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RESEARCH ARTICLE

PHYTOCHEMICAL SCREENING AND QUANTITATIVE ANALYSIS OF *TEPHROSIA PURPUREA*

Vishal Sahu[1], Dr. Vivekanand Katare*[1], Mrs. Abhilasha Delouri[1], Mr. Prabhat Kumar Jain [2]

[1]Vivekanand College of Pharmacy, Bhopal (M.P.)

[2]Scan Research Laboratories, Bhopal (M.P.)

***Correspondence Info:**

Dr. Vivekanand Katare, Vivekanand College of Pharmacy, Bhopal (M.P.)

Email:

vivekanandkatare@gmail.com

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ABSTRACT

Solanum xanthocarpum belongs to the family Solanaceae commonly known as the Indian night shade or Yellow berried night shade (English) and kantakari (Sanskrit). *Solanum xanthocarpum* has played an important role in the traditional medicine. The aim of present invention is to formulate and develop ODFs of hydro-alcoholic extract of *Solanum xanthocarpum*. ODFs of *Solanum xanthocarpum* extract were prepared using solvent casting method. The percentage yield of Hydroalcoholic extract of *Solanum xanthocarpum* was found to 3.35 % by using maceration method under laboratory conditions. The results of phytochemical screening show the presences of various bioactive compounds such as Carbohydrates, Flavonoids, Proteins & Amino acids, Diterpenes and Saponins. Phenol s or phenolic compounds were found to absent in Hydroalcoholic extract *Solanum xanthocarpum* roots. Among the prepared formulations, formulation F1 was found to have transparent visual appearance, best film forming capacity, least disintegration time and also found to be stable at accelerated stability studies. Evaluation of the films confirmed their potential as an innovative dosage form to deliver *Solanum xanthocarpum*

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Key words: *Tephrosia purpurea*, phytochemical test, total Alkaloids content, total Flavonoid content

INTRODUCTION:

Plant extracts were used in folk medicine in the form of tinctures, infusions and decoctions or essential oils, as a cure and treatment of diseases all over the world. The most common studied plants for their therapeutic potential are considered the spices and medicinal herbs. Although they are extensively used for the design and development of new drugs in human medicine, plant antimicrobial compounds are also a promise for future plant disease controlling agents. The use of plant products as antimicrobial agents is an ancient idea (Cowan, 1999), but the researches in the area are gaining attention lately. As a response to the acquired pathogens resistance to antibiotics existing on the market, new alternatives should be designed for the treatment of infectious diseases. It is therefore desirable to explore the potential of plant

extracts for the development and design of new antimicrobial agents (Butu et al., 2014; Ahmed et al., 2015), as this could be a solution for both medical and Phytopharmaceutical industry.

Plants contain natural bioactive compounds such as secondary metabolites and antioxidants. The medicinal plants used as traditional medicine all over the world are rich in secondary metabolites (Tshivhandekano et al., 2014). The traditional medicine all over the world is nowadays revealed by an extensive activity of researches on different plant species and their therapeutic principles. Plants contain phytochemicals with various bioactivities including antioxidant, anti-inflammatory and anticancer activities.

The present study aims to screen and quantify hydroalcoholic extract for phytochemical content, total Alkaloids content and total Flavonoid content. *Tephrosia purpurea* or Sarpunkha belongs to family Leguminosae (Sub family-papilionaceae). The genus Tephrosia comprises between 300 to 400 species of annual and perennial woody herb, distributed in tropical and subtropical regions of the world. Plant has high economic value due to the presence of phytochemicals like flavonoids, alkaloids, carbohydrates, tannins and phenols, gums and mucilage, fixed oils and fats and Saponins and lipids. Flavonoids have antioxidants and they have strong antimicrobial activity (Kumari et al., 2014).

Material and Methods

Collection of plant materials

The roots of *Tephrosia purpurea* were collected from Akshat nursery Karond, Bhopal in the period of March 2022,

Extraction (By Maceration Method) [6]

Maceration

Collected plant drugs namely *Tephrosia purpurea* roots were cleaned properly and washed with distilled water to remove any kind of dust particles. Cleaned and dried plant drugs were converted into moderately coarse powder in hand grinder. Powdered plant drugs were weighed (22 gm) and packed in (1 liter) air tight glass Bottle. The plant drugs were subjected to extraction by Methanol+water (20:80) as solvent for about 24 hrs. The liquid extracts were collected in a tarred conical flask. The solvent removed from the extract by evaporation method using hot plate. The extracts obtained with each solvent were weighed to a constant weight and percentage w/w basis was calculated (Pandey and Tripathy, 2014).

Phytochemical Analysis

Preliminary Phytochemical Screening To analyze the plant material in terms of its active

ingredients, one must first perform a preliminary phytochemical screening. *Tephrosia purpurea* root Hydroalcoholic extract was put through routine phytochemical testing to identify the various components that were present in it. Alkaloids, glycosides, carbohydrates, tannins, resins, flavonoids, steroids, proteins, and amino acids were identified using phytochemical screening (Kokate, 1994; Harborne, 1976).

