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"Anti Bacterial Activity of Different Vegetable Peels"

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ABSTRACT:
Many of the vegetables skins are thrown in the garbage or fed to live stock.These arehavingveryrichbio-activecomponentswhichareconsideredtohavebenefi cialeffectsonhealth. But the aim of the study was to evaluate the antibacterial activity. Here by we present the antibacterial activity of different peels of vegetables due to their numerous anti-oxidants and odd compounds. The peel powders were effective in antibacterial activity.We aimed to evaluate the different vegetable peel powders against EscherichiaColi,PseudomonasAeruginosa,Staphylo coccusAureus,VibrioCholerae,Klebsiellaspp.,werek nowntocauseantibioticresistantinfections.we performed the agar diffusion method and indicated the bactericidal action. We suggest that peels of vegetables might be effective sources as they have numerous antioxidants.

Keywords: Antibacterial activity, Peels of different vegetables, Different microorganisms.

I INTRODUCTION:

Numerous scientific investigations point at consecutive rich sources of antimicrobes, especially among vegetables. But few of them involved in waste part of vegetable peels. Vegetables are considered as an important part of a good diet**[1]**.Besides, their delicious taste and flavour; they are known to reduce risk of several chronic diseases. Vegetable waste and their by products are formed in great amounts during industrial processing and hence represent a serious problem, as they exert harmful impact on environment. So they need to be managed or they can be utilized**[2]**.Consequently the nutrients and beneficial compounds of some vegetables are found in its 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. Differentcomponentshavingactivitieslikeantibacteri alantioxidantetc.,have been isolated from different vegetable peels. Present review is written with a view to present the antibacterial status of vegetables which are commonly used.

CitrusLimon:

Lemon peel contains Volatile oil from 2 to 4%. The other constituents of the peel are Hesperidin, Pectin, Calcium Oxalate & Bitter substances. The Volatile oil of the drug contains mainly Limonene (about 90%), Citral (about 4%), and other aromatic compounds like Geranyl Acetate& Teripneol. The Lemon Oil has Pale yellow colour. The citrus peel shows strong antibacterial activity. The antibacterial activity has been checked in terms of minimum inhibitory concentration by using different solvents against microorganisms like E.coli. The peel extracts is done by different solvents such as Ethanol and Acetone which are subjected to antibacterial assay **[4]**

Zingiber Officinale:

Ginger contains1to2%volatileoil, 5to8% pungent resinous mass and starch. The volatile oil is responsible for the aromatic odour and the pungency of the drug is due to the yellowish oily body called gingerol which is odourless. Volatile oil is composed of sesquiterpene hydrocarbon like alpha-zingberol,alpha-sesquiterpenealcoholalpha-bisabolene,alphafarnesene,alpha-sesquiphellandrene. Less pungent components like gingerone and shogaolare
Also present. Shogal is formed by the dehydration of gingerol and is not present in fresh rhizome **[5]**.

Daucus Carota:

The Daucus carota is a root vegetable,

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conical or cylindrical in shape. Usually they are orange in colour, though purple, red, white and yellow varieties exist. They are available in 2 inch baby size and larger. Carrot belongs to the family Apiaceae. Carrot contains carotenes, especially alpha-and beta-carotenes,vitamin A and C and dietary fiber. It is rich in calcium and potassium. Red carrots also contain lycopene.

II AIM & OBJECTIVE:

The aim of present study is to determine the anti-bacterial activity of different peels of vegetables on micro-organisms.

The objectives of this present study are:

- Procurement of vegetables
- Procurement of Microorganisms
- Preparation of vegetable peel powders
- Preparation of pure cultures
- Determinationofanti-bacterialactivityofdifferentvegetablepeelsonvariousmicro-organisms.

III MATERIALS AND METHODS

Sample : Vegetables and fruits were obtained from the local market. Vegetables and fruits were Washed cleaned of extraneous matter and peeled it. The peels were dried at room temperature in a shaded Region for period of 1 week . The dried peels were grinded in mortar and pestle.

