EVALUATION OF HEAT STABLE PROTEINS, TOTAL SOLUBLE PROTEINS AND ANTIBACTERIAL PROPERTIES OF COSTUS PICTUS D. DON

A. C. MANJULA* AND SHUBHA
Department of Sericulture, Maharani’s Science College for Women, Bangalore - 560 001, Karnataka, INDIA
Department of Botany, Maharani’s Science College for Women, Bangalore - 560 001, Karnataka, INDIA
E-mail: ashurajkashi@yahoo.com

INTRODUCTION
In developing countries like India, contagious diseases caused by microorganisms account for maximum health problems. The indiscriminate use of allopathic antimicrobial drugs has resulted in microbial resistance to these drugs. Hence researchers are keen on biologically active compounds isolated from plants for the elimination of pathogenic microorganisms because of the resistance that they have developed to antibiotics (Hunter and Reeves, 2002). The continuous evolution of bacterial resistance to antibiotics has necessitated the search for novel and effective antimicrobial compounds (Fagbemi et al., 2009).

The plants are being used from ancient times to cure diseases. Medicinal plants are immensely contributing to the primary health care of human beings from the time immemorial. Medicinal plants are natural composite sources that act as new anti-infectious agents (Ushimaru et al., 2007). They are used against many ailments which includes infectious diseases caused by bacteria. Costus pictus is an important medicinal plant and the leaf of which is used by people of Karnataka and Kerala to treat diabetes. It is also called insulin plant, spiral ginger and step ladder. Its antidiabetic property is reported by Merina (2005) and Nandakumar et al., (2007). The plant is also rich in antioxidants (Shubha and Anusuya, 2010). As there is no report on the antibacterial activity of the plant, the present work was undertaken to study the antibacterial properties of the leaves against human pathogenic bacteria.

MATERIALS AND METHODS

The plant material
The medicinal plant Costus pictus was brought from western ghat and grown in the herbal garden of Maharani’s Science College for Women, Bangalore, Karnataka, India. Leaves from well grown and healthy plants were used for the study.

HSP and TSP analysis
The leaves were collected and washed with distilled water several times and kept over filter paper for drying. 10g of leaves were placed in mortar and pestle and blended with prechilled acetone. The slurry obtained is then filtered through Whatmann filter paper by adding chilled acetone over the funnel. The extract is air dried and is stored in sealed condition at -40ºC until use.

Extraction of total soluble proteins
1g of acetone extract was stirred with extraction buffer containing Tris-EDTA and thiol compounds and precipitated with 10% TCA. The slurry was centrifuged at 15,000 rpm for 20 min at 4ºC. The supernatant was taken and volume was measured. The TSP was quantified at 280nm and aliquot was kept in the refrigerator.

Extraction of heat stable protein
TSP was incubated at 70ºC for 10 minutes and then centrifuged at 12,000 rpm for 20 min at 4ºC to remove the precipitated heat labile protein. The protein content was determined by Lowry’s method (Lowry et al., 1951).

Bacterial cultures
Escherichia coli, Pseudomonas, Bacillus subtilis and Staphylococcus aureus (ATCC type) were procured from...
Victoria Hospital, Bangalore and maintained on nutrient agar medium.

**Antibacterial activity**

The HSP was used for the study. The bacteria were grown in the Mueller Hinton agar media at 37°C and maintained at 4°C. Antibacterial assay was carried out by a modified agar well diffusion method (Perez *et al*., 1990). The sterile media containing agar was poured into the sterilized Petri plates and allowed it to solidify at room temperature. 1000µL of bacterial suspension was spread on the solidified medium using sterile glass spreader. Wells were made in the medium using cork borer. Different volume of the extract was poured into the well and incubated for 24hrs at 37°C. Tris-EDTA was used as control. The experiment was carried out in triplicates and data was analyzed statistically.

**RESULTS AND DISCUSSION**

The leaf sample contained 0.9mg/mL HSP and 7.8mg/mL TSP. Antibiotics provide the main basis for treating infectious diseases. Hence, there is an increase in the investigations on plants as a source of human disease management (Prashanth *et al*., 2003). Medicinal plants are very good sources of antimicrobial agents (Mahesh and Satish, 2008). An extensive research has been done on the effects of plant extracts on bacteria (Reddy *et al*., Ateb and ErdoUrul, 2003). Table 1 shows that the leaf extract of *Costus pictus* was effective against all the bacteria studied with inhibition zone ranging from 0.07mm to 14mm and with a concentration of 25 to 100 µL/L. For *Pseudomonas*, and *Bacillus subtilis* at 50 µL/L the zone of inhibition was 0.3mm and 0.8mm. The Table 1 shows that the minimum inhibition concentration for *Escherichia coli* was 75 µL with a zone of inhibition of 0.9mm diameter. At 100 µL/L of leaf protein extract zone of inhibition was maximum for all the bacteria tested. As the concentration of the extract increased, the diameter of inhibitory zone was also increased. The results proved that the leaf protein extract of *Costus pictus* is having significant antimicrobial activity. *Gymnema sylvestre*, another widely used antidiabetic plant showed similar antimicrobial activity against four bacteria (Satdive *et al*., 2003). Hence the use of *Costus pictus* leaf not only protects the diabetic patients from pathogenic bacteria but also nourishes the diabetic patients with proteins which also serve as antimicrobial. But further phytochemical evaluation is essential for the antimicrobial effect of this medicinal plant.

**REFERENCES**


