



ISSN 0973-3450

(Print)

JUC Vol. 14(1), 22-25 (2018). Periodicity 2-Monthly

(Online)



ISSN 2319-8036

9 772319 803009



Estd. 2005

JOURNAL OF ULTRA CHEMISTRY

An International Open Free Access Peer Reviewed Research Journal of Chemical Sciences and Chemical Engineering

website:- www.journalofchemistry.org

Chemical Characterisation of Medicinally Important Solanaceous plant *Solanum xanthocarpum* Schrad & Wendl

KUMUD MODI^{1*} and NEHA JATAV²

Department of Chemistry, PMB Gujarati science college, Indore 452001 (M.P.), (India)

Email address of Corresponding Author: immehajataw@yahoo.com<http://dx.doi.org/10.22147/juc/140104>

Acceptance Date 10th November, 2017,

Online Publication Date 2nd January, 2018

Abstract

The plant *Solanum xanthocarpum* is widely distributed in the Himalayan (IHR) especially in kumaun Himalayan regions of India. It possess various potential due to its medicinal properties. Based on preliminary reports, there is a lot of interest in using the roots of this plant for treating various disorders in indigenous system of medicine such as antifertility, antipyretic, anticancer, anti-allergy, anti-inflammatory, antihistamine, hypoglycemic, antibacterial, antioxidant, anti-fungal properties. The purpose of work is to study medicinally active substances present in ethanol extract, Aqueous extract and Benzene extract obtained from roots powder of *Solanum xanthocarpum*. Preliminary Phytochemical screening of the extracts revealed the presence of Alkaloids, Carbohydrates, Phenolic compounds, tannins, Saponins, Steroids and Flavonoids.

Key words : *Solanum xanthocarpum*; Chemical characterization; Medicinally active substances; Steroids.

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* Schrad & Wendl., which belongs to the family solanaceae, is an important medicinal plant². *Solanum xanthocarpum* is commonly known as the Indian night shade or Yellow berried night shade (English). It is a prickly diffuse, bright green perennial herb, woody at the base, 2–3 m height, found throughout India, mostly in dry places as a weed along

roadsides and waste lands. *Solanum xanthocarpum* is known by different names in various languages in India viz, Kantkari (Sanskrit), Kateri (Hindi), Bhoringni (Gujarati), Kantankattiri (Tamil), Kantkaricunta (Malayalam), Vakudu (Telugu), Nelagulle (Kannad)³. The natural products have played a vital role in curing health related problems and in ailments of various diseases. Herbal drugs are easily available and have fewer side effects. So many people attracted towards the herbal drugs⁴. In developing countries and especially in India low income people such as farmers, people of small isolated villages and native

communities use folk medicine from some plants for the treatment of common infections⁵. These plants are ingested as decoctions, teas and juice preparations to treat various infections. They are also made into a poultice and applied directly on the wounds or burns. Traditional healers consider these medicines as much cheaper and more effective than modern medicines⁶. Fruits, flowers and stems of *Solanum xanthocarpum* possess carminative, anthelmintic and bitter properties, root is expectorant and used in treatment of toothache, chest pain due to cough, asthma and bronchitis. The leaves are applied externally as a pain relieving agent. This plant forms the basis of many polyherbal preparation in the ayurvedic industry⁷. *Solanum xanthocarpum* has a high concentration of solasodine alkaloid, a spiroketal alkaloid sapogenin with a heterocyclic nitrogen atom, which is the starting material for the manufacture of cortisone and sex hormones⁸. 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 asthma⁹. It is one of the members of the dashamula (ten roots) of the Ayurveda¹⁰. Thus taking in to the view of this plant, the present investigation is directed to remain some pharmacognostic parameters of the roots for strengthening the traditional knowledge with scientific bases.

