



**EXTRACTION OF OIL FROM CITRUS FRUIT PEELS AND THEIR STUDY ON ANTIBACTERIAL ACTIVITY**

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**ABSTRACT**

The citrus is a type of fruit which contains high amount of vitamin-c, phenolic compounds, dietary fibres, essential oils. The paper mainly focus on antibacterial activity of an oil extracted from three selected species of citrus such as *Citrus limetta* (sweet lime), *Citrus limmon* (Lemon) and *Citrus reticulata* (Mandrain orange) etc. Gram positive and gram negative bacterial strains were observed. Orange oil therefore, has a lot of therapeutic functions such as anti-inflammatory, antiseptic, anti- depressant, tonic, and carminative, antispasmodic, diuretic and as a sedative. Limonene, which is the major component of orange oil (about80-85%) due to which orange oil has variety of use seen in different ways.

**KEYWORDS :** Citrus fruit peels, oil extract and antibacterial activity etc.

**INTRODUCTION:**

Citrus is genus of flowering trees and shrubs which belongs to family Rutaceae. It consist of near about 140 genera and 1300 species. It is one of the major fruit tree crop growing throughout the world. The genus citrus is native of Southeast Asia, East Asia, South Asia and Australia and Melanesia etc. The antibacterial activity of natural products from medicinal plants is applicable for the treatment of bacterial, fungal and viral disease ( Bernhoft,2010) Some secondary metabolites and essential oil have prove to be responsible for antimicrobial activity of plants, ( Hwang et.al., 2001) Several workers have reported that the phenolic compounds show antimicrobial ( Saify et.al., 2005)

The peel extract of *Citrus reticulata* is more effective against gram positive bacteria. The highest zone of inhibition shown by peel extract was against *Aspergillus*. The presence of higher amount of flavanone in peel might be reason behind effectiveness of peel extract (Levaj et.al.2009)

**MATERIALS AND METHOD:**

The method is described by (Hegazy and Ibrahim 2012). The fruit were washed thoroughly after collection in the distilled water, Orange peels were dried and by using mixer and grinder fine powder is made.20g of peel powder was packed in a filter paper and put in the extractor. Acetone is used as solvent, extraction is done at 600 ° C for 10-12 hours. Oil is separated from acetone solution by using distillation method and then centrifuges it at 10000 rpm for 10 min. collected oil is then stored in reagent bottle.

The antibacterial activity of juice and peel extract of three selected citrus fruits *Citrus reticulata* (orange), *Citrus limetta* (sweet lime), *Citrus limon* (lemon) Gram positive and Gram negative bacterial strains were examined. The plates were incubated at 37 ° c for 24 hours. Antibacterial activity was evaluated by measuring diameter of zone of inhibition around the plate.

**OBSERVATION AND RESULT:**

The test was taken to check the antimicrobial activity of Extracted oil sample against some selected microbes such *Escherichia coli*, *Xanthomonas solanecearum* and *Ralstonia campestris Aspergillus niger*, the microbial culture was used and also P.D.A media was used as growth media for bacterial and fungal growth respectively. The microbial culture were inoculated after pouring the respective media into the Petri plates. The wells were prepared and the oil samples were placed into the wells by micropipette. All the processes were conducted in laminar air flow. Then these plates were placed into the incubator at 37 ° C for 24-36 hour for clear results. Then the results were recorded.The Solvent extraction process found that the oil production from200g of orange peels 4.5ml, from 200 gm of Sweet lime peels 4.2ml and from100 gm of Lemon peels 2.2ml pure oil was extracted successfully



Fig.1 Citrus limmon



Fig.2 Citrus reticulata



Fig.3 Citrus limetta



Fig.4 Escherishia

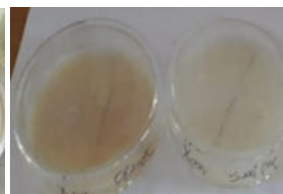


Fig.5 Xanthomonas



Fig.6 Ralstonia

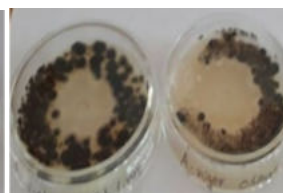


Fig.7 Aspergillus

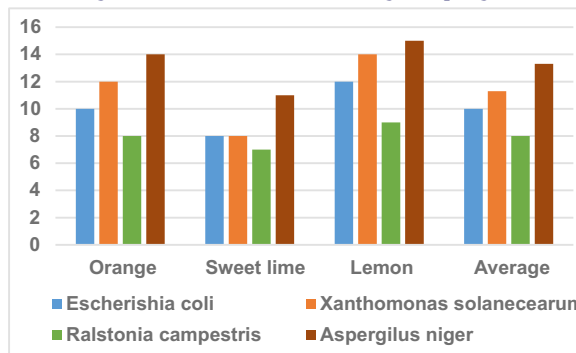


Fig. 8. Graph showing zone of inhibition

**Table 1. Showing zone of inhibition against microorganisms**

Sr. No.	Micro-organism	Zone of Inhibition (in mm)			
		Orange	Sweet lime	Lemon	Average
1	<i>Escherishia coli</i>	10	08	12	10
2	<i>Xanthomonas solanecearum</i>	12	08	14	11.3
3	<i>Ralstonia campestris</i>	08	07	09	08
4	<i>Aspergillus niger</i>	14	11	15	13.3

**Table 2. Oil yielding of different varieties of citrus peel.**

Sr. No.	Extraction methods	Orange peel Oil (200 gm)	Sweet lime peel Oil (200 gm)	Lemon peel Oil (200 gm)
1	Solvent method	5.5	5.3	3.2
2	Steam Distillation	6.4	5.2	2.8

The peel extract of *Citrus reticulata* is more effective against gram positive bacteria. The highest zone of inhibition shown by peel extract was against *Aspergillus*.

**CONCLUSION:**

The antibacterial activity shown by citrus fruit peel extracted oil is more effective agent and can be used for treatment of infections associated to the studied microorganisms.

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