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Research Article

# Evaluation Of The Microscopy Study Of *Senna Uniflora* Plant And Leaf Powder By Foldscope

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**Abstract**

Microscopy is useful for the study of the internal structure, constitution, and inclusions of plant and animal cells or other objects in detail. It is necessary for the detection of adulterants and contaminants of the herbal preparations and thus provides means for assessing the authenticity and quality of herbal drugs. Size, shape, relative position of different cells and tissues as well as the chemical nature of the cell walls, and the form and nature of cell contents are considered during microscopic analysis of crude drugs.

Qualitative microscopy includes studies of the transverse sections of leaf, root bark, as well as longitudinal section of root bark under photomicrograph with or without staining. In case of powder microscopy, different staining reagents such as iodine for detection of starch grains and calcium oxalate crystals while phloroglucinol for detection of lignified components are used. Plant sections or powders of the drug are mounted in water or dilute glycerol for light microscopic examination.

**Keywords:** Foldscope, Senna Uniflora, Microscopic study.

## Introduction

A microscope is an instrument used to see objects that are too small to be seen by the naked eye. Microscopy is the science of investigating small objects and structures using such an instrument. Microscopic means invisible to the eye unless aided by a microscope.The simplest optical microscope is the magnifying glass and is good to about ten times (10X) magnification. The compound microscope has two systems of lenses for greater magnification, 1) the ocular, or eyepiece lens that one looks into and 2) the objective lens, or the lens closest to the object.

A Foldscope is an optical microscope that developed by Manu Prakash and designed to cost less than US$1 to build. The Foldscope weighs 8 grams and that provide magnification from 140X to 2,000X. Foldscope attach it to a smartphone with the help of magnet for the user to take pictures of the magnification. It is compact and light, especially when compared with conventional field microscopes.

(a)

(b)

***Fig no.1. (a) Optical Microscope, (b) Foldscope***

The characteristic microscopic features include trichomes, palisade and spongy parenchyma, collenchyma, stomata frequency, their index, vein-islet, vein termination number, palisade ratio, shape and size, as well as vascular bundles, xylem and phloem cells, inclusions, etc., and their physical constants for leafy drugs while

cork cambium, primary cortex, phloem fibers, medullary rays, endodermis, pericycle, vascular bundles, etc., in the transverse and longitudinal sections, and their physical constants stand as characteristic microscopic features of drugs from root, stem, etc. with the help of Optical microscope and foldscope to study Microscopic evalution for herbal plant.

The traditional medicines involve the use of plant extracts particularly the bioactive components present in it. This type of study provides the health application at affordable cost. Secondary metabolites in plants are responsible for various medicinal uses of plants. Hence present microscopical screening of *Senna uniflora* (Mill.) H.S. Irwin & Barneby was belonging to family *Caesalpiniaceae*, leaves of the plant are consumed as vegetable. A poultice of the leaves is applied to wounds and the extract is reported to heal specific types of eczema. Roots are used to combat dropsy.

**Chemical constituents:**

1. Senna contains anthraquinones glycoside glycosides as sennosides A, sennosides B, sennosides-C, sennosides D, emodin, chrysophenol, Aloe emodin, rhein.

2. Two naphthalene glycoside, i.e. 6-hydroxy musizin glucoside and Tinnevellin glycoside.

3. It also contains yellow flavinol, colouring matter kaempferol and its glycosides kaempfrin,

4. Sterol and its glucoside.

5. Mucilage, resin and calcium oxalate.

**2. MATERIALS & METHODS**

1. Authentication of plant:

Senna uniflora (Mill.) plant was collected from local area of Pune in the month of Aug 2016 and authenticated at Head Botanical survey of India, Pune, Reference number (BSI/WRC/IDEN. CER/ 2016/ 371). The report obtained from the organization confirmed the Cassia plant to be Senna uniflora (mill).

**2. Macroscopic study:**

The leaves were studies for the macroscopic parameters like apex, margin, lamina and base.

**3. Microscopic study of whole plant:**

**a.Leaf:** To take transverse section of the leaves stained in Phloroglucinol and ruthenium red observed under optical microscope and foldscope

**b.Stem:** To take transverse section of the Stem stained in Phloroglucinol and ruthenium red observed under optical microscope and foldscope

**c.Root:** To take transverse section of the Root stained in Phloroglucinol and ruthenium red observed under optical microscope and foldscope

**4.. Preparation of powder:**

The leaves were shade dried and crushed using grinder to obtain coarse powder which was further use for microscopical& micro chemical test.