Material and Method

Plant Material:

The roots of *Solanum xanthocarpum* (Family: Solanaceae) were collected in mature stage in the month of February and March from Green house nursery, Khandwa road, Dist. Indore (M.P.), India. The collected roots were washed with water to remove soil and other extraneous matter. Roots were taken and cut into small pieces and dried under shade for one month. Then dried roots were homogenized to coarse powder and the fine powder was collected and used for the experiment and preparation of extract.

Preparation of Crude Extracts:

Ethanol Extract :

In a Soxhlet apparatus the root powder was macerated repeatedly with 95% of ethanol and under reduced pressure at 40-50°C the combined filtrate was evaporated to dryness. The resulting crude ethanol extract was stored at 10-15°C

Aqueous extract :

For 7 days 50g of *Solanum xanthocarpum* root powder was immersed in aqueous solution in 250 ml flat bottom flask and was cold extracted with shaking and warming occasionally. The clear filtrate was obtained at the end of the seventh day. By vacuum distillation the filtrate was further converted and cooled, then was transferred into a petri dish to be dried in an oven at the temperature of 60-70 °C for 5 minutes.

Benzene extract:

100gm of dried powdered macerated with Benzene. The extracts were filtered and the solvent was removed by rotary evaporator. Over the desiccator the extracts were dried.

Qualitative phytochemical analysis:

The alcoholic, aqueous and benzene extracts of *Solanum xanthocarpum* were subjected to different chemical tests for the detection of phytoconstituents such as Sterols, Saponin, Alkaloid, Tannins, carbohydrates, Flavonoids, Lactones, Aminoacids/ proteins, Resins and Starch^{11,12}. 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 confirmed¹³.

Results

Test for Sterols : (Salkowski test): In the different extracts few drops of concentrated sulphuric acid were added; and was shaken then allowed to stand, instead of aqueous extract, in all extract the presence of sterols is indicated with appearance of red colour.

Test for Saponins : (Foam test): With little quantity of water, small amount of extract/fraction was

shaken. The presence of saponins is indicated if foam has produced persists for 10 minutes. Finding out in aqueous and alcoholic extract is a positive result and rest of extracts show negative response.

Test for Alkaloids:

With ammonia the various extract /fractions were basified and extracted with chloroform. With the dilute hydrochloric acid the chloroform solution was acidified. For testing the alkaloids the acid layer was used.

Wagner's test (Iodine in Potassium iodide): With few drops of wagner's reagent the acid layer was treated. The presence of alkaloid is indicated with the formation of reddish brown precipitate in chloroform.

Mayer's test (Potassium Mercuric Iodine solution): With the few drops of mayer's reagent the acid layer was treated, in which the presence of alkaloids is indicated with the formatted creamy white precipitate.

Test for Tannins (Ferric chloride test) A few drops of 1% neutral ferric chloride was added in different extracts. The presence of tannins is indicated by the formation of blackish blue colour which is found in ethyl alcohol solution.

Test for Carbohydrate: In little quantity of distill water a small amount of extracts/fractions were dissolved. To test presence of carbohydrates the filtrate were used.

Molisch's test: With molisch reagent the extract was treated and from the sides of test tube concentrated sulphuric acid was added to form a layer. The presence of carbohydrates in aqueous and alcoholic extract is shown with a reddish violet ring.

Benedict's test: To the filtrate added 2 mL Benedict's reagent and boiled in water bath. Green reddish brown precipitate is formed.

Test for Flavonoids (Alkaline reagent test/ NaOH test) Few drops of sodium hydroxide solution were added with alcoholic solution. The presence of flavonoids was indicated when an intense yellow colour which had disappeared after adding dilute HCl.

Test for Amino acid/ Protein (Ninhydrin test) heated the 3 mL of extract and 3 drops of ninhydrin solution in boiling water bath for 10 minutes. The appearing of purple colour shows the presence of amino acid but in our case negative result found.

