/ml, Orange 50µg/ml, Banana 50µg/ml. The antimicrobial activity of peel extracts of **Pomegranate (*Punica granatum*), Orange (*Citrus*), and Banana (*Musa Sapientum*)** were determined. The result showed the good antimicrobial activity of these peel extracts against Escherichia Coli.

#### FUTURE ASPECTS:

Hence the present investigation results show promising evidence of utilizing the fruit peels as a source for natural antimicrobial. Thus new aspects concerning the use of the wastes therapeutically are very attractive. The demonstration of broad spectrum of antibacterial activity by peels may help to discover new chemical classes of antibiotic substances that could serve as selective agents for infectious disease chemotherapy and control. This investigation has opened up the possibility of the use of this plant in drug development for

human consumption possibly for the treatment of various infections caused by microbes. These are novel, natural and economic sources of antimicrobics, which can be used in the prevention of diseases caused by pathogenic microbes. Therefore, this study will open up as a scope for future utilization of the waste for therapeutic purpose.

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