**5.Microscopic study of leaf powder:**

Powder microscopy is one of the simplest and cheapest methods to start with for establishing the correct identity of the source materials.

**6.Micro-chemical test for leaf powder Senna uniflora**

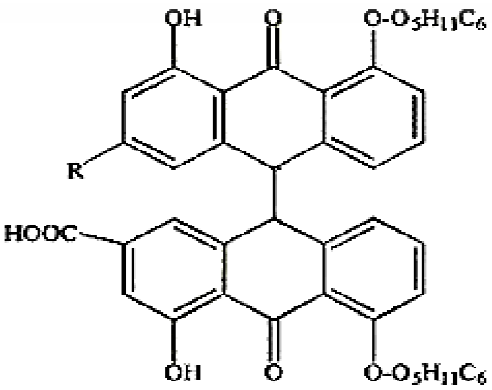
**3. RESULT & DISCUSSION**

In the present study, Senna uniflora plant part was carried out with the help of microscope and foldscope .Transerver section of senna leaf, stem ,root observed under microcroscope and foldscope .Therefore, in the present study compare optical microscope and foldscope images of part of the Senna uniflora plant.

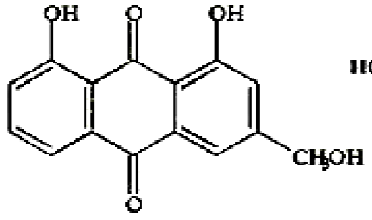
**1.Macroscopic study:**

The fresh leaves, Stem, and root of S.uniflora were collected and checked for macroscopic parameter such as Apex,margine,lamina, base.

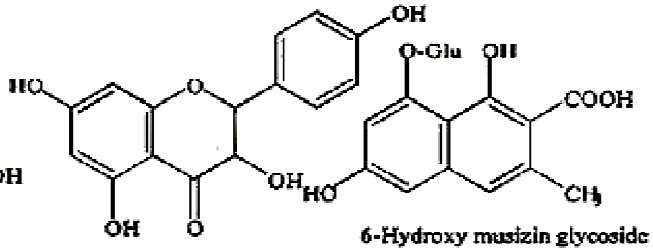
Senna plants are low branching shrubs (3 feet) with a straight woody stem and yellow flowers. Leaflets of senna have stout petiolules, entire margin lamina with an asymmetric base and an acute apex.




| S. No. | Compound | R | 10–10' |
|---|---|---|---|
| 1 | Sennoside A | —COOH | Trans |
| 2 | Sennoside B | —COOH | Meso |
| 3 | Sennoside C | —$CH_2OH$ | Trans |
| 4 | Sennoside D | —$CH_2OH$ | Meso |




Aloe-emodin




Kaempferol

6-Hydroxy musizin glycoside

**Fig.2. Senna uniflora plant**

**2. Microscopic study of the plant:**

**a)Leaf:**

Transverse section of *Senna uniflora*leaf under microscope and foldscope showed upper epidermis, vascular bundle crystals sheath,chlomchyma, mesophyll, palaside.(Fig no.2)

**b) Stem:**

Transverse section of *Senna uniflora* Stem under microscope and foldscope showed Epidemis,outer cortex ,inner cortex,bundle cap, xylum, medullary rays (Fig no.3)

**c)Root:**

Transverse section of *Senna uniflora* Stem under microscope and foldscope showed cambium, cork, cortex, xylum.(Fig no.4)

**3.Powder analysis of *Senna unifora* leaf :**

**a) Preliminary test:**

Prelimanary test determined colur,odour,test,solubility etc.(showed table no.1)

**4. Microscopic study of leaf powder:**

Powder microscopy is one of the simplest and cheapest methods to start with for establishing the correct identity of the source materials. It showed Mesophyll,Calciumoxalate,Trichomes,Xylum vessels.(fig.NO.5)

**5.Micro-chemical test for leaf powder *Senna uniflora*:**Microscopic study of powder reveals the presence of The micro chemical test of Senna uniflra leaf powder reveals the presence of lignified cells, cuticle, Hemi-cellulose, mucilaginous cells, endodermal starch grains. Calcium oxalate crystal and stone cells were present (table no.2. ).