Culture Media:

For culturing of the microorganisms, nutrient agar medium was used. Nutrient broth and sabouraud dextrose media Was used for the incubation and standardisation of the microorganisms. The following cultures were used for the Study: Escherichia coli, Staphylococcus aureus, Proteus vulgaris, Lacto bacillus and Saccharomyces cerevisiae.

Media:

Nutrient Agar, Nutrient Broth was procured from Hi Media and fungal media was procured from standard Sabouraud Dextrose Agar Media.

Preparation of Media:

The required quantities of nutrient agar (2.8 g 100ml-1) and nutrient broth (1.3g 100ml-1) and sabouraud dextrose Agar (6.3g 100ml-1) 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.

Preparation of Nutrient Agar media:

Nutrient agar media of 50ml was separated in other conical flasks and is inoculated with 0.5ml of cultures in the same way fungal media is also prepared but standard media that is sabouraud dextrose agar media is used and poured aseptically into sterilized petri plates. The media was allowed to be solidified in petri plates and then wells are made with sterile borer having 0.5cm diameter and then placed in an incubator at 37◦ C for 24 h for bacteria and 28- 30◦ C for 48 h for fungi.

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Standard Reference Antibacterial Agent:

The reference antibacterial used is crude form of Gentamycin (1mg/ml).

Standard Reference Antifungal: The reference antifungal used is Fluconazole (1mg/ml).

Antibacterial Activity:

The Antibacterial activity was assayed by Agar-well Diffusion method. Agar well diffusion method is widely used to evaluate the antibacterial activity of plants, microbial extracts and Also peels of different vegetables. Similarly to the procedure used in disk-diffusion method, the agar plate surface is inoculated by spreading a volume of the microbial inoculum over the entire agar surface**[12]**.Then, a hole with a diameter of 6 to 8 mm is punched aseptically with asterile cork boreror a tip,and avolume(20–100µl)of the antibacterial agent or extract solution at desired concentration is introduced into the well. Then ,agar plates are incubated under suitable conditions depending upon the test microorganism. The antibacterial agent diffuses in the agar medium and

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inhibits the growth of the microbial strain tested.

IV RESULTSANDDISCUSSIONS:

- Antibacterial activity of dried fruits peel of Citrus Limon has been evaluated. The present study was done against the variety of gram-positive, gram-negative bacteria, and fungal strains were selected for screening antibacterial impact of the extracts to see the antibacterial spectrum .Results of this study shows that the methanolic extracts of the peel of the fruit of Citrus Limon were highly successful in producing the desired result against most of the gram-positive bacteria ,gram-negative bacteria, and fungal strains in agar well diffusion method. Based on this result, the strength on lemon (Citrus Limon) peel extract onconcentration100% gave 18, 77mmof the average inhibition zone.
- The antibacterial activity of the soybean extract of ginger varied depending on the bacterial species used. The diameter of the zone of inhibition varied ranging from (8.0±1.73 mm) to (11.67±1.53mm) for ginger extract as compared to (12.33±7.09 mm) to (19.33±3.51 mm) for gentamicin .the antibacterial activity of the ginger was found. Lowest activity was found against Escherichia coli. Staphylococcus aureus showed lower sensitivity to ginger extract as compare to the most other gram-negative bacteria. This result also indicated that soybean extract of ginger was more effective as an antibacterial agent compared to the soybean alone.

- The antibacterial activity of the extracts increased linearly with increase in concentration of the extracts (µg/mL).The growth inhibition zone measured for acetone extracts for various bacteria ranged from 11-16 mm. The growth inhibition zone measured form ethanol extracts were in the range 12-17 mm. The antibacterial potential was dose dependent against E.coli .Carrot peel inhibited the growth of disease causing pathogens. There was little difference in antibacterial activity in both the extracts.
- The result of antibacterial activity o f Cucumis sativus ,peel extracts are presented in table Both the extracts had good inhibitory activity against all the tested organisms ,Shigellaflexneri, Ecoli Staphylococcus aureus and Klebsiella pneumonia. The methanol extrac showed inhibited diameter zones(IDZ)rangingfrom11-21mm,withhig host zone of inhibition exhibited by E.coli. IDZ for chloroform extract were in the range 12-17 mm.

