Novel Antibacterial And Anti-Fungal Agent From Eichhornia Crassipes

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1. Introduction

Bacterial and fungal infection in humans and plants is an undiscriminating concern to countries worldwide. Some of the contributors are Staphylococcus aureus,Escherichia coli,Streptococcus sobrinus, Magnaporthe grisea, Fusarium oxysporum and Aspergillus niger. Large number of it occurs in developingcountries with poor economic condition such as countries like Africaand Asia.Eichhornia crassipes, also known as water hyacinth in English, is a floating hydrophytic plant that is notorious for its invasive ability. Due to its prolificness, the plant constantly and quickly causes eutrophication and retardation of the flow of the water it lives in. This results in the need of constant removal of this plant by the people.This research has led to the discovery of using the abundantly found Eichhornia crassipes, as a cheap yet effective source of antibacterial and Antifungal agent.

2. Experimental Setup

The experiment was conducted in two sets, each set is divided into two parts and each part was subdivided into three elements of different microbes.

SET 1, Part 1

1. The ethanol extract of Eichhornia crassipes is first purified through centrifugation and pasteurisation, and then diluted into 3 different concentrations; 75%, 50% and 25%. In three trials, each of the three Eichhornia crassipes extract concentrations is tested against the three bacterias : Staphylococcus aureus, Streptococcus sobrinus and Escherichia coli, in vitro, by the cylinder plate assay method.
2. Water is used as negative control and ampicillin is used as positive control and comparison, being a representative of conventional antibacterial agents.
3. The size of zone of inhibition produced after incubation will be the measure of the antibacterial effect of the extract.

SET 1, Part 2

1. The ethanol extract of Eichhornia crassipes is first purified through centrifugation and pasteurisation, and then diluted into 3 different concentrations; 75%, 50% and 25%. In three trials, each of the three Eichhornia crassipes extract concentrations is tested against the two fungi: Magnaporthe grisea, Fusarium oxysporum and Aspergillus niger, in vitro, by the cylinder plate assay method.
2. Water is used as negative control and fosphine is used as positive control and comparison, being a representative of conventional Anti fungal agents.
3. The size of zone of inhibition produced after incubation will be the measure of the Anti fungal effect of the extract.

SET 2, Part 1

A second set of experiment is conducted to test whether the extract is bacteriostatic or bactericidal. The second experiment involves:

1. The transfer of the inhibition zone liquid into a new nutrient media.
2. Presence of bacteria on the new media after 24 hours incubation will determine the type of the antibacterial activity

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SET 2, Part 2

A second set of experiment is conducted to test whether the extract is fungistatic or fungicidal. The second experiment involves:

1. The transfer of the inhibition zone liquid into a new nutrient media.
2. Presence of fungus on the new media after 24 hours incubation will determine the type of the antibacterial activity.

Result and Analysis

SET 1, Part 1

The negative control shows no inhibition effect, indicated by the absence of inhibition zone. The highest inhibition effect is produced by the 75% concentration,. The smallest inhibition effect is produced by the 25% concentration. The Ampicillin produces higher inhibition effect than the extracts.

SET 1, Part 2

The negative control shows no inhibition effect, indicated by the absence of inhibition zone. The highest inhibition effect is produced by the 75% concentration,. The smallest inhibition effect is produced by the 25% concentration. The fosphine produces lesser inhibition effect than the extracts.

SET 2, Part 1

Presence of bacteria in the new nutrient media of the experiment indicates that the extract is bacteriostatic.

SET 2, Part 2

Absence of fungi in the new nutrient media of the experiment indicates that the extract is Fungicidal.

Conclusion:

The antibacterial property of Eichhornia crassipes is due to the presence of two bioactive chemicals; flavonoid and alkaloid [2, 3].The Anti fungal property of

Eichhornia crassipes is due to the presence of bioactive chemicals similar to Efinaconazole