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Research Article

PHYTOCHEMICAL SCREENING AND PHARMACOGNOSTICAL STUDIES OF *SOLANUM XANTHOCARPUM*

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ABSTRACT

Kantkari (*Solanum xanthocarpum*) of the family *Solanaceae* is one of the '*dasamoola*' and used drug in Ayurveda. *Dasamoola* means combination of ten plant roots together. It comprises roots of fine big or major trees (Brihat panchmoola) and roots of fine small or major herbs (Laghu panchmoola). In traditional system of medicine, different parts like leaf, stem, flower, roots of *solanum xanthocarpum* and plant as a whole are used. The drug is used as an antiasthmatic, hypotensive and cytotoxic activity, hypoglycaemic, anti-inflammatory, anti-tumor activity. The result of physico chemical parameters (Loss on drying:4.1%, WSE:16.5% and ASE: 18%) were found to be under WHO guidelinese. The phytochemical studies revealed the presence of active constituents' alkaloids, carbohydratye, steroid and flavonoids and their HPTLC fingerprinting revealed that active constituents are fully active in methanolic extracts which are obtained in different colours having spotted on different Rf values. Hence, it is concluded that this drug supposed to be great beneficial and boon for our society.

Keywords: Kantakari, Pharmacognosy, phytochemical.

INTRODUCTION

India with its mega-biodiversity and knowledge of rich ancient traditional systems of medicine (Ayurveda, Siddha, Unani, Amchi and local health traditions) provide a strong base for the utilization of a large number of plants in general healthcare and alleviation of common ailments of the people[1]. *Solanum xanthocarpum* is known as the Indian night shade or Yellow berried night shade (English). It is a prickly diffuse, bright green perennial herb mostly found in dry places as a weed along roadsides and waste lands. In Ayurveda, plant is supposed to possess pungent, bitter, digestive, alternative astringent. Root decoction used as febrifuge, effective diuretic and expectorant. In ancient times, Charak and Shrusuta used the entire plant for their medicinal perspective and fruits in internal prescription for bronchial asthma, tympanitis, misperistalsis, piles. These plants are found to be useful in the treatment of catarrhal fever, coughs, asthma and chest pain[2]. *Solanum xanthocarpum* plant contains alkaloids, sterols, saponins, flavonoids and their glycosides and also carbohydrates, fatty acids, amino acids etc. The fruit of these plants are rich in carpesteral, Solanocarpine and glucoside alkaloids. This herb is primarily used with tulsi, datura, honey and black pepper This herb has been known to promote conception in females. The perfect substitutes for these plants are the Pranrakshak churan that has been specially formulated with organic vegetarian ingredients. We at planet Ayurveda are continually working on formulations that are being devised for the welfare of our patients. The herbal products that the organization produces is subjected to a strict quality check that has been carefully designed by experts. This quality assurance mechanism helps us in providing the customer with excellent product quality. We at the planet Ayurveda use only organic ingredients and do not add any chemicals or perspectives in them.

MATERIAL AND METHODS

Method of preparation of *curna*

The whole plant of *Solanum xanthocarpum* was collected from chitrakoot region which is widely distributed in hilly and rural areas. After collection, it was washed and stored in an airtight container.

Physico-chemical parameter

Physico-chemical parameters i.e. loss on drying at 1050C, total ash, water and alcohol soluble extractive were checked out in triplicate according to the prescribed Standard methods in Indian Pharmacopeia[3].

Loss on drying (1050)

The crude sample of *Solanum xanthocarpum* was weighed and put in crucible in an overnight and took the reading. (the procedure is based on WHO guidelines)[4].

Extractive values

Water soluble extractive values

The extractive value of given sample was carried out on the basis of their polarity. The sample was accurately weighed and put in conical flask and left for overnight for continuous stirring[4].

Alcohol Soluble extractive value

The extractive value of given sample was carried out on the basis of their polarity. The sample was accurately weighed and put in conical flask and left for overnight for continuous stirring. (All these procedures are given by as per WHO guidelines)[4]

Phytochemical analysis

The phytochemical analysis of this plant was performed for the detection of active constituent's i.e alkaloids, protein, saponin, resin, tannin, carbohydrate, flavonoid and steroid.

