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PROJECT REPORT ON ANTIMICROBIAL ACTIVITY OF JACK FRUIT TREE LATEX

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BACKGROUND AND OBJECTIVE:

Antimicrobial nanotechnology is a recent addition to the fight against disease causing organisms, replacing heavy metals and toxins and may someday be a viable alternative. Plant and plant products show activity against resistant bacteria. Plant gum, latex, and resins are considered as folk medicines with curative and antimicrobial property but still there is very little research available on it to support the traditional claim. *Artocarpus heterphyllus* locally known as jackfruit tree and indigenous to India is a Latex producing pant. Pant Latex is produced from secretary cells. The jackfruit tree readily yields milky latex which is an aqueous emulsion. A high percentage of waxy matter is present along with proteins, enol esters, hydroxyl acids, sterols and mineral substances. It is insoluble in water but soluble in oil and alcohol. It contains 82.6 to 86.4% resins which may have value in bacteriolytic activity

The project aimed to explore some new and promising leads to characterize the antimicrobial activities of the latex through experimentation and phytochemical studies. Latex from jackfruit tree can be a cheaper substitute for the existing synthetically prepared antimicrobial substance. The latex thus can be then used to control the growth of microbes on low acid foods, sewage, surface water, industrial effluents and many more.

METHODS:

Latex was collected and homogenized using a cooling centrifuge and then coagulated by adding 70% of alcohol and the resulting coagulum was used for the experiments. The experiments were also done with coagulum of water and oil base. The antimicrobial activity was tested using Disc Diffusion method for different solvents. In addition Laminar Air Flow device was used to ensure high efficiency particulate air, which is a sterile air. Electronic Nose device was used for qualitative analysis of the crude latex which is based on the aroma produced on heating a compound.

Latex purification was also done through different solvent extraction technique. Throughout the experimentation process the variables maintained were dilution, temperature, pH conditions, humidity and vapour pressure. In the process of experimentation tests were also conduct to negate the antifungal property of the latex.

BACTERIAL STRAINS:

Standard culture collection strains of Pseudomonas, Bacillus, Staphylococcus, Klebsiella were used in the anti bacterial study. The strains were decided on the basis of temperature, habitat and primary, secondary and tertiary metabolites. Nutrient broth was prepared for inoculation of the microorganism and incubation for growth at 37 degree centigrade for 24 hours was done to obtain a good culture.

ANTIMICROBIAL ACTIVITY:

Kirby Bauer chart which gives inhibition zone of various antibiotics on a variety of bacteria was taken as a reference. The broth two fold disc diffusion methods were applied for minimum inhibitory concentration of coagulum of latex in alcohol, oil, water in 1: 1 ratio against bacteria at pH 7.2. 50 micro litres of microbial suspensions were mixed with 300 ml of nutrient medium and different concentration in micro litres of latex mixtures were added in the well and incubated over night at 37 degree centigrade for 24 hours. One sample was maintained as the control with the solvent. The medium with and without latex was growth controlled.

RESULT:

The crude latex showed better results than the purified enol ester form of the latex. The latex had antimicrobial activities by it could inhibit the growth of bacillus, klebsiela, pseudomonas. The latex mixture results show that as concentration of the latex increases the inhibition zone increases. The best inhibition zone results were seen with alcohol and oil.

DISCUSSION:

This study is on broad spectrum microbes and how jack fruit tree latex can work as an antimicrobial. With increase in concentration of latex – solvent mixture, latex component must be working as a negative catalyst in the protein synthesis in the bacterial cell. There is also alteration of bacterial morphology to define the antibiotic mechanism where resistivity of the organism decreases. Bacterial strains selected for the study can be found in soil, surface water, on plants, in human and animal intestines. The main infections are in respiratory system, burn wounds, post operative infections and malignant cells

SCOPE:

Latex in its solid and vapour form can also be experimented. The vapour form of the latex gives a strong aroma on heating. Next level of experiments could be against pathogenic micro organisms and its antifungal activity. Latex can also be used to control the growth of microbes on low acid foods, sewage, surface water and industrial effluents. Since latex has antimicrobial property, on studying the phytochemistry of the components responsible for this property a drug can also be derived. Role of enol wax esters, ketones, sterols and minerals in the latex need to be further explored.

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