Zone of Inhibition of Lemon peel extract against Escherichia coli.

Name of the compounds and their concentration	Antibacterial activity diameter of inhibition zone against *Escherichia coli*(mm)			
	I	II	III	Mean
Peel extract (25%)	15,10	15,80	14,20	15,03
Peel extract (50%)	16,10	16,30	16,10	16,17
Peel extract (75%)	14,20	16,10	17,20	15,83
Peel extract (100%)	18,80	19,20	18,30	18.77

Antibacterial activity of boiled ginger extract in soybean oil

S.NO	EXTRACT	ORGANISMS	STANDARD	ZONEOFINHIBITION		
				50µL	75µL	100µL
1	Acetone	E.coli	22 mm	12 mm	14 mm	16 mm
2	Methanol	E.coli	25 mm	13 mm	14 mm	16 mm

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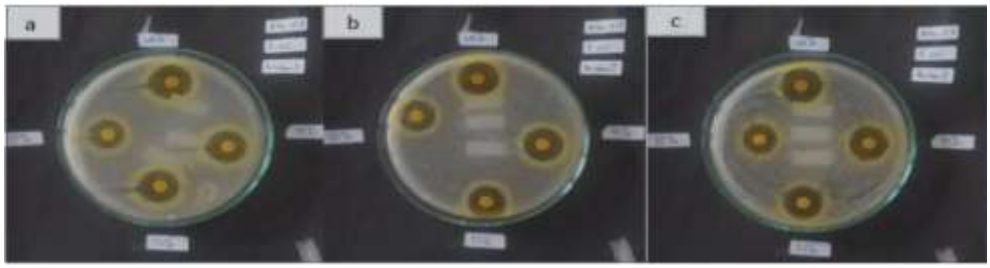
Anti bacterial activity of carrot peel acetone and methanol extract.

S.NO	EXTRACT	ORGANISMS	STANDARD	ZONEOFINHIBITION		
				50µL	75µL	100µL
1	Choloroform	E.coli	29 mm	14 mm	15 mm	16 mm
2	Methanol	E.coli	29 mm	11 mm	16 mm	18 mm

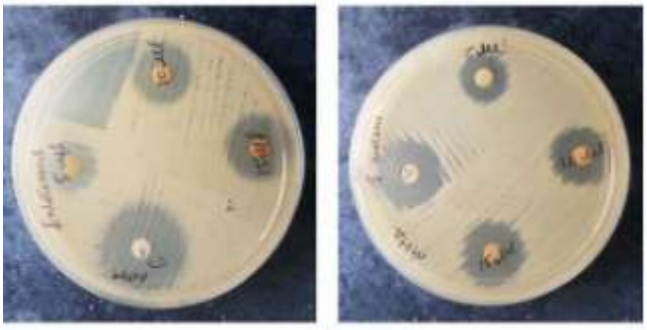
Anti bacterial activity of Cucumber peel chloroform and methanol extract.

S.NO	EXTRACT	ORGANISMS	STANDARD	ZONEOFINHIBITION		
				50µL	75µL	100µL
1	Choloroform	E.coli	29 mm	14 mm	15 mm	16 mm
2	Methanol	E.coli	29 mm	11 mm	16 mm	18 mm

The anti bacterial activity of lemon(Citruslimon)peel extract against E.coli
First experiment,(b)second experiment,(c)third experiment