Alkaloid

Dragendroff's test: Few drops of sample mix with 1ml of Dragendroff's reagent and few drops of 1N HCL[5,6]
Wagner test: 1ml of alcoholic extract of sample and 3-4 drops of Wagner reagent[5,6]
Mayer's test: 1ml of alcoholic extract of sample and add few drops of Mayer's reagent[5,6]

Carbohydrate

Anthrone test: Add 0.5ml of aqueous extract of drug in 2ml of anthrone reagent[5,6]
Fehling test: To 1ml aqueous extract of drug, add 1ml of each of equal part of Fehling solution A and Fehling solution B. Boil the content[5,6]
Molisch test: To 1ml of aqueous extract of drug, add 2-3 drops of alpha napthol after it add few drops of conc. sulphuric acid[5,6]

Flavonoid

0.5ml of an alcoholic extract, add 5-6 drops of dilute HCL and few pieces of Magnesium metal[5,6]

Protein

Bieuret test: To 1ml of alcoholic extract of drug, add 1.5% sodium hydroxide solution and add 1or 2 drops of 5% copper sulphate solution.
Millons test: To 1ml of alcoholic extract of drug add 5-6 drops of millions reagent which result in formation of white precipitate which turns red on heating[5,6]

Saponin
1ml of alcoholic or aqueous extract of drug in 1ml of sodium bicarbonate[5,6]

Steroid
To 1ml of alcoholic extracts of drug, add 2ml of chloroform and 1ml of sulphuric acid from the side wall of test tube[5,6]

High Performance Thin Layer Chromatography

The dried fresh part of *Solanum xanthocarpum* were prepared in methanolic extract. Extract 2g of powdered drug with methanol by warming on a water bath. The extract was collected and place in vacuum evaporator for complete evaporation. The sample was carefully scratch and again dissolved in methanol having AR grade and used for chromatographic fingerprinting. The solvent system used for *Solanum xanthocarpum* plant drug was Toluene: Ethyl acetate (7:3). Apply 5ul of test solution on precoated silica gel 60F254 (E.Merck) of uniform thickness of 0.2mm. Develop the plate in the solvent system to a distance of 8cm. Observe the plate under UV 254nm, 366nm and white r and spray the plate with 5% methanolic sulphuric. Note the Rf value and colour of resolved bands[7,8].

RESULTS AND DISCUSSION

In present study the drug of *Solanum xanthocarpum* were evaluated for its physicochemical and phytochemical aspects. Organoleptic parameters revealed that the powder of leaves of *Solanum xanthocarpum* are green in colour, with the characteristic odour, astringent and bitter in taste and fine and hard texture. The results of preliminary phytochemical analysis in the ethanolic and water extracts of the drugs showed the presence of carbohydrates, steroids, alkaloids, resin, saponins and tannins (Table 1) which could make the drug useful for treating different ailments as having a potential of providing useful drugs for human use.

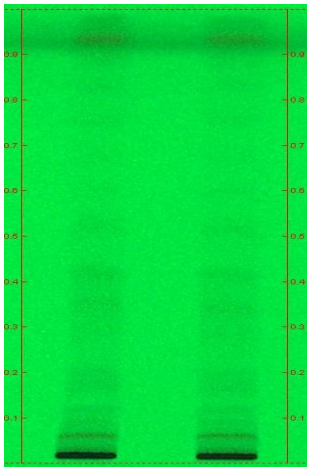
Table 1: Phytochemical analysis of *Solanum xanthocarpum*

Parameters	Test method	Result		
		Ethanolic extract	Aqueous extract	Observation
Alkaloid	Dragendroff's test	+	+	Orange colour appears
	Wagner's test	+	+	Light brown colour appears
	Mayer's test	+	+	Pale yellow colour appear
Carbohydrate	Anthrone's test	+	+	Blue colour appears
	Fehling test	+	+	Brick red colour appears
	Molisch test	+	+	Red violet colour ring appears
Flavonoids	Shinoda test	+	+	Light brown colour appears
Protein	Biuret's test	-	-	Yellow colour appears
	Millons test	-	-	Blue colour appears
Saponin	Foam test	+	+	Honey comb like froth forms
Steroids	Salkowski tests	+	+	Red colour ring appears

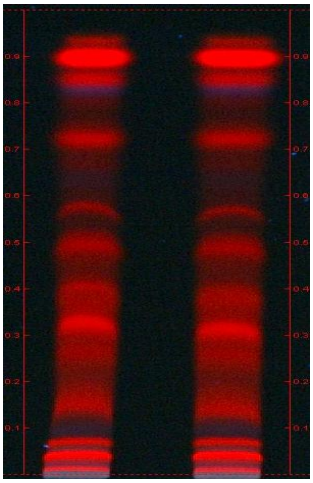
Physicochemical investigations were performed for loss on drying, water soluble extractive and alcohol soluble extractive the results were tabulated in (Table 2).