Discussion

The alcoholic, aqueous and benzene extracts of *Solanum xanthocarpum* were subjected to qualitative phytochemical screening for the detection of phytoconstituents like Sterols, Saponin, Alkaloid, Tannins, carbohydrates, Lactones, Amino acids/ proteins, Resins and Starch. The results revealed the presence of Sterols, Saponin, Alkaloids, carbohydrates, Flavonoids, Tannins and Lactones. These finding show slightly similarities from previous work of Nagamani (2012, Ravishanker et al (2012) and Javeed Ahmed Wani (2011)¹⁴.

Conclusion

For identification and authentication of a drug the standardisation of crude drug has become very important now a days. But the importance was not up to the mark due to the certain types of problems. And so, to identify the drug from its originality fails due to the lack of standardisation technique, which thereby experts the usage of drug from its traditional system of medicine. Hence the aims and results were found to be significant and encouraging towards the goal by the present investigation. Thus, the result of preliminary phytochemical screening has done, and it will be helpful in future for the proper identification of the root powder of *solanum xanthocarpum*.

Acknowledgement

We are thankful to department of Botany PMB Gujarati Science College Indore (M.P.) for providing laboratory facilities. I am highly thankful to staff members of Chemistry department, Specially Prof. M.L. Gangwal, Prof. Dr. Mrs. Kumud Modi for encouragement and guidance. I also sincerely thank to my relative Mr. Yogesh Titariya, my friend Mr. Goverdhan Ahirwar for their kind co-operation and timely advice. No funding was provided by any organization.

Reference

1. Yasin JN, Flora of Pakistan, Pakistan Agricultural Research Council, Islamabad, Pakistan., 168

- (1985).
2. Rita P, Animesh DK. An updated overview on *Solanum xanthocarpum* schrad and wendl. *International Journal of Research in Ayurveda and Pharmacy*; 2(3), 730-735 (2011).
3. Sachin Parmar, Amit Gangwal, Navin Shet *Solanum xanthocarpum* (Yellow Berried Night Shade): A review. *Der Pharmacia Lettre.*, 2(4), 373-383 (2010).
4. Agrawal R., Traditional Uses and Pharmacological Action of *Ocimum Kilimandscharicum*: A review. *Journal of Ultra Chemistry.*, 13 (6), 140-144 (2017).
5. Fabricant, D.S., Farnsworth, N.R., The value of plants used in traditional medicine for drug discovery. *Environmental Health Perspectives.* Nat. Institute of Environ. Health Sci., 69-75 (2001).
6. Abhishek M., Rakshanda B., Prasad G.B.K.S., Dua V.K., Satish K., Pavan, K.A., Antimicrobial activity of plants traditionally used as medicine against some pathogens. *Rasayan J. Chem.*, 615-620 (2010).
7. Roshy Joseph C IR, Patgiri BJ, Therapeutic potential of kantkari (*Solanum xanthocarpum* Schrad. & Wendl.). *International journal of ayurveda and allied sciences I* (2), 46-53 (2012).
8. N.P. Bector, A.S. Puri., *J Assoc Physicians India*, 19, 741-744 (1971).
9. C.P. Khare., *Encyclopedia of Indian Medicinal Plants*, Springer, 432-433 (1995).
10. Mohan L, Sharma P, Srivastava C. N., Southeast Asian J Trop Med Public Health., 38 (2), 256-260 (2007).
11. Garabadu D, Muruganandam AV, Joshi VK and Krishnamurthy S, *Pharmacol Biochem Behav.*, 91 (3), 283-90 (2009).
12. Sairam K, Priyambada S, Aryya N Cand Goel RK, *J Ethnopharmacol.*, 86 (1), 1-10 (2009).
13. Archana C and Jessy Jacob, *Asian Journal of Phytomedicine and Clinical Research.*, 3 (1), 32-36 (2015).
14. Nagmani *et al.*, *Annals of Biological Research.*, 3(3): 1294-1304 (2012).