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## Original Research Article

### A study on Evaluation of phytochemical screening and *in vitro* bioactivity of leaf and stem extracts of *Solanum xanthocarpum* (Solanaceae)

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#### Abstract

The present study was carried out for phytochemical screening of principle bioactive compounds and antibacterial activity in *Solanum xanthocarpum* Schrad and Wendl. Phytochemical analysis revealed the presence of Alkaloids, Flavonoids, Phenols, Phlobatannins, Saponins, Steroid, Tannins and Triterpenoides. The ethanol and acetone extracts were subjected for antibacterial activity against nine bacterial strains using agar well diffusion method. Ethanol extracts of Leaf inhibited *Bacillus* sp, *E. faecalis*, *K. pneumoniae*, *Micrococcus* sp, *P. mirabilis* and *S. epidermidis*. Acetone extracts of stem possessed antimicrobial activity against *Bacillus* sp, *K. pneumoniae*, *Micrococcus* sp, *P. mirabilis*, *P. aeruginosa*, *S. aureus* and *S. epidermidis*. In stem extracts, the ethanol extracts exhibit anti bacterial activity against *Bacillus* sp, *E. coli*, *K. pneumoniae*, *Micrococcus* sp and *P. mirabilis*. The acetone extracts of stem gave antibacterial activity against *Bacillus* sp, *E. faecalis*, *E. coli*, *K. pneumoniae*, *Micrococcus* sp, *P. mirabilis* and *S. epidermidis*. *K. pneumoniae* showed significant sensitivity to both leaf and stem extracts. The results suggested that ethanol and acetone extracts of leaf and stem extracts were highly potent against *K. pneumoniae* and *P. mirabilis* can be used in treatment of nosocomial infections such as pneumonia, urinary tract infections (UTIs) and bacteremia. Extensive animal studies may be required before investigating the role of *Solanum xanthocarpum* for treating RTI and UTI

**Keywords:** *Solanum xanthocarpum*, Phytochemical analysis, antibacterial activity, agar well diffusion method.

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#### Introduction

*Solanum xanthocarpum* (Solanaceae) smoke is inhaled through mouth to led through mouth to treat toothache has profound use in Ayurveda and folkore medicine. It is supposed that the plant has solasonine and solasomargine (Yoshida *et al.*, 2006) sapogenins (Khanna *et al.*, 1976) and solasodine (Oudhia, and Kadu Pani, 2007) which are responsible for medicinal effect. The whole plant extracts of *S. xanthocarpum* have a larvicidal defect (Rajkumar, and Jebanesan, 2005) hypoglycemic activity (Kar *et al.*, 2006) bronchitis and antitussive response (Govindan *et al.*, 1999). Dried or fresh fruits are kept in fire and smoke is inhaled through mouth to led through mouth to treat

toothache. The present investigation is aim to focus the phytochemicals of *Solanum xanthocarpum* leaf and stem and its antibacterial action against Gram-positive and Gram-negative bacteria.

#### Materials and Methods

Leaves and Stems of *S. xanthocarpum* were collected from the Medicinal plant garden, Idaya College of Arts and Science, Tiruvannamalai, Tamil nadu, India.

The plants were dried and broken into small pieces under sterile conditions, and 20 g of each plant part

were extracted with 100 ml of ethanol and acetone solvent (Merck, Darmstadt) for 24 h by using Soxhlet equipment (Bradshaw, 1992).

Phytochemical tests of each extracts were carried out to establish the presence of Alkaloids, Flavonoids, Phenols, Phlobatannins, Saponins, Steroid, Tannins and Triterpenoides using standard procedure (Jigna *et al.*, 2006).

## Results and Discussion

Table 1 shows the results of the preliminary phytochemical analyses of the different leave and stem extracts of *S. xanthocarpum*.

**Table 1: Phytochemical constituents of *S. xanthocarpum* Leaf and stem extract**

Phytochemical	Leaf extract		Stem extract	
	Ethanol	Acetone	Ethanol	Acetone
Alkaloids	++	++	+	+
Flavonoids	++	++	+	++
Phenols	-	-	+	-
Phlobatannins	+	-	-	+
Saponins	-	++	+	-
Steroid	+	-	-	-

Antimicrobial activity recorded in terms of average zones of inhibition in millimeter (mm) is reported in Table 2 and 3. The leaf extractives showed a range of activity against all the tested bacteria. The ethanolic extracts of *S. xanthocarpum* exhibited maximum activity against the bacteria compared to acetone extracts. The extracts failed to exhibit any significant anti-bacterial activity against on *S. aureus*. The results

suggested that ethanol and acetone extracts of leaf and stem extracts were highly potent against *K. pneumoniae* and *P. mirabilis* can be used in treatment of nosocomial infections such as pneumonia, urinary tract infections (UTIs) and bacteremia. Extensive animal studies may be required before investigating the role of *Solanum xanthocarpum* for treating RTI and UTI.

