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PHARMACOGNOSTIC AND PHYTOCHEMICAL SCREENING OF *Tabebuia argentea*

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ABSTRACT

Tabebuia arjentea is a species of Tabebuia native to South America in Suriname, Brazil, eastern Bolivia, Peru, Paraguay and northern Argentina. The common English name Carribbean Trumpet Tree is misleading, as it is not native to the Caribbean. It is small dry season-deciduous tree growing to 8 m tall. The leaves are palmately compound, with five or seven leaflets, each leaflet 6-18 cm long, green with silvery scales both above and below. The flowers are bright yellow, up to 6.5 cm diameter, produced several together in a loose panicle. The fruit is slender 10 cm long capsule. It is a popular ornamental tree in subtropical and tropical regions, grown for its spectacular flower display on leafless shoots at the end of the dry season. This species presence in riparian areas of the caatinga of northeastern Brazil is a crucial resource for Spix's Macaw (*Cyanopsitta spixii*), which is presently extinct in the wild with fewer than 100 birds remaining in capacity. Any future reintroduction would have to provide sufficient *T.argentea* for nesting and other purposes-while the tree is not considered threatened on a global scale, locally it has declined due to unsustainable use of timber.

Keywords: *Tabebuia arjentea*, Carribbean, Spix's Macaw, Cyanopsittaspixii.

INTRODUCTION

Plant Profile

Scientific classification

Scientific name	: *Tabebuia arjentea*
Botanical name	: *Tabebuia arjentea*
Kingdom	: Plantae
Unranked	: Angiosperm
Order	: Lamiale
Family	: Bignoniaceae

A moderate sized evergreen tree grows up to 15 meters in height Leaves simple elliptical, palmately compound; flowers yellow, fruits dehiscent containing many seeds**.** Mostly this plant found in subtropical and tropical region. Its yellow flowers and capsule shape fruits. A moderate sized evergreen tree grows up to 15 meters in height. Leaves simple elliptical, palmately compound; flowers yellow, fruits dehiscent containing many seeds. Mostly this plant found in subtropical and tropical regions. Its yellow flowers and capsule shape fruits. Carbohydrates, Fats, Proteins, Vit A, B1, B2, B3, B6, B12, C, E, Calcium, Iodine, Iron, Mg, Phosphorus, Zinc. *Tabebuia arjentea* plant use in treatment of abdominal disease, abdominal pain, abdominal pain in pregnancy, abdominal tumors, coliCC, hernia etc [1].

MATERIALS AND METHODS

Collection and authentication

The leaves of *Tabebuia arjentea* were collected from Lonavla .The species for proposed study was studied and authenticated as *Tabebuia arjentea in* botanical survey of India, Pune. Specimen no.A1

Pharmacognostical Investigations

a] Determination of foreign matter

Foreign matter in herbal drugs consists of either parts of the medicinal plant or it may be any organism, part or product of an organism. It may also include mineral admixture not adhering to the medicinal plant materials e.g. soil, stones, dust etc. The specified quantity of plant material is spread on the thin layer of paper. By visual inspection or by using a magnifying lens (5X or 10X), the foreign matter are picked out and the percentage is recorded.

b] Determination of physical constants

Loss on drying (LOD)

Loss on drying is a loss of mass expressed as per cent w/w. The test for loss on drying determines both water and volatile matter in the crude drug.

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Moisture is an inevitable component of crude drug, which must be eliminated as far as possible. An accurately weighed quantity of about 5 g of powdered drug was taken in a tared porcelain dish. The powdered was distributed evenly. The porcelain dish kept open in vacuum oven and the sample was dried at the temperature 110^0 C for 2 hr until a constant weight was recorded. Then it was cooled in desiccator to room temperature, weighed and recorded. % Loss on drying was calculated using the following formula.

c] Ash values

Ash values are helpful in determining the quality and purity of a crude drug, especially in the powdered form. The objective of ashing vegetable drugs is removing all traces of organic matter, which may otherwise interface in an analytical determination. On incineration, crude drugs normally leave an ash usually consisting of carbonates, phosphates and silicates of sodium, potassium, calcium and magnesium. The total ash of a crude drug reflects the care taken in its preparation. A higher limit of acid-insoluble ash is imposed, especially in cases where silica may be present or when the calcium oxalate content of the drug is very high.

i] Total ash value

Ash value is a criterion to judge the identify or purify of crude drug. Total ash is usually consisting of carbonates oxidized phosphates, silicate and silica. Weigh accurately about 3 g of the powdered drug in a tarred silica crucible. Incinerated at a temperature not exceeding 450ºC for 4 hours, until free from carbon, cooled and weigh it.