**2.Microscopic study of the plant**

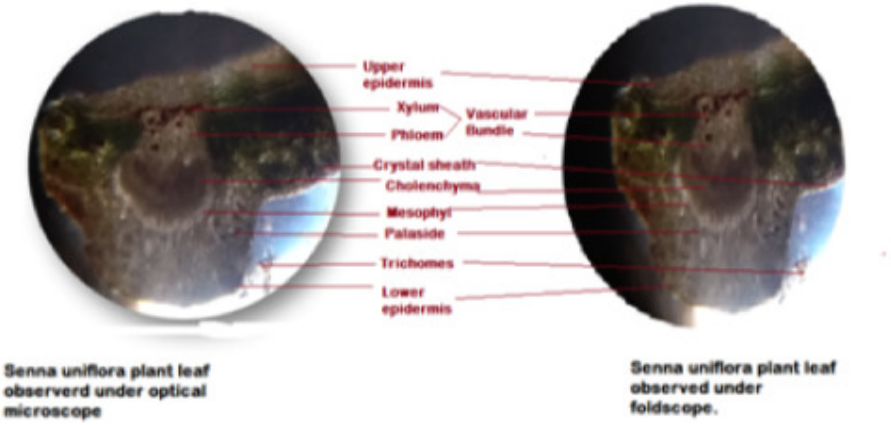



**Fig.2. T.S.of Senna uniflora leaves**

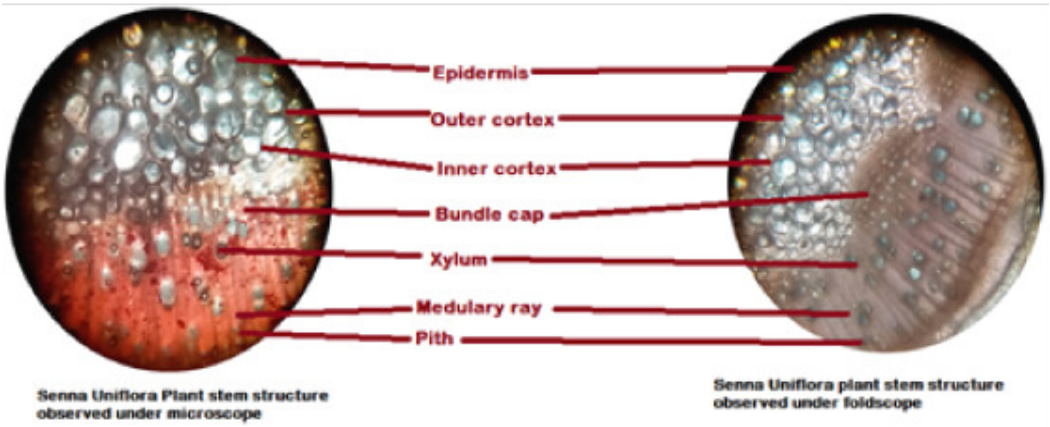



**Fig.3.T.S.of *Senna uniflora* Stem**

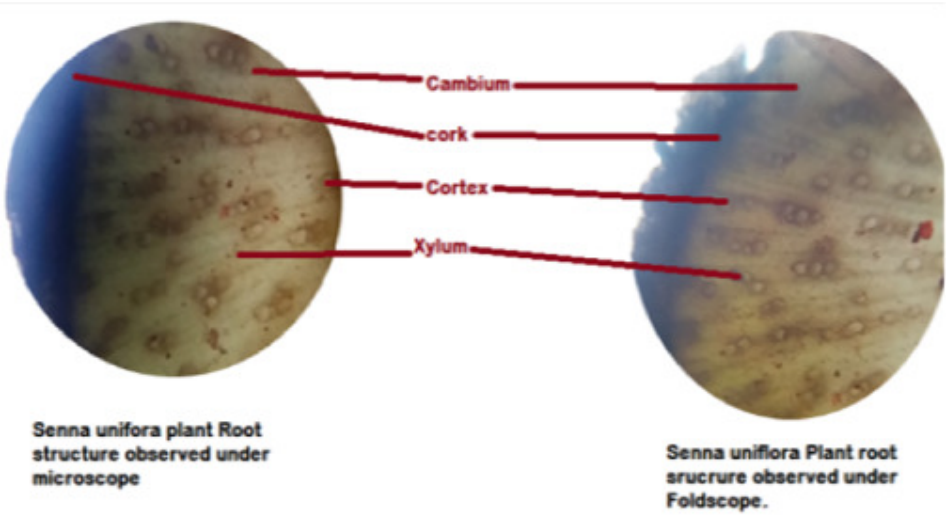



**Fig.4.T.S. of*Senna uniflora* root**

**3. Microscopic study of leaf powder**

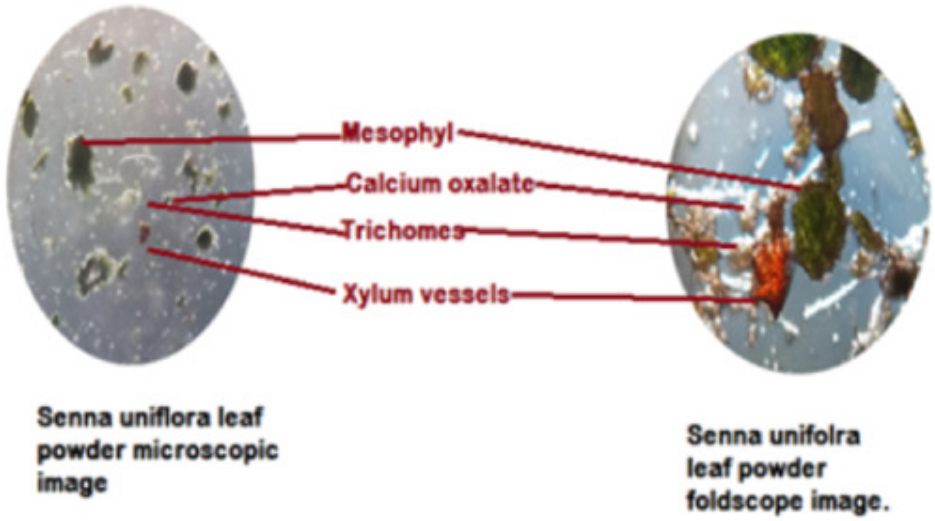