**Table 2. Antibacterial activities of ethanol extract of leaf and stem**

Name of bacteria	25 µg/l		50 µg/l		75 µg/l		100 µg/l	
	Leaf	Stem	Leaf	Stem	Leaf	Stem	Leaf	Stem
<i>Bacillus sp</i>	5.33	0.00	6.99	2.33	12.33	4.66	16.00	9.66
<i>E. faecalis</i>	0.00	0.00	0.00	0.00	3.0	0.66	4.60	1.00
<i>E. coli</i>	0.00	1.33	0.00	3.00	0.00	3.66	1.3	5.33
<i>K. pneumonia</i>	0.66	2.00	4.00	3.00	7.33	8.66	13.33	12.66
<i>Micrococcus sp</i>	1.99	1.00	1.66	4.33	3.33	6.66	4.63	10.00
<i>P. mirabilis</i>	5.00	1.66	8.33	4.66	12.66	9.33	17.00	14.00
<i>P.aeruginosa</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33
<i>S. aureus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. epidermidis</i>	0.00	0.00	0.66	0.00	2.66	0.00	3.33	0.66

**Table 3. Antibacterial activities of acetone extract of leaf and stem**

Name of bacteria	25 µg/l		50 µg/l		75 µg/l		100 µg/l	
	Leaf	Stem	Leaf	Stem	Leaf	Stem	Leaf	Stem
<i>Bacillus sp</i>	0.00	0.00	3.33	0.00	6.00	1.66	10.00	2.33
<i>E. faecalis</i>	0.00	1.33	0.00	2.66	0.00	2.66	0.00	2.66
<i>E. coli</i>	0.00	2.66	0.00	3.33	0.00	3.33	0.00	4.66
<i>K. pneumonia</i>	1.66	3.33	5.33	4.00	9.33	5.66	13.33	6.33
<i>Micrococcus sp</i>	0.33	0.66	1.33	4.66	2.66	7.00	2.66	7.33
<i>P. mirabilis</i>	2.66	0.66	4.66	1.00	8.33	6.66	10.66	8.66
<i>P.aeruginosa</i>	0.33	0.00	0.33	0.00	2.66	0.00	3.00	0.00
<i>S. aureus</i>	1.00	0.00	1.66	0.00	1.66	0.00	3.33	0.00
<i>S. epidermidis</i>	0.00	0.00	1.33	1.33	2.66	1.33	5.36	1.66

## References

- Bradshaw, L.J. 1992. Laboratory Microbiology. Fourth Edition, Saunders College Publishing. Fort Worth.
- Govindan, S., Viswanathan, S., Vijayasekaran, V. and Algappan, R. 1999. *J. Ethnopharmacol.* 66(2): 205-210.
- Jigna, P., Nehal, K. and Sumitra, C. 2006. Evaluation of antibacterial and phytochemical analysis of *Bauhinia variegata* L. bark. *Afr. J. Biomed. Res.* 9(1): 53-56.
- Kar, D.M., Maharana, L., Pattnaik, S. and Dash, G.K. 2006. *J. Ethnopharmacol.* 108(2): 251-256.
- Khanna, P., Uddin, A., Sharma, G. L., Manot, S. K. and Rathore, A. K. 1976. *Indian J. Exp. Biol.* 14(6): 694-696.
- Oudhia, P. and Kadu Pani. 2007. A Specially Prepared Herbal Decoction for Body Wash Used by the Natives of Chhattisgarh, India. [www.botanical.com](http://www.botanical.com) (Accessed November 16, 2010.)
- Perez, C., Paul, M. and Bazerque, P. 1990. Antibiotic assay by agar well diffusion method. *Acta Biol. Med. Exp.*, 15: 113-115.
- Rajkumar, S. and Jebanesan, A. 2005. *Tropical Biomed.* 22(2): 139-142.
- Yoshida, A., Yokote, F., Yahara, S., Nohara, T., Sajio, R., Murakami, K. and Tommatsu, T. 2006. *Phytochem.* 23(4): 743-746.

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