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ESTABLISHMENT OF QUALITY CONTROL PARAMETERS FOR *CASSIA SURATTENSIS* SEEDS

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ABSTRACT

Standardization of drug material means confirmation of its identity, determination of its quality, purity and detection of nature of adulterant by various parameters like morphology, microscopy, physical, chemical and biological evaluation. The present study was aimed to establish the quality control parameters for *Cassia surattensis* seeds family Fabaceae. The quality control parameters like total ash, acid insoluble and water soluble ash values, water soluble and alcohol soluble extractive values, moisture content, swelling index, fixed oil content, chromatographic study and heavy metal content of *Cassia surattensis* seeds were evaluated. Microscopic evaluation was also carried out by taking T.S. and L.S. The preliminary phytochemical screening of seeds showed the presence of various phytochemicals like Carbohydrates, Proteins, Glycosides, Tannins, Alkaloids, Flavanoids and Fixed oil. The results from this study have provided information on the morphological, microscopic and physico-chemical parameters of the seeds of *Cassia surattensis*. The findings from this study will be useful towards establishing standards which can be included in official monograph of the plant for its proper identification and quality control.

KEYWORDS: *Cassia surattensis*, Pharmacognostic standards, Microscopy, Physicochemical studies.

1. INTRODUCTION

Introduction of plant

Cassia surattensis (C. glauca) family Fabeaceae commonly known as golden senna is small tree having bright yellow flowers. The leaves of compound contain 6-10 pairs of leaflet.

Standardization of drugs means confirmation of its identity, determination of its quality, purity and detection of nature of adulterant by various parameters like morphology, microscopy, physical, chemical and biological evaluations. There is an increasing awareness and general acceptability of the use of herbal drugs in today's medical practice. Over 80% of the world population depends on herbal medicines and product for healthy living.

2. MATERIALS AND METHODS

2.1. Plant Material

The pods of *Cassia surattensis plant* were collected from the premises of Smt. Kishoritai Bhoyar Collage of Pharmacy, New Kamptee, Nagpur District, Maharashtra, India in the month of February 2017.

2.2. Macroscopic examination

- Shape- Transverse, oblong
- Size- 4-5 mm long, 2.5-3.5 mm wide
- Color- Dark brown and shining
- Taste- Bitter
- Odor- Odorless
- Testa is hard, smooth and glossy in appearance.

2.3. Microscopic examination

The transverse and longitudinal sections of seeds showed the presence of epidermis, sub-epidermal layer, palisade layer, parenchymatous cells and cotyledons.

2.4. Physiochemical parameter

The seeds of the plant were subjected for the determination of physiochemical parameter including total ash value, acid insoluble ash value, water soluble ash value, foreign organic matter, loss on drying, water soluble extractive value, alcohol soluble extractive swelling factor, foaming index.

Ash value

Take about 2 or 3 gm accurately weighed, of the ground drug in a silica dish previously ignited and weighed. Scatter the ground drug in fine even layer on the bottom of the dish. Incinerate by gradually increasing the heat until free from carbon.

Acid insoluble ash

Boil the total ash with for five minutes with 25 ml dil. HCl, collect the insoluble matter on an ash less filter paper, wash with hot water, ignite and weigh. Calculate the % of insoluble ash with reference to the air dried drug.

Water soluble ash

Boil the total ash for five minutes with 25 ml of water, collect the insoluble matter on an ash less filter paper, wash with hot water, and ignite to constant weight at low temperature. Subtract the weight of insoluble matter from the weight of the ash, the difference in weight represent the water soluble ash. Calculate the % of water soluble with reference to the air dried drug.

EXTRACTIVE VALUES

Determination of Alcohol-soluble Extractive

Macerated 5 gm of the air-dried drug coarsely powder, with 100 ml of alcohol in a conical flask for 24 hours, shaken frequently for six hours and filtered rapidly taking precaution against loss of alcohol then evaporated 25% of the filtrate to dryness in a tarred bottomed shallow dish, dried at 105^0C and weighed. Calculate the percentage of alcohol soluble extractive value with reference to the air-dried drug.

Determination of Water-Soluble Extractive

Proceed as directed for the determination of alcohol soluble extractive, used chloroform water, instead of alcohol.

Loss on Drying

10g of drug after accurately weighing was placed in a tarred evaporating dish and dried in an oven at 105^0 C for 5 hours. Constant weight is reached when two consecutive weighing of drying for 30 minutes and cooling for 30 minutes in a desiccator, show not more than 0.01g difference.

Swelling Index

Swelling index is the volume in ml taken up by the swelling of 1gm of plant material under specified conditions. Its determination is based on addition of water or a swelling agent.

Carbohydrates: (Mollish's test)

To 2 ml of test solution, two drops of alcoholic solution of α- Naphtha were added. The mixture was shaken well and few drops of concentrated sulphuric acid were added slowly along the sides of test tube. A violet ring indicates the presence of carbohydrates.