**Fig.5.*Senna uniflora* Leaf powder**

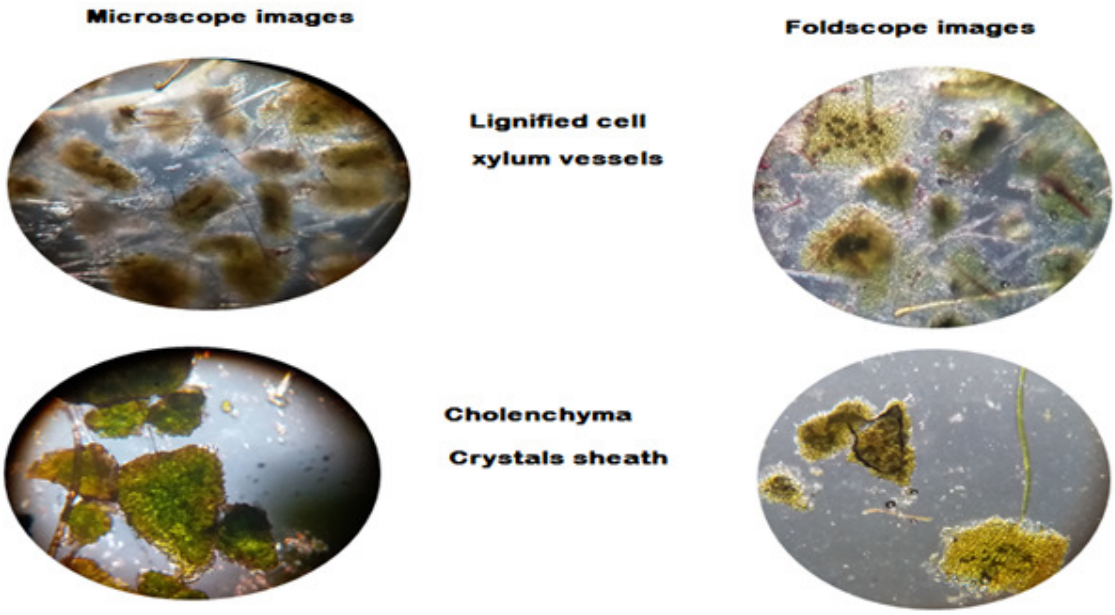



**Fig no.6 *Senna uniflora* leaf powder**

**4.Powder analysis of Senna unifora leaf :**

**a) Preliminary test:**

| Sr. No | Test | Observation | Inference |
|---|---|---|---|
| **1.** | Color | Brownish color | Leaf drug |
| **2.** | Odor | Characteristics | Aromatic crude drug |
| **3.** | Taste | Bitter | Drug contain alkaloids |