Table 2: Physicochemical parameters of Solanum xanthocarpum

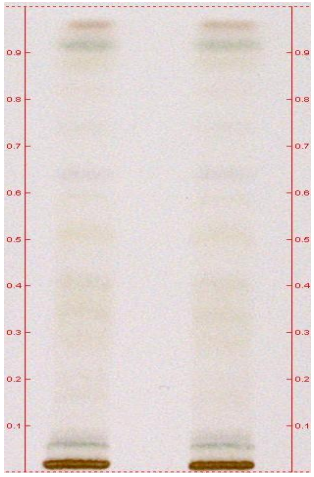
S.NO.	Parameter	Result
1.	Loss on drying at 105^0c	4.1%
2.	Alcohol soluble extractive value	18%
3.	Water soluble extractive value	16.5%



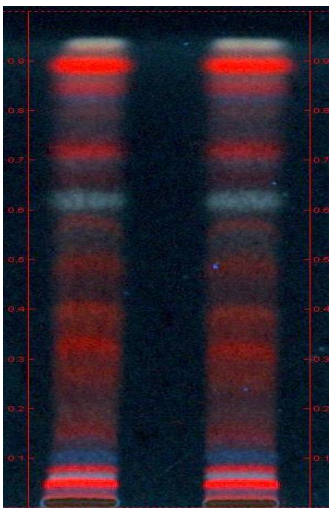
At 254nm



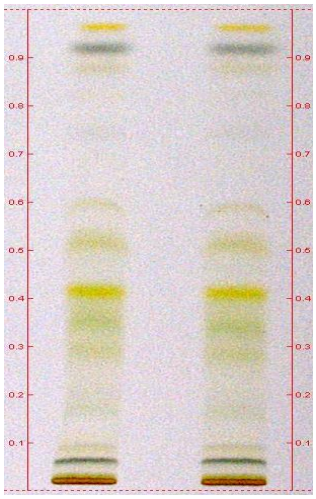
At 366nm



At white r



At 366nm AD



At white r AD

The TLC plate were examined under ultra violet light at 254 nm; at 366 nm; at visible for both before and after derivetisation with 5% methanolic-sulphuric acid reagent (Fig. 1-4). The Rf values and colours of the bands obtained were recorded. It shows major spots at visible light Rf 0.03 (light green), 0.06(green), 0.28,0.34,0.41,0.51,0.59,0.88 (all spots yellow/light yellow), 0.92 (light black), 0.96 (yellow); at 254nm Rf 0.06, 0.92 (all spots black) and at 366nm Rf 0.01, 0.04, 0.07, 0.13, 0.26, 0.31,0.39,0.48,0.57 (all spots red), 0.66 (light red), 0.71 (red), 0.82 (purple), 0.85 (red), 0.89 (red), 0.93(light red). After spray the plate shows major spots at visible light Rf 0.06, 0.92 (Faint green), 0.96 (light brown); at 366nm Rf 0.02, 0.05(pink), 0.06(faint violet), 0.08(pink),0.10(light blue), 0.31,0.39,0.48, 0.58(light red),0.61(faint white),0.72(light red),0.82(light blue), 0.84(light red),0.89(red),0.93(white)

CONCLUSION

The Physico-chemical and preliminary data generated from the above mention procedure is helpful in determining the quality, purity and authencity of the drug, especially in the crude form. The extractive values are being useful for the further extraction of phytoconstituents from the plant. The alcohol soluble extractive indicated the presence of polar constituents like phenols, flavonoids etc. The preliminary phytochemical screening of the extract of whole plant which was prepared in different solvents were found to contain alkaloids, carbohydrates, glycosides, flavonoids, triterpenoids, steroids, tannins and saponins.

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