

## Research Article

Powder and Physico-Chemical Analysis of *Amaranthus retroflexus*\*Jyoti Pandit<sup>1</sup>, S. Ramachandra Setty<sup>2</sup><sup>1</sup>Dept. of Biotechnology, Acharya Nagarjuna University, Guntur (A.P.)<sup>2</sup>Dept. of Pharmacology, Govt. college of Pharmacy, Bangaluru (Karnataka)Available Online: 1<sup>st</sup> September 2014**ABSTRACT**

*Amaranthus retroflexus* is an under-exploited medicinal plant, although its biological screening is in progress, the present paper shows its specific microscopic powder characteristics and few physical constants. As the powder contains fibres hence it was also subjected to fiber analysis to lay basis for possible utility.

**Key words:** *Amaranthus retroflexus*, powder microscopy, physical constants, fiber analysis

**INTRODUCTION**

*Amaranthus retroflexus* (Amaranthaceae), it is native to the tropical countries. This is an erect annual herb reaching a maximum height near 3 meters. The leaves are about 15 cms long on large individuals, the ones those higher on the stem having a lance shape and those lower on the plant diamond or oval in shape. The plant is monoecious with individuals bearing both male and female flowers. The inflorescence is a large, dense cluster of flowers interspersed with spiny green bracts. The fruit is a capsule less than 2 millimeters long with a "lid" which opens to reveal a tiny black seed. The leaves are good source of vitamins A and C. It is helpful in treating mouth and throat inflammations and sores. They are also rich in iron. A tea made from the leaves is used as an astringent. It is used in the treatment of intestinal bleeding, dysentery and diarrhoea. It is also used as anthelmintic. It is often used as flavouring agent. Yellow and green dyes can be obtained from whole plant.<sup>1</sup>

So far, there is no data regarding powder and fiber characteristics of this plant of therapeutic potential. Therefore the present communication reveals the powder microscopic features and also fiber analysis in addition to establishment of physico-chemical properties.

**MATERIALS AND METHODS**

Collection and identification of plant: The plant was collected from Kusnoor village (Gulbarga district), Karnataka in the month of March and was authenticated by Dr. Srinath Rao, chairman, P.G. Department of Studies and Research in Botany, Gulbarga University, Gulbarga, Karnataka. The plant was thoroughly cleaned to remove adherent soil and other impurities, the leaves

were shade dried and made into a coarse powder by rubbing in the palms.

Powder microscopic features and fiber analysis: The powdered drug was treated with phloroglucinol-HCl solution, glycerin iodine solution to determine various diagnostic characters such as nature of vessels, calcium oxalate crystals fiber etc.

Powder microscopy (Fig. 1 & 2): The powder of the leaf shows fragments of lamina, parenchyma cells, crystals and mucilage masses.

The leaf fragments have reticulate veins and crystal masses (Fig. 1: a,b). The druses are surrounded by dense mucilage and appear as circular thick masses. The veins are distinct, thin and straight. They form wide rectangular vein-islets which are oriented more or less along same angles. The *vein-terminations* are also evident, they are long, slender and unbranched or branched once (Fig. 1:b).

Druses are also seen scattered in the powder. They are seen embedded in mucilage substance (Fig. 2:a).

Isolated epidermal fragments are seen having circular, anomocytic type of stomata (Fig. 2:b).