Alkaloids

Alkaloid detection was carried out by extracting 1g powdered sample with 5 ml methanol and 5 ml of 2N HCl, and then treating the filtrate with Meyer's and Wagner's reagents.

Flavanoids

About 0.2 g of plant extract was dissolved in diluted NaOH and HCl was added. A yellow solution that turns colorless indicates the presence of flavanoids.

Terpenoids: (Salkowski test)

To the test solution chloroform was added and concentrated sulphuric acid was added from the side of test tube, the chloroform layer shows red to blue color and acid layer shows greenish yellow florescence.

Tannins

Small quantity of extract was mixed with distilled water and heated on water bath. It was filtered and Ferric chloride was added to the filtrate. A dark green color indicates the presence of tannins.

Anthraquinone: (Borntrager Test)

About 0.5 g of the extract was taken into a dry test tube and 5 ml of chloroform was added and shaken for 5 min. The extract was filtered and the filtrate was shaken with equal volume of 10% ammonia solution. A pink violet or red color in the ammonical layer indicates the presence of anthraquinone.

Vitamin C: (Ascorbic acid)

1ml of 2% w/v test solution was diluted with 5ml of water and to it 1 drop of freshly prepared 5% w/v solution of sodium nitroprusside and 2ml of dilute sodium hydroxide solution were added. The 0.6ml of hydrochloric acid was added drop wise and stirred, the yellow color turns to blue.

Gums

The extract mixed with water which gives the thickening of the substances, indicates the presence of gums.

Proteins: (Millon's test)

To 2 ml of test solution few drops of Millon's reagent were added. A white precipitate indicates the presence of proteins.

Amino acids: (Ninhydrin Test)

Two drops of ninhydrin solution (10 mg of ninhydrin in 200 ml of acetone) were added to 2 ml of test solution. Appearance of purple color indicates the presence of amino acids.

Calcium

To a 10ml of test solution, 1 drop dilutes NH_4OH and saturated ammonium oxalate solution was added. White ppt. of calcium oxalate form, ppt. was soluble in HCl but insoluble in acetic acid.

Potassium

Flame test: Gives violet color to the flame.

Sulphate

With lead acetate reagent gives white ppt, soluble in NaOH.

Chloride

To 3ml test solution prepared in HNO_3, few drops of 10% $AgNO_3$ solution were added. White ppt. of $AgCl_2$ was observed. ppt. was soluble in dilute ammonia solution.

Fixed oil content

50g of the powdered drug, accurately weighed was extracted with solvent n-Hexane in soxhlet apparatus for 24 hours. Transferred the extract obtained to a tarred porcelain dish, and allowed to evaporate the solvent and weighed. Calculate the percentage of this extract from the weight taken.

3. RESULT

Photochemical constituents result

Phytocompounds	Powder/aqueous
Carbohydrate	+
Alkaloid	+
Terpenoids	_
Flavanoids	+
Anthraquinone	+
Vitamin C	+
Gum	_
Protein	+
Amino acid	+
Fixed oils	+
Inorganic elements Calcium, Potassium, Sulphate, Chloride	+

Evaluation Par1ameters	Results
1. Ash value	6.166 %w/w
2. Water soluble ash	58.33 %w/w
3. Acid insoluble ash	0.769 %w/w
4. Extractive value	
a) Water soluble extractive value	8.2 %w/w
b) Alcohol soluble extractive value	15.8 %w/w
5. Moisture content	1.981 %w/w
6. Swelling index	3.6
7. Fixed oil content	6.8 %w/w

4. DISCUSSION

There is an increasing interest in herbal medicines which may be due to the belief that herbal medicines are safe, cheap and have no adverse effects coupled with an increase in scientific justification for many ethno medicinal claims. However, there are still some challenges facing complete acceptance of herbal alternative medicines which may be due to lack of proper documentation as well as appropriate standardization and quality control processes. It is a fact that the therapeutic efficacy of medicinal plants depends on the quality and quantity of its chemical constituents and that the misuse of medicine or natural products in general started with wrong identification. Therefore, for the preparation of herbal medicines, there is need for proper identification of the plant materials to ensure some level of standards for such products. Proper identification can be achieved through pharmacognostic and phytochemical studies. Pharmacognostic studies are reliable and affordable tools in the quality control of crude drugs. Hence, it is very essential to lay down pharmacognostic specifications for medicinal plants being used as drugs.

5. CONCLUSION

Study of preliminary phytochemical screening of *Cassia surattensis* revealed the presence of carbohydrates, proteins, fixed oil, anthraqinone glycoside, tannins, flavanoids, alkaloids and elements such as calcium, magnesium and also presence of vitamin C.

Therefore in future these compounds can be isolated in pure form by various separation techniques such as column chromatography, preparative TLC or counter current extraction and their structures can be elucidated using the modern analytical techniques such as IR, NMR, and Mass spectroscopy for the exact identification of the compounds.

Figure no. 1. *C. surattensis* seeds

Figure no. 2. *C. surattensis* leaves and flowers

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