ii] Acid insoluble ash value

Acid insoluble ash, which is part of total ash insoluble in dilute hydrochloric acid I, is also recommended for certain drugs .Adhering dirt and sand may be determined by acid-insoluble ash content. Boiled the ash for 5 min with 25 ml of 2 M HCL. Filtered and collect the insoluble matter on an ash less filter paper, washed with hot water and ignited in a tarred crucible at a temperature not exceeding 450ºC for 4 hrs. Coolled in a desiccators and weighed. Calculated the percentage of acid insoluble ash with reference to the air-dried drug using following formula,

iii] Water soluble ash value

Water soluble ash value determines the quality and purity of the crude drug. Boil the ash with 25 ml of water. Filtered and collected the insoluble matter on an ash less filter paper, washed with hot water and ignited in a tarred crucible at a temperature not exceeding 450ºC for 4 hrs. Cooled in a desiccators and weighted. Subtract the weight of insoluble matter from the total weight of ash. The difference in weight represented weight of water soluble ash. Calculated the percentage of water soluble ash with reference to the air-dried drug using the formula.

d] Extractive values:

The extract obtained by exhausting crude drugs is indicative of approximate measure of their chemical constituents. Taking in to consideration the diversity in chemical nature and properties of contents of crude drugs, various solvents are used for determination of extractives. The solvents used for extraction is in position to dissolve appreciable quantity of substance desired.

Water soluble extractive value:

Water soluble extractive value is useful for determination of the water soluble contents of the crude drugs. Macerated 5 gm accurately weighted coarse powdered drug with 100 ml of water in a stoppered flask for 24 hour, shaking frequently during first 6h.Filtered rapidly through filter paper taking precaution against excessive loss of water evaporated 25 ml of water extract to dryness in the tarred dish and weighed it. Calculate the percentage w/w of water soluble extractive value with reference to the air- dried drug.

e) Fluorescence analysis of drug:

Many crude drug show the fluorescence when the sample is exposed to UV radiation .Evaluation of crude drug is based on fluorescence in day- light is not much used, but short UV and long UV are used; as it is usually unreliable due to the weakness of fluorescent effect .Fluorescence lamps are fitted with suitable filters, which eliminate visible radiation from the lamp and transmit UV radiation of definite wavelength. Several crude drugs show characteristic fluorescence useful for their evaluation. When physical and chemical parameters are inadequate as it often happened with the powdered drugs, the plant material may be identified from there adulterants as it often happens with the powdered drug, the plant material may be identified from their adulterants on the basis of fluorescence study. The test of powder of flower was examined under daylight, short and long UV .The observed character was recorded.

f) Foaming index:

Foaming index is useful for determination of saponin contents of the crude drugs. Weight 1gm of finely powdered drug accurately and transfer to a 500 ml conical flask containing 100ml of boiling water .Maintain at moderate boiling for 30 min. Cool and filter into a 100ml volumetric flask and add sufficient water to make the volume to 100ml. Place the above decoction into 3 stoppered test tube, graduated test tubes in the series of successive portions of 1, 2, 3 ml and adjust the volume of the liquid in each test tube water to 10 ml. Stopper the tubes and shake them vertically for 15 seconds, 2 frequencies/ sec .Allow to stand for 15 min and measure the height of the foam.

The result assed as follows

i) If the height of the foam in every tube is less than 1 cm, the foaming in index is less than 100.

ii).If the height of the foam is every tube is less than 1 cm, the volume of the plant material decoction in this tube (a) is to determine the index. If this tube is the first or second tube in series, prepare an intermediate dilution in similar manner to obtain a more precise result.

iii) If the height of the foam is more than 1 cm in every tube, the foaming index is over 1000.In this case repeat the determination using a new series of dilution of the decoction in order to obtain a result.

Foaming Index-100/a

a=volume in ml of the decoction used for preparing dilution in the tube where foaming to a height of 1 cm is observed [2].

Extraction

- Plant material used : Dried powder of leaves.
- Solvent used : Using three different

Solvents in the following sequence –

1) Petroleum ether 2) chloroform, 3) Water (Maceration)

The leaves of *Tabebuia argentea* was collected and shade dried and then pulverized in grinder. About 150gm powdered utilized for extraction was passed through 120-mesh sieve to remove fine powder and coarse powder was used for extraction by using technique continuous hot Soxhlet extraction used different solvents in increasing order of polarity with petroleum ether (60^0c - 80^0c),chloroform. The extraction was carried out in Soxhlet extractor till all the constituents were extracted. The completion of extraction was indicated by taking sample out of siphon tube on TLC plate and placing it in iodine chamber. Absence of colored spot on plate indicated complete extraction. After completion of extraction, solvent was distilled off and concentrated extract was air-dried. The extract was stored in airtight container. The same procedure was followed during extraction with other solvents.