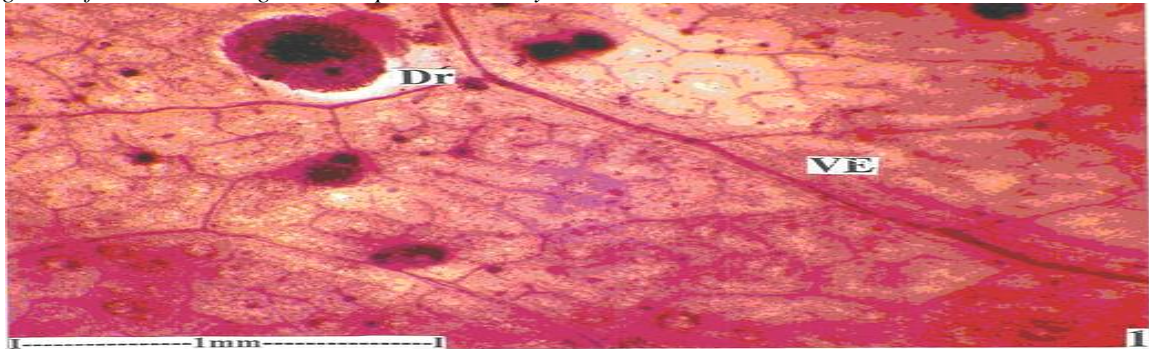
Elongated, wide, rectangular parenchyma cells are frequently seen in the powder. The cells have thin walls; they are seen in two or more cells attached end to end or they are also solitary (Fig. 2:c). The cells are 130  $\mu$ m long and 40-60  $\mu$ m wide. No inclusions are seen in the parenchyma cells.

Crude fiber is determined by Dutch method<sup>2</sup>: Physico-chemical properties like total ash, acid-insoluble ash, water soluble ash, moisture content,<sup>3</sup> pH and specific gravity are determined.

Evaluation for *Amaranthus retroflexus* leaf:

- Total ash = 22.8 % (dry)
- Acid-insoluble ash = 3.75 % (dry)
- Water soluble ash = 4.8 % (dry)

a. Fragment of lamina showing venation pattern with crystal distribution.



b. Fragment of lamina showing venation pattern with crystal distribution a portion magnified.

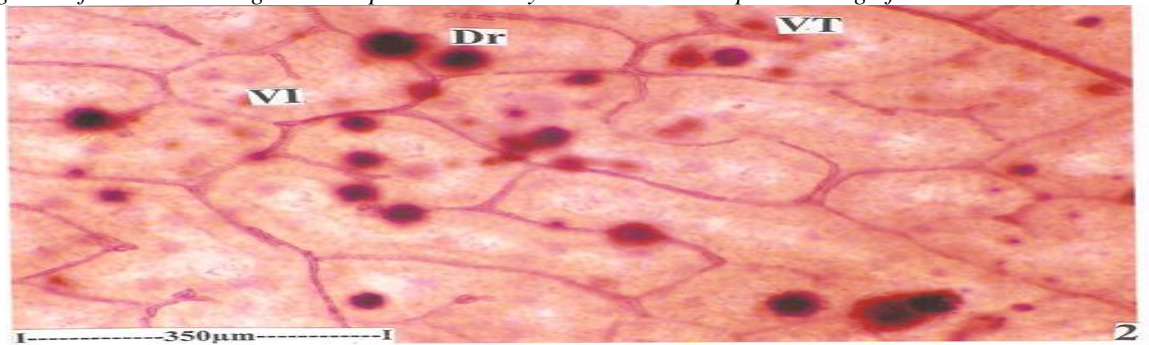
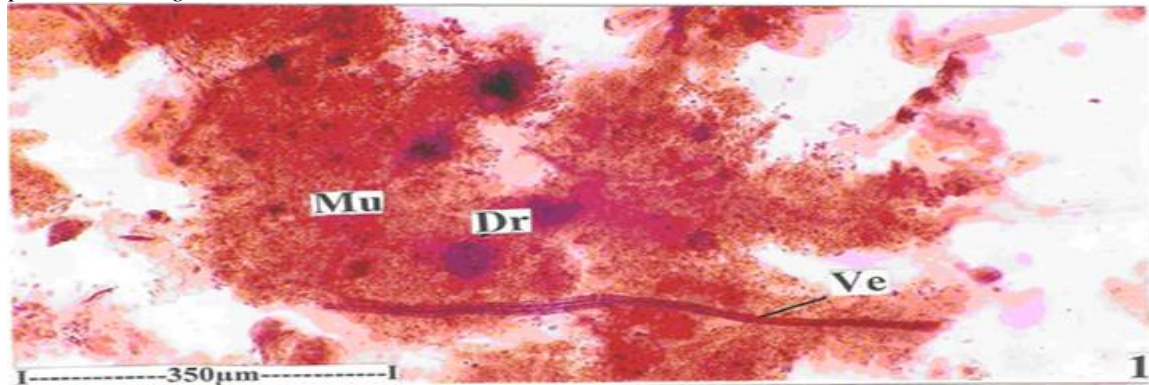
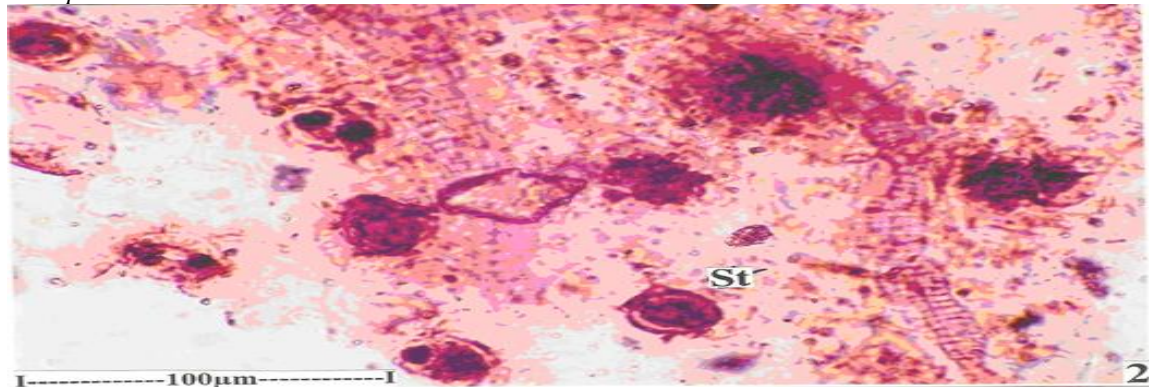


