



## Evaluation of Anti Microbial Activity of Pineapple Extract Against Selected Microbes

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### ABSTRACT

The aim of the study is to evaluate the antibacterial activity of Pineapple extract on against selected bacterial pathogens. Pineapples have exceptional juiciness and a vibrant tropical flavour that balances the tastes of sweet and tart. Bromelain is a complex mixture of substances that can be extracted from the stem and core fruit of the pineapple. It has a wide variety of health benefits. Excessive inflammation, excessive coagulation of the blood, and certain types of tumour growth may all be reduced by therapeutic doses of bromelain when taken as a dietary supplement. The present study is aimed to determine the antimicrobial activity of Pineapple extract against various bacterial pathogens. The antibacterial activity is carried out by agar well diffusion technique against the bacterial pathogens and the zone of inhibition is measured in mm diameter. In the present study, Pineapple extract was found to be equally effective against both gram-positive and gram-negative organisms tested.

**Keywords:** Antibacterial, Pine apple extract, Agar well diffusion, zone of inhibition.

### INTRODUCTION

The increase in antibiotic resistant bacteria is larger due to the generalised use of antibiotics in medicine, in animal care, in agriculture. Due to the lack of antibiotics to attack the resistant bacteria, the researches have been initiated in the search of new antimicrobial agents in order to counter the resistant bacteria. Plant proteolytic enzymes have also received attention in the field of medicine and biotechnology due to their proteolytic properties. One such enzyme is Bromelain. Bromelain belongs to the group of protein digesting enzymes obtained commercially from the fruit and stem of pineapple plant (*Ananas comosus*) belonging to the Bromeliaceae family<sup>1-3</sup>. It is a nontoxic substance notable for its effect in the reduction of inflammation<sup>4-5</sup>, but scope of its benefit is increasing. It is also used for hay fever, treating a bowel condition that includes swelling and ulcers (ulcerative colitis), removing dead and damaged tissue after a burn (debridement), preventing the collection of water in the lung (pulmonary edema), relaxing muscles, stimulating muscle contractions, slowing clotting, improving the absorption of antibiotics, preventing cancer, shortening labor, and helping the body get rid of fat.

Bromelain is a mixture of Thiopeptidases, such as asananain and Comosain, Phosphatases, Glucosidases, Peroxidases, Cellulases, Glycoproteins, Proteinase inhibitors, such as cystatin<sup>6-7</sup>. Bromelains sold in stores as the nutritional supplement to promote digestive health and as an anti-inflammatory drug<sup>8</sup>.

It also has demonstrated antimicrobial effect including anti-helminthic activity against gastrointestinal nematodes, antifungal effects and can resolve infectious skin diseases. Bromelain has been known for its clinical

applications particularly in the field of modulating the tumour growth, blood coagulation. It has been shown that bromelain is well absorbed after oral application and it has no negative impact on health after prolonged use. Bromelain enhances absorption of drugs, especially antibiotics<sup>9-12</sup>.

Potential of antibiotic molecule is one of the main uses of bromelain for several years.

Bromelain can modify the permeability of organs and tissues to different drugs. In humans, bromelain has been well documented to increase blood and union levels of antibiotics and results in higher blood and tissue levels of tetracycline and amoxicillin when they are administered concurrently with Bromelain<sup>13-14</sup>.

Therefore, the objectivity of the study was to determine the effect of enzyme bromelain which is a pineapple extract on some selected bacteria such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiellapneumoniae* and *Staphylococcus aureus*.

This research may help in the development of other products with pineapple extract as its constituent.

### MATERIALS AND METHODS

#### Materials

The Bacterial strains used were *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiellapneumoniae* and *Staphylococcus aureus*. The organisms were obtained from Department of Microbiology, Saveetha Dental College.

#### Methodology

The Pineapple extract was dissolved in distilled water in following concentrations 2.5mg/ml, 5mg/ml and 10mg/ml

so that 100µl delivers 250µg/ml, 500µg/ml and 1000 µg/ml respectively.

### Agar Well Diffusion Technique

Broth culture of the test organisms compared to Mac Farland's standard 0.5 were prepared. Lawn culture of the test organisms were made on the Muller-Hinton agar [MHA-M1084] plates using sterile cotton swab and the plates were dried for 15 minutes.

Well measuring 4 mm depth was made on the agar with sterile cork borer. 100µl of the extract was added to the wells. The plates were incubated overnight and the zone of inhibition of growth was measured in mm diameter. All the tests were done in triplicate to minimize the test error.

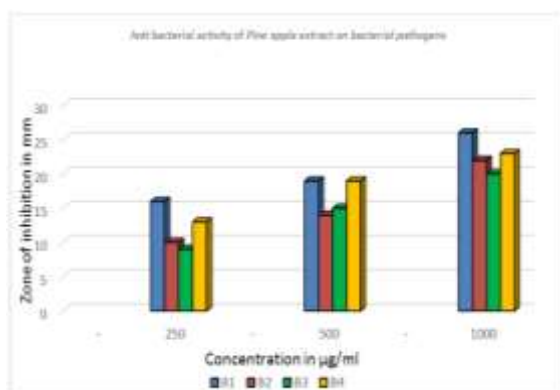
### RESULTS AND DISCUSSION

The antibacterial activity of the Pineapple extract at different concentrations was screened by agar well diffusion technique and the zone of inhibition was measured in mm diameter. The results are given in the Table 1. Pineapple extract was more effective against *E. coli* with a zone of inhibition of 26mm diameter (at conc 1000 µg/ml.). With *Pseudomonas aeruginosa*, *Klebsiellapneumoniae* and *Staphylococcus aureus* it was found to be 20mm, 22mm and 23mm respectively. Natural substances have demonstrated antibacterial action mainly because most plants used in alternative medicine are composed of flavonoids, which act on bacterial cells disrupting the cytoplasmic membrane and inhibiting the enzymatic activity. In our present study the extract used have significant anti microbial action on all the bacterial agents.

**Table 1:** Anti Bacterial Activity of Pineapple Extract on Bacterial Pathogens

Extract	Conc (µg/ml)	B1	B2	B3	B4
Pineapple extract	250	16	10	09	13
	500	19	14	15	19
	1000	26	22	20	23

B1-Escherichia coli, B2-Pseudomonas aeruginosa, B3-Klebsiellapneumoniae, B4-Staphylococcus aureus.



### CONCLUSION

Popular observations on the use and efficacy of medicinal plants significantly contribute to the disclosure of their therapeutic properties, so that they are frequently prescribed, even if their chemical constituents are not always completely known. The results of our present study shows the extract used have significant antibacterial action on the bacterial agents tested.

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