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**ANTIBACTERIAL INVESTIGATION OF *SOLANUM XANTHOCARPUM***

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**ABSTRACT**

In Ayurveda *Solanum xanthocarpum* *(Famiily : Solanaceae)* is known as Kantkari. For the human health care this plant is totally medicinally contributed. In Ayurvedic text *Solanum xanthocarpum* is found very active and beneficial medicinal plant as antifirtility, antipyretic, anticancer, antiallergic, anti-inflammatory, antihistemic, hypoglycomic, antibacterial, antioxidant properties. The present work study revealed and signified the antibacterial investigations of the crude extract obtained from the roots of *Solanum xanthocarpum* using the different solvants i.e. ethanol, chloroform, water and acetone and the effect of the different extracts were tested on Gram positive bacteria i.e. *staphylococcus aureus, Bacillus subtilis* and Gram negative bacteria e.g. *Pseudomonas aeruginosa, E. coli* by the agar well diffusion method. Although several points like antiinflammatory, antianaphylactic, immunomodulation, antiallergic and antitumor effects of the roots are still remained to be validated scientifically, yet for the vivid bacterial infections the present study work supports scientifically the usage of the roots of the plant as a very eminent remedy.

***Key words:*** *Solanum xanthocarpum, Solanaceae,* Antibacterial, Antioxidant*.*

1. **INTRODUCTION**

The Solanaceae family is widely distributed in different regions of the world. It is composed of approximately 84 genera and 3000 species1. *Solanum xanthocarpum* (Family: Solanaceae) commonly known as the Indian night shade or Yellow berried night shade (English) and kantakari (Sanskrit). *Solanum* *xanthocarpum* has held a place of some importance in the Hindu Materia Medica*,* primarily as an expectorant and antipyretic. It is one of the members of the dashamula (ten roots) of the Ayurveda. It occurs throughout India, in dry situations as a weed along the roadsides and wastelands. It is naturally propagated by seed in waste lands. A very prickly diffuse bright green perennial herb, somewhat woody at the base; stem is somewhat zigzag; branches are numerous. Various medicinal properties are attributed to it, particularly in the treatment of asthma, chronic cough and catarrhal fever2-7.In ancients Ayurveda, plant is described as pungent, bitter, digestive, alternative astringent. Stems, flowers, fruits are bitter, carminative. Root decoction used as febrifuge, effective diuretic and expectorant . Charaka and Sushruta used the extract of entire plant and fruits in internal prescription for bronchial asthma, tympanitis, misperistalsis, piles and dysuria and for rejuvenation. *Kantkari Ghrita* of *Charaka* is specific for cough and asthma. The whole plant is used traditionally for curing various ailments. Decoction of the plant is used in gonorrhea; paste of leaves is applied to relieve pains; seeds act as expectorant in cough and asthma; roots are expectorant and diuretic, useful in the treatment of catarrhal fever, coughs, asthma and chest pain8. All the parts of *Solanum xanthocarpum* are used as traditional Ayurvedic medicinal herb in India. It is used for treating TB, fever, asthma, lung diseases and kidney disorders. The species contain steroids, alkaloids, solasonine and solamargine. Solasonin serves as an important intermediate in the synthesis of steroidal hormones9 and is a potential alternative to diosgenins as a precursor in synthesis of steroidal hormones10. Chemical and physical investigation of methanolic extract of roots of *Solanum* *xanthocarpum* was carried out. By phytochemical screening the presence of alkaloid, triterpenoid, phenols, tannins, flavanoids, carbohydrates, phytosterols, fats and fixed oil were confirmed11.

1. **MATERIAL AND METHOD**

In the month of February and March from Green House Nursery, Khandwa Road Indore M.P., India the roots of the *Solanum xanthocarpum (Famiily : Solanaceae)* were collected, and indentified with the herberium specimen of the Department of Botany, P.M.B. Gujarati Science College Indore which was deposited there for future references. The roots were washed under the running water of the tap to wash and clean it’s dirt and soil and to clean them. After cleaning the roots they were cut into pieces and dried under the shade at the room temperature for about 20 days and then the roots were grinded to the powder with the help of the pestle mortar.

1. **EXTRACTION PROCEDURE**

The above mentioned and obtained powder was processed to get extract from the following procedure-

1. Ethanol Extract :

In the soxhlet apparatus the root powder was macerated repeatedly with 95% ethanol, and the combined filterate was evaporated for drying under reduced pressure at about 500 C and the found crude Ethanol extract was stored at 150C.

2. Chloroform Extract :

The root powder was subjected to extract with chloroform. For the three days the extract was allowed to stand and after every 24 hours with the sterile glass rod the extract was stirred. And then with the whatman filter paper no.1. The filtrate was concentrated with a rotary evaporator under vacuum at 30-350 C and then utilized.

3. Aqueous Extract :

A small amount of powder was mixed in aqueous solution in a flat bottom flask of 500 ml and was processed cold for 7 days and was shaken occasionally. And then the clear filtrate was obtained which was further concentrated by vacuum distillation.

4. Acetone Extract :

With acetone the small amount of the powder was macerated and then the extract was filtered and with the rotary evaporator the solvent was removed, then over the desiccator the extract was dried.

1. **TEST ORGANISMS**

Gram positive bacteria i.e. *Bacillus subtilis, staphylococcus aureus* and Gram negetive bacteria i.e. *Escherichia coli and Pseudomanas aeruginosa* organisms were procured from the Department of Biotechnology, P.M.B. Gujarati Science College, Indore M.P. India.

**Antibacterial Activity of Agar Well Diffusion Assay**

As per the instruction of the manufacturers the Nutrient Agar (Hi media) for bacteria was prepared. With the Agar well diffusion method the antibacterial activities of the root extract was determined. With the test microorganisms nutrient agar slants was inoculated after solidification. With the sterile cork borer about 5mm diameter wells were punched in the agar medium. As the positive controls the antibiotics were used in the test system and for the next 24 hours on the body temperature (370C) the plates were incubated. To know the sterile conditions the negative control was added without any cultures. For the respective plant extract and antibiotic. The antibacterial activity was accessed by measuring the diameter of the zone of inhibition.

1. **RESULT AND DISCUSSION**

In the higher plants the presence of antibacterial substances is well established as the inspirational novel drug compound as the plant derived medicines. It’s significant contribution towards the remedy of diseases done in the Ayurveda system of medicines. Majority of phytochemical components are known to produce the therapeutic activity like antibacterial, antifungal and antioxidant etc.12. These finding are in accordance with the work carried out by Salie13 and Kannabiran14.

The antibacterial investigation was carried out of the obtained extract of the roots using the different solvents like Ethanol, Chloroform, Acetone and water were subjected to antibacterial activity against *Escherichia coli, Bacillus subtilis, Pseudomonas aeruginosa, Staphylococcus aureus*. The following table shows it’s result. Against the Gram positive and Gram negative bacteria the different extract of *Solanum xanthocarpum* roots have potent antimicrobial activity in the study and found equally affected by the root extract of *Solanum xanthocarpum* shows the presence of broad spectrum antibacterial substance in the plant.



1. **CONCLUSION**

In present study, The importance of the root extract of the *Solanum xanthocarpum* Plant has been showed Inhibitory action against all the selected bacteria. It is concluded that the methanolic extract of *Solanum xanthocarpum* is effectivecuring the bacterial disease.

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