AntibacterialactivityofGingerpeel extractagainstE.coli



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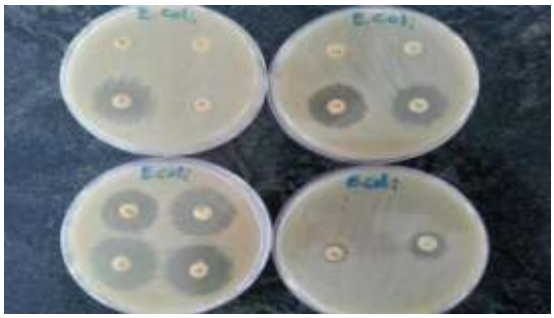
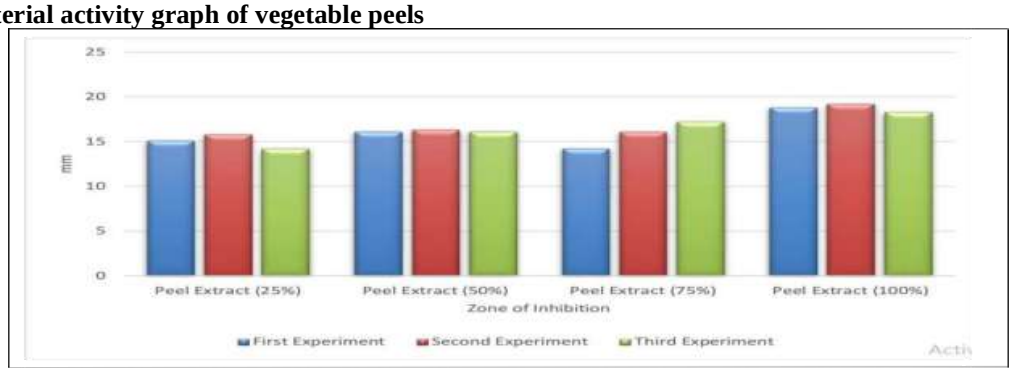
Anti bacterial activity of Carrot peel extract against E.coli

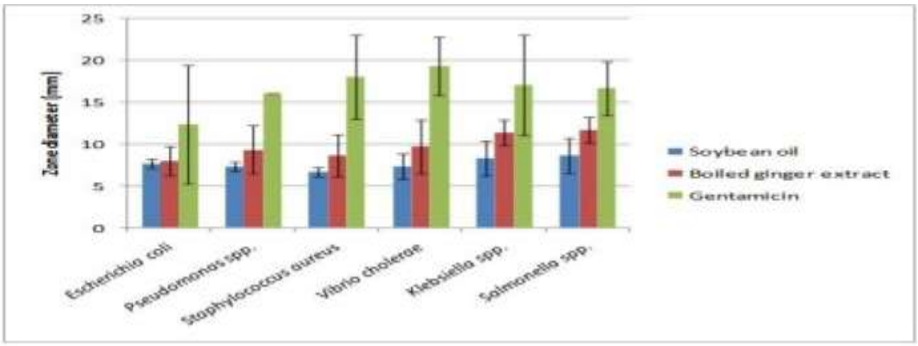
Antibacterial activity of Cucumber peel extract against E.coli.



Antibacterial activity graph of vegetable peels



Antibacterial activity graph of vegetable peels



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V CONCLUSION

The different vegetables were collected from local market. The fruits and vegetables were washed, cleaned of extraneous matter and peeled it. The peels were dried at room temperature in a shaded region for a period of one week. The dried peels were grinded with the help of motor and pestle. The works states that the peels of different vegetables were responsible for antibacterial and antifungal activity, these peel powders exhibit a maximum zone of inhibition against E.coli. Lacto. Bacillus, Proteus. Vulgaris, Staphylococcus. Aureus, Saccharomyces cerevisiae. It is interesting to observe the results of high antibacterial activity on Citrus **imon, Zingiber Officinale, Daucus Carota, Cucumis Sativus.**

Future aspects:
Hence the present investigation results shows promising evidence of utilizing the vegetable peels as a source for natural antimicrobial. Thus new aspects concerning the use of the wastes therapeutically are very attractive. The present investigation focuses on the possibility of using plant peel waste as a source of low-cost natural antimicrobial. M. indica peel, usually a waste product which is thrown into the environment has a very good antimicrobial potentiality. The demonstration of broad spectrum of antibacterial activity by M. indica 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 anti microbics, which can be used in the prevention of diseases caused by pathogenic microbes. Therefore, this study will definitely open up as a scope for future utilization of the waste for therapeutic purpose.

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