



COMPARATIVE STUDY ON THE ANTIBACTERIAL ACTIVITY OF SOLANUM XANTHOCARPUM AGAINST ANIMAL AND HUMAN PATHOGENS

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Abstract

Solanum xanthocarpum, a spiny medicinal herb with woody base in north eastern states of India. The plant is an important herb in Ayurvedha and folkore medicine. Hence an attempt has been made to study the invitro antibacterial activity against selected animal and human pathogen. The study revealed that among the animal pathogen tested *V.Parahaemolyticus* Showed maximum zone of (8.33±1.5 mm) inhibition against alcoholic extract and among the human pathogen *Pseudomonas aeruginosa* showed maximum zone of inhibition (7.66±2.5mm)

Key Words: Shrimp, Pathogen, Solanaceae, Invitro, Antibacterial.

INTRODUCTION

Aquaculture, also known as aquafarming, which involves cultivating of freshwater and salt water populations under controlled conditions and can be contrasted with commercial fishing which is harvesting of wild fish. Aquaculture is one of the fastest growing food production sectors in the world[1]. However disease outbreaks have caused serious economic losses in several countries. According to World Bank report, global losses due to shrimp diseases are around US \$ 3000 million [2]. Bacterial diseases may cause wide range of problems ranging from mass mortalities. *Vibrios sp* are considered the major culprit for the aquaculture system; *Vibrio sp* are aquatic bacteria that are widely distributed in fresh water estuarine and marine environments, over 20 species are recognized, some of them are human pathogens. Though most *Vibrio* sp are recognized as opportunistic pathogen, *V.harveyi* could be primary pathogens, however they can cause serious mass mortalities in shrimp hatcheries in Asia. Rapid diagnosis of diseases is essential in aquaculture management, not only to facilitate control of diseases but also help in developing strategies for management against diseases and to prevent the spread of diseases.

Lack of tools to accurately diagnose disease often leads to in discriminate use of chemical and antibiotics resulting in environmental problems such as emergence of antibiotic resistance pathogens and antibiotics residues in the raw materials. Medicinal plants are wealth of mankind India with its mega biodiversity of knowledge of rich ancient traditional systems of medicine prove a strong base for the utilization of large numbers of plants in general healthcare and alleviations of common ailment of people.

Solanum xanthocarpum, a herb of important plant species in Ayurvedha and folkore medicine since the time immemorial but there are meager reports in literature is about its other potentials.

Solanum xanthocarpum is very prickly perennial herb about 1.2m tall, usually with woody base stem profusely branched, leaves ovate or elliptic, sinuate or sub pinatifid, obtuse or sub-acute. The plant contains steroidal alkaloid, solasodine is the principal alkaloid, fruit contain and solasonine, solamargine beta solamargine, solanocarpine and solanocarpidine.[3] reported and quantified bioactive Steroidal glycoalkaloid-khasianine in addition to solasonine, solamarine through HPTLC.

The herb is useful in bronchial asthma [4] cough, chest pain stopping vomiting, curing dropsy, hairfall, leprosy itching, scabies etc., The species also acts as wound healer [5] The plant extract possesses antipyretic, antihelmintic, carminative, stomachic, febrifuge, laxative etc. Dried fruits are smoked in the form of cyarethe to cure dental infection or toothache[6]. Hence an attempt has been made to study the invitro antibacterial activity of *Solanum xanthocarpum* against animal and human pathogens.

MATERIALS AND METHODS

The seed part of *Solanum xanthocarpum* were collected from the herbal garden of dry land of Thanjavur region, Tamil Nadu, India. The seeds were shadow dried and stored for analysis. About one gm of sterilized seed were ground in mortar and pestle with 10ml aqueous and organic solvent (H₂O; Alcohol) it was filtered and the supernatant was stored for invitro screening [7].

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The test organism such as *Vibrio harveyi* and *V.parahaemolyticus* were isolated from diseased *Penaeus monodon* (fab) and were chosen for the study [8] The human pathogens such as *Staphylococcus aureus* and *Pseudomonas aeruginosa* were isolated and characterized from pus sample [9] were selected for the present study. The invitro antibacterial activity was performed by disc diffusion method [10]. Muller hinton agar plates were prepared (Himedia, Mumbai pH7±0.1; 8±0.1) made swab with the test organism (12 hrs old) The discs impregnated with the alcohol and aqueous extract air dried and placed over the swab. The plates were incubated at 37°C for 24 hrs after incubation the inhibition zone were measured. The observation were recorded and compared. In the present analysis the double distilled water was used as negative control. For positive control ciprofloxacin was used.

RESULTS

In the present analysis no zone of inhibition was recorded against negative control among the animal pathogen the positive control showed the zone of inhibition of (27.33±2.51) mm against *V.parahaemolyticus* and was followed by *V.harveyi* (20.667±3.0). *V.parahaemolyticus* showed maximum zone of inhibition (8.33±1.53 mm) against the plant extract and was followed by *V.harveyi* (7.33±1.53mm). Among the human pathogen the positive control showed maximum zone of inhibition (29±2 mm) against *Pseudomonas aeruginosa* and was followed by *Streptococcus mutants*.

The alcohol extract showed maximum zone of inhibition against *Pseudomonas aeruginosa* (7.66±2.5mm) and was followed by *Streptococcus mutants* (6.66±2.5mm). Thus the study revealed that among the animal and human pathogen tested the alcohol extract of *Solanum xanthocarpum* showed maximum zone of inhibition against animal pathogens.

DISCUSSION

[11] reported that the antibacterial activity of *Solanum esculantum*, *Solanum trilobatum*, *Solanum nigrum* and *Solanum tuberosum* revealed that the methanol extract of *Solanum esculantum*. Showed maximum antibacterial activity in all the test cultures. [12] reported that the agar well diffusion method for demonstration of antimicrobial activity of ethanolic extract of *Solanum Virginianum* against gram negative bacteria, the zone of inhibition varies from 12mm-16mm in diameter. The ethanolic extract of same plant for gram positive bacteria showed the zone of inhibition of about 12-21mm. The MIC values of ethanolic extract range from 50-250 µg/ml for gram negative bacteria. Steroidal alkaloid solasodine is the principal alkaloid. Alcoholic extracts of the plant contain fatty and resinous substances. Solasonine is present in fruits, fruits contains. Solasonine, solamargine, solanocarpine, beta

solanocarpine and solanocarpidine. [13] reported that column chromatographic analysis of *S.xanthocarpum* revealed the presence of coumarine, scopolin, scopoletin, esculin and esculetin.

CONCLUSION

Herbal medicines are gaining much interest because of the cost effective and eco friendly attributes. In future the standardization and stabilization studies on *S.xanthocarpum* can be carried out which can help in proving it to be a promising source in pharmaceutical industry.

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