Extraction by cold maceration

It is the process of extraction of crude drug with water with several daily shaking and stirring at room temperature 150gm of power crude drug was taken into 3 liters of conical flask. 30 ml chloroform water was added to it and shaken well. Flask was plugged with cotton and aluminium foil and kept aside for 12hrs. Flask was shaken vigorously then flask was allowed to stand for 7 days with frequent shaking. After completion of 7 days extract was separated by decantation and filtration. Filtration was carried out by using vaccum filtration assembly. The residue was obtained against subjected to same procedure of maceration for 8 days to assure the complete extraction of crude material. The filtrate was concentrated on rotary flash vaccum evaporation then dried by using vaccum dryer. The dried extract then collected and preserve in desiccators [3-14].

RESULTS

Macroscopic Evaluation

Different parameters were studied in macroscopic evaluation of *Tabebuia argentea*.

T.S of *Tabebuia argentea* leaf

Microscopical examination of leaf

Upper epidermis, Lower epidermis.
Upper palisade, Lower palisade.
Collenchyma.
Xylem and Phloem.
Stomata.

Physicochemical Constants

The foreign organic matter was 1.2% w/w and loss on drying was found tube 16% w/w. the total ash value was 10% w/w, while water soluble ash value was found to be 4.5% w/w. acid insoluble ash value was found to be 6% w/w. also water soluble extraction found to be 4.45% w/w. ash value was found to be high. The alcohol soluble extraction value was found to be greater than water soluble extraction value. This indicates that there are more polar compounds present in seeds that can be extracted maximum into alcohol than the water.

Table 1. Table showing various physiochemical parameter of leaf of *Tabebuia argentea*

Sr. No.	Evaluation parameter	Value (%w/w)
1	Foreign organic matter	1.2
2	Moisture content	16
3	Total ash value	10
4	Water soluble ash value	4.5
5	Acid insoluble ash value	6
6	Water soluble extractive value	4.45

Table 2. Fluorescence analysis of *Tabebuia argentea* Leaf

Treatment	Colour appeared in day light
10% HNO_3	Brown
10%$FeCl_3$	Light brown
NaOH	Dark brown
Methanol	Brown
Acetic acid	Brown
Sulphuric acid	Light brown
Iodine solution	Dark brown
Picric acid	Brown
Dil. Ammonia	Light red
Ethanol	Brown

Figure 1. *Tabebuia argentea* branch

DISCUSSION

Pharmacognostic study is the initial step to confirm the identity and to assess the quality and purity of the crude drug. It is necessary that standards have to be laid down to control and check the identity of the plant and ascertain its quality before use. According to World Health Organization (WHO) the macroscopic and microscopic description of medicinal plant is the first step towards establishing its identity and purity and should be carried out before any tests are undertaken. Microscopical evaluation is simplest and reliable tool for correct identification of herbs as well as small fragment of crude drugs or powdered drugs and detection of adulterants and substituents. Total ash values and extractive values are useful in identification and authentication of the plant material Extractive values is useful to evaluate the chemical constituents of crude drug. Fluorescence is an important phenomenon exhibited by various chemical constituents present in plant material.Some constituents show fluorescence in the visible range in day light. The ultra violet light produces fluorescence in many natural products, which do not fluoresce in daylight. If the substance themselves are not fluorescent, they may often be converted into fluorescent derivatives by applying different reagents hence some crude drugs are often assessed qualitatively in this way and it is important parameter of pharmacognostic evaluation.

CONCLUSION

Preliminary phytochemical screening mainly revealed the presence of phenol and tannins in petroleum ether extract; carbohydrates, protein, steroid and flavonoid in chloroform extract; carbohydrates, tannins and flavonoids in methanol extract, protein, aminoacid, steroid and fat in aqueous extract.

T.S of the leaf confirmed the presence of wide cortex, stomata, epidermis, trichomes and parenchymatous cells.

In conclusion the detail study was undertaken with an aim of pharmacognostic standardization and preliminary phytochemical analysis of *Tabebuia argentea* leaves established in the present study will useful in identifying the genuine drug and will also be useful in development of pharmacopeial standards for further studies.

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