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PHARMACOGNOSTICAL STUDY OF CHIRABILVA (HOLOPTELEA INTEGRIFOLIA PLANCH)

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ABSTRACT

Aim: To do the detailed pharmacognostical study of Chirabilva (*Holoptelea integrifolia* Planch.) stem. **Methods:** Stem samples of *H. integrifolia* were studied by macroscopic, microscopic, physicochemical, phytochemical, fluorescence analysis of powder of the plant and other methods for standardization recommended by WHO. **Result:** Macroscopically stem of *Chirabilva* is 6 to 10mm thick, slightly curved, outer surface rough, grey to brownish grey, with lenticels. In microscopic study it shows starch grains and prismatic calcium oxalate crystals, phloem fibre and stone cells. T.S. of stem shows cork and upper phelloderm region, stone cells in phelloderm, parenchyma cells with starch grains and crystal. Preliminary phytochemical screening showed the presence of triterpenoids, saponins, tannins and flavonoids. Physiochemical parameters such as loss on drying, swelling index, extractive values and ash values were also determined. **Conclusions:** The results of the study can serve as a valuable source of information and provide suitable standards for identification of this plant material in future investigations and applications.

Keywords:*Chirabilva*, Macroscopic study, Microscopic study.

INTRODUCTION

Chirabilva consists of dried stem bark of *Holoptelea integrifolia* Planch. (Family - Ulmaceae); a large deciduous trees found throughout the greater parts of India up to an altitude of 660 meter, lower ranges of Himalaya, Saharanpur, Orissa, Chota Nagpur, Bihar, W. Bengal, hills of Deccan, eastern slopes of W. Ghats and NorthCircars. The selected drug *Chirabilva* possess *Tikta, Kashaya rasa* and have *Pramehaghna* (antidiabetic) action, therefore drug seems to be rational for the treatment of *Madhumeha* (Diabetes mellitus). Preliminary phytochemical and pharmacognostical study comprises of macroscopic and microscopic study of drug, organoleptic tests, ash value, acid insoluble ash and the qualitative analysis of drug.

MATERIAL & METHOD

The trial drug *Chirabilva* was collected from the Ayurvedic garden, Department of Dravyaguna, IMS, BHU.Stem bark of the *Chirabilva* was dried in shade and cut into small pieces.The preliminary phytochemical studies were performed for testing the different chemical groups present in the drug. 10% (w/v) solution of extract was taken unless otherwise mentioned in the respective individual test. General screening of various extracts of the plant material was carried out for qualitative determination of the groups of organic compounds present in them

(Trease and Evan, 1983).Microtome sections were taken, stained and mounted as usual and the cell content and cell wall structure were studied according to the method described by Sass (1940)[1],Johnson (1940) [2] and O'Brian et al (1964)[3].

Powder characteristics:

Preliminary examination, behaviour of powder with different chemical reagents and microscopical examination was carried out (Kay, 1938)[4] .

Fluorescence analysis:

Fluorescence characteristics of powdered material were recorded under ultraviolet light as per the method mentioned by Kokaski (1958)[5].

Physicochemical parameters:

The various physicochemical parameters such as total ash, moisture content (Loss on drying), water content, foreign organic matter, extractive values (Petroleum ether, chloroform, alcohol and water) have been studied as per WHO guidelines (WHO 2004)[6].

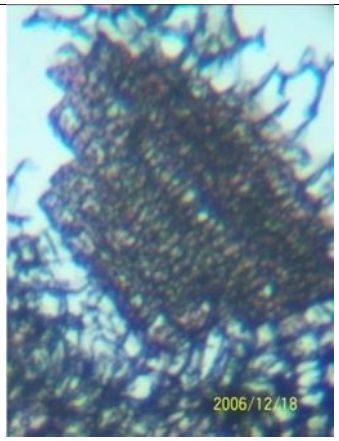
RESULTS & DISCUSSION

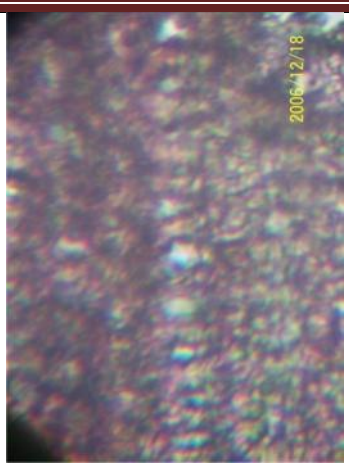
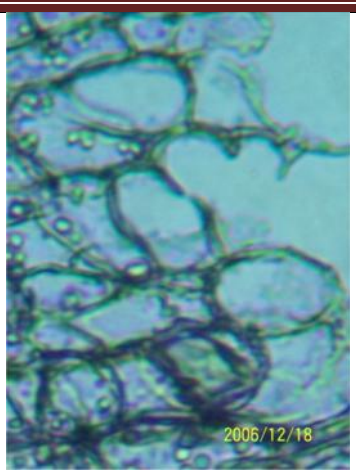
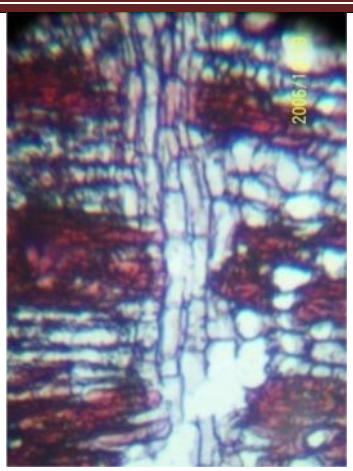
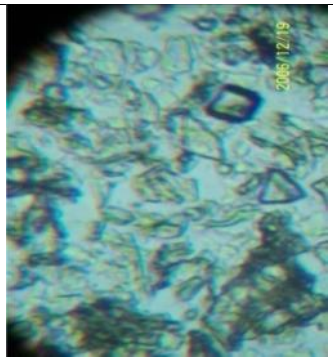
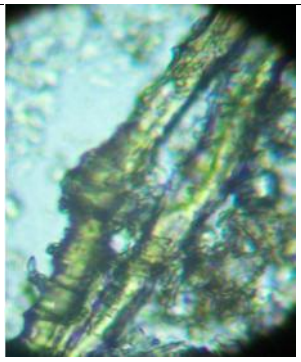
Macroscopical characters:

Bark of Chirabilva

Drug occurs variable in length, 6 to 10 mm thick, slightly curved, outer surface rough, grey to brownish grey, with lenticels and inner surface yellowish brown, fibrous, smooth; fracture hard; odour not characteristic and taste slightly bitter.

Microscopical characters

T. S. OF STEM BARK		
		
Cork and upper phelloderm region	**Cork cells**	**Stone cells in phelloderm**

		
Stone cells	**Parenchyma cells with starch grains and crystal**	**Medullary rays in between the phloem cells**
POWDER MICROSCOPY		
		
Starch grains and prismatic calcium oxalate crystals	**Phloem fibre**	**Stone cell with fibre**

Transverse section of stem bark shows wide zone of cork, 3 – 5 layers of phellogen and a wide zone of phelloderm; phloem occupied 1/3rd of the bark. Peripheral region of phelloderm shows patch of stone cells which are variable in shape, lignified and radiating canals. Groups of phloem fibres traversed by medullary rays; phloem fibres lignified having narrow lumen and septate and parenchyma cells contains starch grains and prismatic crystals of calcium oxalate.

Powder study shows scattered prismatic crystals of calcium oxalate, starch grains, stone cells and lignified phloem fibres.

Physico-chemical parameters of stem of *Holopteleaintegrifolia*Planch

Foreign matter	-	2.0 %
Moisture content	-	4.31 %
Total ash	-	17.63 %
Acid – insoluble ash	-	2.05 %
Sulphated ash w/w	-	18.12 %
Alcohol – soluble extractive	-	5.6 %
Water – soluble extractive	-	12.3 %
Chemical test:		
Steroids	-	+ve
Terpenoids	-	+ve
Tannins	-	+ve
Saponins	-	+ve

Fluorescence analysis:

[Chase & Pratt, 1949.,Kokaski, et al.,1958) with some modification]

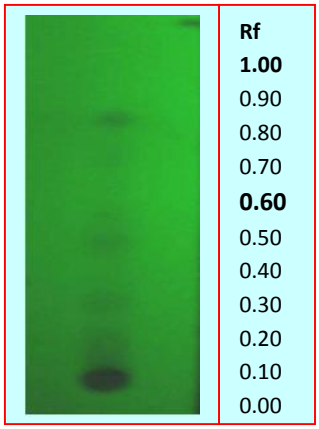
S.No.	*Treatment*	**Colour produced under ordinary light**	**Colour produced under UV - Long (366nm)**
1.	Drug as such	Dark brown	Brown
2.	Drug + Nitrocellulos	Orange	Light green
3.	Drug + Picric acid	Yellow	Brown
4.	Drug + $HCl_{conc.}$	Dark brown	Black
5.	Drug + H_2SO_4 conc.	Black	Black
6.	Drug + $HNO_{3(50\%)}$	Orange	Green
7.	Drug + 1 N Na OH in Me OH	Light brown	Black
8.	Drug + 1 N Na OH in Me OH + Nitrocellulos	Lemon	Black
9.	Drug + NH_4OH	Light brown	Black
10.	Drug + $FeCl_3$	Light brown	Black
11.	Drug + Acetic acid Glacial	Lemon	Black
12.	Drug + Sudan-III	Brick red	Dark brown

THIN LAYER CHROMATOGRAPHY

Alcoholic Extract (Soxhlet) - Visualization in UV 254 (Short wave length)

- Stationary phase - TLC Aluminium sheet silica gel 60 F 254 plates
- Mobile phase - Toluene – Ethyl Acetate – Methanol – Formic acid (40: 5: 2: 2dps)
- Rf in Iodine - 0.12, 0.24, 0.40, 0.50, 0.63, 0.68 and 0.74

Thin layer chromatography plate:



TLC results indicated 7 spots in alcoholic extract of bark at Rf 0.60.

Chirabilva is a very good drug for *madhumeha* (Diabetes mellitus), it has *Tikta, Kashaya rasa* which do the *Stambhana*(anti-secretory) of urine. In has terpenoids, saponins, steroids and tannins all these chemicals prevent diabetes.

CONCLUSION

From the foregoing observations it is seen that the drug occurs variable in length, 6 to 10 mm thick, slightly curved, outer surface rough, grey to brownish grey, with lenticels and inner surface yellowish brown, fibrous, smooth; fracture hard. Transverse section of stem bark shows wide zone of cork, 3 – 5 layers of phellogen and a wide zone of phelloderm; phloem occupied 1/3rd of the bark. Peripheral region of phelloderm shows patch of stone cells which are variable in shape, lignified and radiating canals. Powder study shows scattered prismatic crystals of calcium oxalate, starch grains, stone cells and lignified phloem fibres. TLC results indicated 7 spots in alcoholic extract of bark at Rf 0.60. In chemical analysis it shows presence of terpenoids, saponins, steroids and tannins all these chemicals prevent diabetes. All these properties make it very much favourable for diabetes mellitus.

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