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Short Communication

PHARAMACOGNOSTICAL EVALUATION OF *ANTIDESMA ACIDUM* RETZ. LEAF: A WILD EDIBLE PLANT

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ABSTRACT

A wild edible plant *Antidesma acidum* Retz. is large shrub belongs to family Euphorbiaceae. The leaves of *Antidesma acidum* Retz. are used as vegetable in rural area of Western Ghats and used against in dysentery and for appetizer. In present investigation macroscopic and microscopical characters of leaves were studied. The powder behaviour of leaves indicates the presence of starch, alkaloids, xanthoprotein, tannin, cystine and oil etc. The fluorescence analysis and phytochemical test were done.

Keywords: Pharmacognosy, leaf, *Antidesma acidum* Retz.

1. INTRODUCTION

Antidesma acidum Retz. is shrub, 3-5m tall. Traditionally leaves of *Antidesma acidum* Retz. are used for treatment of stomachache of children and in case of digestion. In Western Ghats region leaves are used against dysentery and in case of appetizer. Boiled extract of leaf used in antidiabetic treatment [1], tender shoot of *A. acidum* eaten boiled with chili and salt [2]. Dried leaves used with other vegetable for acidic test [3]. *Antidesma acidum* Retz., a plant bearing sour foliage, which is used especially in Udupi district, under traditional practice in the form of various diet preparations, as a general tonic in chronic debilitating disease [4]. Today, world over, there is a great deal of interest in Ayurvedic system of medicine and thus the demand of various medicinal plants in the production of Ayurvedic medicines is ever increasing. Due to varied geographical locations where these plants grow, a great deal of adulteration or substitution is encountered in the commercial markets. Medicinal plants have been a major source of cure of human diseases since time immemorial. It is no wonder that the world's one-fourth populations are dependent on traditional medicines for the treatment of various ailments (Reddy 2004). Despite the modern techniques, identification of plant drugs by pharmacognostic studies is more reliable. Histological studies of the plant drugs are not only to study the adulterants but also are indispensable in accurate identification of plant [5]. According to WHO [6], the macroscopic and microscopic description of medicinal plant is first step towards the establishing its identity, purity and should be carried out before any test are undertaken. Therefore, it is very important to evaluate various quantitative and qualitative parameters, which may be helpful in setting standards for particular medicinal plant or parts of the plant. These standards can help in identify and characterized an individual drug. This may play major role in maintaining purity and quality of the plant.

2. MATERIAL AND METHODS

Plants were collected from Tillari Ghat, in the month of July to August and identified with the help of flora of Maharashtra [7], flora of Kolhapur district [8]. Transverse section of petiole and leaf taken through midrib then mounted in glycerin and observe under microscope for its anatomical details [9, 10]. Quantitative leaf microscopy was carried out to determine trichomes, stomata number, stomata index, vein islet number [11]. The collected plant material were washed and dried under the shade and these shade dried leaves were powdered with the help of an electric grinder till a fine powder was obtained. This powder was subjected to further study of powder microscopy [12, 13], powder behaviour, fluorescence study and preliminary phytochemical study of plant. The powder behavior and fluorescence study of the leaf was carried out by treating with different chemical reagents and observe under natural light and UV light (short and long wavelength) [14, 15]. Physicochemical parameters such as colour, odour, test, total ash, extractive value of crude drugs were observed by using method as recommended by Indian Pharmacopoeia [16]. Successive extractive values were performed with successive solvent like Petroleum ether, Benzene, Chloroform, Acetone, Ethanol and Aqueous. The percentage yield of extract, Preliminary phytochemical tests of the extract were performed using specific reagents by reported methods [17-20].

3. RESULTS AND DISCUSSION

Young shoot of *Antidesma acidum* Retz. was glabrous, leaves simple, alternate, short petioles, broadly elliptic or orbicular obovate, entire pubescent margin, base rounded more rarely obtuse, apex mucronate (fig. 1 and 2). Transverse section of Petiole (fig. 6) shows single layered epidermis is made up of

tubular cells and was covered by densely arranged unicellular trichomes (fig. 4). Epidermis is followed by collenchymatous cells. Vascular bundle is conjoint collateral and closed type. In the transverse section of leaf (fig.7) dorsal and ventral epidermis compactly arranged by single layered more or less hexagonal cells without chloroplast. The outer surface of epidermis was covered by thin cuticle. Paracytic stomata (fig. 3) distributed throughout its ventral surface and absent on dorsal surface. Unicellular trichomes were observed on the surface of young shoot, petiole and leaf.

Fig. 1. Habit of *A. acidum* Retz.