Estimation of total flavonoids content

The aluminum chloride colorimetric method was modified from the procedure reported by Olufunmiso and Afolayan (2011). Quercetin was used to make the calibration curve. Ten milligrams of quercetin was dissolved in 80% ethanol and then diluted to 10 to 50 µg/mL. The diluted standard solutions (0.5 mL) were separately mixed with 1.5 mL of 95% ethanol, 0.1 mL of 10% aluminum chloride, 0.1 mL of 1M potassium acetate and 2.8 mL of distilled water. After incubation at room temperature for 30 min, the absorbance of the reaction mixture was measured at 415 nm with a Shimadzu spectrophotometer. The amount of 10% aluminum chloride was substituted by the same amount of distilled water in blank. Similarly, 0.5 mL of Hydroalcoholic extracts and Flavonoid standard solutions (100 ppm) were reacted with aluminum chloride for determination of Flavonoid content as described.

Estimation of total Alkaloids content (Ajanal et al., 2012**)**

Bromocresol green solution was prepared by heating 69.8 mg bromocresol green with 3 ml of 2N NaOH and 5 ml distilled water until completely dissolved and the solution was diluted to 1000 ml with distilled water. Phosphate buffer solution (pH 4.7) was prepared by adjusting the pH of 2M sodium phosphate (71.6 gm Na_2HPO_4 in 1 L distilled water) to 4.7 with 0.2 M citric acid (42.02 gm citric acid in 1 L distilled water).

Atropine standard solution was made by dissolving 1 mg of pure Atropine (AR-grade procured from Sigma Company) in 10 ml distilled water. Separation of Alkaloid A part of extract residue was dissolved in 2N HCL and then filtered. 1 ml of this solution was transferred to separatory funnel and washed with 10 ml chloroform (3 times). The pH of this solution was adjusted to neutral with 0.1 N NaOH. Then 5 ml of BCG solution and 5 ml of phosphate buffer were added to this solution. The mixture was shaken and complex extracted with 1, 2, 3 and 4 ml chloroform by vigorous shaking, the extract was then collected in a 10 ml volumetric flask and

diluted with chloroform. Preparation of standard curve accurately measured aliquots (0.4, 0.6, 0.8, 1 and 1.2 ml) of Atropine standard solution was transferred to different separatory funnels. Then 5 ml of pH 4.7 phosphate buffer and 5 ml of BCG solution was taken and the mixture was shaken with extract with 1, 2, 3, and 4 ml of chloroform. The extracts were then collected in 10 ml volumetric flask and then diluted to adjust solution with chloroform.

The absorbance of the complex in chloroform was measured at spectrum of 470 nm in UV-Spectrophotometer (SHIMADZU UV-1800) against the blank prepared as above but without Atropine

Results and Discussion

The plant drug (22g) was subjected to extraction by (maceration) using Hydroalcohol as solvent for about 24 hrs. The percentage yield of Hydroalcoholic extract of *Tephrosia purpurea* roots was found to 5.45 % by using maceration method under laboratory conditions. The percentage yield was found to be slight higher due to polar nature of the solvent, methanol and water table 1.

Results of Phytochemical test showed the presence of various bioactive compounds such as Carbohydrates, Flavonoids, Proteins & Amino acids, Diterpenes and Saponins. Phenol s or phenolic compounds were found to absent in Hydroalcoholic extract of Tephrosia *purpurea* roots. The results of phytochemical revels that the all polar and Methanolic and aqueous soluble compound was found to be present in *Tephrosia purpurea roots* extract. Table 2.

Flavonoid content was calculated from the regression equation of the standard plot ($y=0.02x+0.020$, $R^2=0.995$) and is expressed as quercetin equivalents (QE) table 4, Fig. 2. Total Flavonoid content was 0.165mg/100mg quercetin equivalent in HETP.

Table 1: Extractive values obtained from *Tephrosia purpurea*

S.N.	Solvent	% Yield
1.	Methanol+water (20:80)	5.45%

Table 2: Preliminary phytochemical screening of *Ricinus communis*

S.N.	Phytoconstituents	Test Name	Hydroalcoholic Extract
1	Alkaloids	Wagner's Test	**+(ve)**
2	Carbohydrates	Fehling's Test	**+(ve)**
3	Flavonoids	Lead acetate	**+(ve)**
		Alkaline reagent test	**+(ve)**
4	Proteins & Amino acids	Precipitation test	**+(ve)**
5	Phenols	Ferric chloride test	**-(ve)**
6	Diterpenes	Copper acetate test	**+(ve)**
7	Saponins	Foam test	**+(ve)**

Table 4: Total Flavonoid content of Hydroalcoholic extracts *Tephrosia purpurea*

S. N.	Extracts 100µg/ml	Flavonoid content Quercetin equivalent mg/100mg
1	Hydroalcoholic extract (100µg/ml)	0.165

Table 5: Total Alkaloid Content of Hydroalcoholic extract of *Tephrosia purpurea*

Sample	Total Alkaloid content AT mg/100mg
Hydroalcoholic extract 100µg/ml	0.215

n=3, values are given in SEM

CONCLUSION

In the present study, we have found the presence of various bioactive compounds such as Carbohydrates, Flavonoids, Proteins & Amino acids, Diterpenes and Saponins. Phenol s or phenolic compounds were found to absent

in Hydroalcoholic extract *Tephrosia purpurea* roots. The presence of total flavonoids and alkaloids were found to be in higher amount. This study revealed that the plant *Tephrosia purpurea* (roots) can be use in various formulations for the treatment of different diseases and disorders

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