Fig. 1: Powder microscopy of the leaf  
[Dr – Druses; Ve – Vein; VI – Vein-islets; VT – Vein-termination].

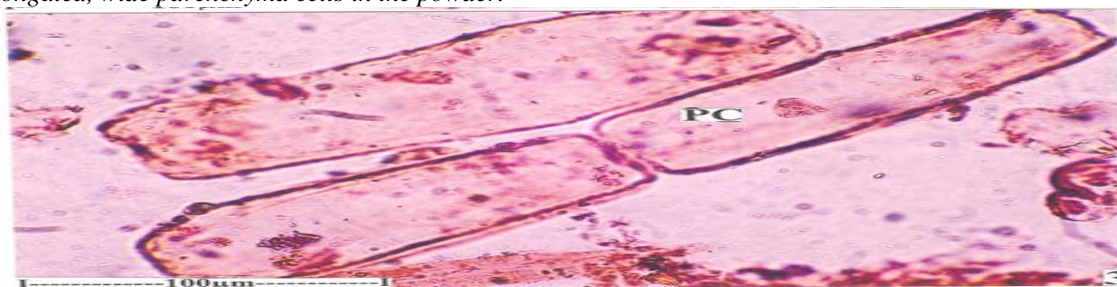
a. Leaf powder showing scattered druses



b. Isolated epidermal cell with stomata



c. Elongated, wide parenchyma cells in the powder.



[Dr – Druses; Mu – Mucilage; PC – Parenchyma cell; St – Stoma; Ve – Vein].

Fig. 2:

- Moisture content (loss on drying ) = 1.85 % ( dry)
- Crude fibre = 7.4 % ( dry)
- pH = 9.1
- Specific gravity = 0.2029

(Values expressed as mean, n = 3)

pH: The finely powdered material was suspended in distilled water with occasional mixing. After 2 hours, the suspension was filtered and the clear solution was measured for pH using digital pH meter.

Specific gravity<sup>4</sup>: The finely ground leaf powder of the plant was filled in specific gravity bottle and weight was determined. Then, the weight of same volume of water was determined. The specific gravity was determined by using the following equation.

$$\text{Specific gravity} = \frac{\text{Weight of powder}}{\text{Weight of water}}$$

### RESULTS AND DISCUSSION

Powder microscopic features, fiber analysis and Physico-chemical properties like total ash, acid-

insoluble ash, water soluble ash, moisture content, pH and specific gravity are determined. Depending upon climatic conditions and season the above parameters may vary. It is a plant of great medicinal value.

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