**5. Micro-chemical test for leaf powder *Senna uniflora***

| Sr.No. | Reagent | Observation | Characteristics |
|---|---|---|---|
| 1. | Phloroglucinol + Conc. HCl | Pink colour present | Lignified cells are present |
| 2. | Power + Ruthenium red | Green colour | Mucilaginous cells are present |
| 3. | Powder + Sudan red III | Pink colour | Cuticle |
| 4. | Powder + Dilute iodine solution + Conc. Sulphuric acid | Black colour | Hemicellulose absent |
| 5. | Powder +Dilute HCl | Soluble | Calcium oxalate crystal are present |
| 6. | Powder + Sulphuric acid. | No Brown colour | Stone cell Present |

**Discussion:**

The present study deals with the comparative images of microscope and foldscope. We sought to examine parts of the *Senna uniflora* plant and their leaf powder.The transverse section of leaf, Stem, Root showed upper epidermis, vascular bundle, crystals sheath,chlomchyma, mesophyll, palaside,Epidemis,outer cortex ,inner cortex,bundle cap,xylum,medullary rays, cambium, cork, cortex etc. leaf powder also showed Mesophyll,Calcium oxalate,Trichomes,Xylum vessels. The images was good and clear showed under foldscope.

**Conclusion:**

The plantmicroscopy study compared with the light microscope and foldscope. The modern research tools for evaluation of the plant drugs are available that is foldscope method is one of the simplest and cheapest methods to start for establishing the correct identity of the source

materials as compared to optical microscope. In the present work microscopy evaluation and Micro-chemical test of Senna uniflora were carried out. The microscopical studies of the transverse section of leaf, Stem, Root showed upper epidermis, vascular bundle, crystals sheath, chlomchyma, mesophyll, palaside, Epidemis, outer cortex ,inner cortex,bundle cap, xylum, medullary rays, cambium, cork, cortex etc. Leaf powder also showed Mesophyll, Calcium oxalate,Trichomes, Xylum vessels. Micro-chemical test for leaf powder *Senna uniflora* indicated presence of Mucilaginous cells,Cuticle, Calcium oxalate crystal,Stone cell are present.Hence,while handling microscope there have many precautions, as compared to foldscope and that Foldscope handing is easy, works well and is easily synchronized with smart phones for photographs of the images.Since,evaluation of the microscopy study of*Senna uniflora* plant and leaf powder is easilyidentified by foldscope. In conclusion, the present work was undertaken with a view to lay down standards which could be useful to detect the authenticity of this medicinally useful plant. Microscopic study and microchemical standards can be useful to substantiate and authenticate the drug by using foldscope.

**Reference:**

1. More BH, SakharwadeSN, Sakarkar DM, Formulation and evaluation of herbal gel contain the flower extract of butea monosperma.American journal of pharmatech research,2012,2(5),650-660
2. Sheetal S. Chaudhari, "Analgesic, antiinflammatory and anti-arthritic activity of Cassia uniflora Mill," Asian Pacific Journal of Tropical Biomedicine,2012,S181-S186.
3. NiveditaG,AanadP,Larvicidal activity of invasive weeds cassia uniflora and Synedrella nodiflora. International Journal of Pharma and Bio Sciences.2010.1(3), 1-10.
4. Violet VD, Gas Chromatography - Mass Spectroscopy Analysis of Senna uniflora(Mill.) Irwin &Barne by Whole Plant," Journal of Natural Products and Resources,2016. 2(1) 37–39.
5. Khandelwal KR, Practical pharmacognosy technology and experimental,Nirali prakashan.42-56.
6. James Cybulski1, James Clements2, Manu Prakash, foldscope: origamibased paper microscope, June 2014,1-10.
7. Isaac I. Bogoch, Jason R. Andrews, Short Report: Mobile Phone Microscopy for the Diagnosis of Soil-Transmitted Helminth Infections: A Proof-ofConcept Study, April 2013, 626–629
8. Soumitra Banerjee. "Foldscope, the Frugal Innovation and its Application in Food Microscopy - A Review". Acta Scientific Nutritional Health 2.6 (2018): 53-54.