Fig. 2. single leaf

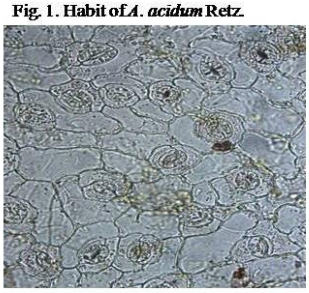

Fig. 3. Paracytic Stomata

Fig. 4. Unicellular trichome

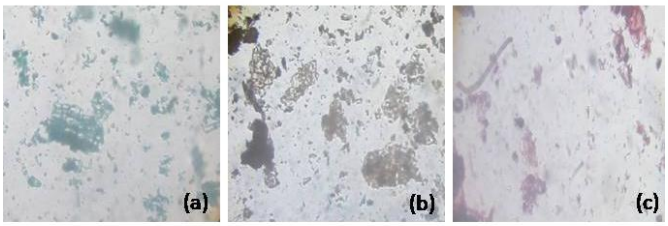

Fig . 5. Powder microscopy of *Antidesma acidum* Leaf (a, b, c): hexagonal sclerenchyma cells, epidermal cells, stomata, fibers of phloem, xylem and trichomes are present.

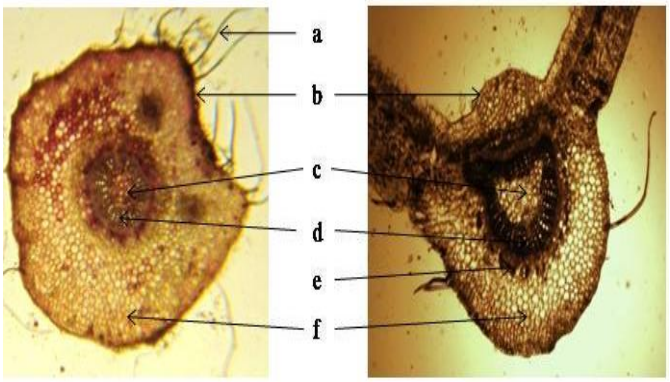

Fig. 6. T. S. of Petiole

Fig. 7. T. S. of Leaf

In Fig. 6 and 7 where, a) Trichome, b) Endodermis, c) Pith, d) vascular system, e) Sclerenchyma and f) Cortex

The main part of the ground tissue of a leaf blade is differentiated as mesophyll characterized by an abundance of chloroplasts and a large intercellular spaces. The mesophyll tissue is made up of parenchyma cells, which are distinctly differentiated in to upper palisade parenchyma and lower spongy parenchyma. Upper palisade parenchyma composed of columnar, elongated compactly arranged two or more rows containing numerous chloroplast, while loosely arranged oval or spherical spongy parenchymatous cells found below the lower epidermis, having abundant intercellular space with few chloroplast. The midrib represents the large mid vein. Vascular system in leaf is commonly called veins and the pattern formed these veins, venation. Upper and lower epidermis layer continues over the midrib which is followed by patch of collenchyma cells below the upper and above the lower epidermis. Vascular bundle is conjoint, collateral and open type. Parenchymatous medulla represents the pith at the centre.

Table 1. Physicochemical Parameters

Antidesma acidum Retz.	Leaf
Colour	Green
Odour	Acetose
Taste	Acidic
Total Ash (%)	95%
Moisture content	88%
Dry matter	30%
Stomatal index	34
Vein islet number (2mm×2mm area)	109

Unicellular trichomes, hexagonal sclerenchyma cells, epidermal cells, stomata, fibers of phloem and xylem were observed in powder microscopy of leaf (fig. 5 a, b, c). The pharmacognostical study revealed the purity of the sample. This study establishes the pharmacognostical and physico-chemical standards of the crude drug and helps to differentiate the plant sample from the adulterants. Physicochemical parameter of plant showed in table no.1. Ash value is such a parameter by which purity of drug can be measured. The physical and chemical parameters, when felts inadequate, as it often happens with powdered drugs, the plant material may identified from their adulterants on the basis of fluorescence study. Powder behavior and Fluorescence study of plant tabulated in table no. 2nd and 3rd respectively. Successive extraction of *A. acidum* leaves made in Petroleum ether, Benzene, Chloroform, Acetone, Ethanol and Aqueous. High amount of extract found in the Petroleum ether, Benzene and Chloroform as compare to the Acetone, Ethanol and Aqueous solvent system (Fig. 8). All the extracts were found to contain various compounds after subjecting them to preliminary phytochemical test (Table No. 4).

Table 2. Powder behavior of Leaves with different chemical reagents

Sr. No.	Reagent	Colour / Behaviour	Inference
1	Powder as such	Olive green	-
2	Powder + 5% $FeCl_3$	Sepia brown	Tannin present
3	Powder + Picric acid	Gold yellow	Alkaloids Present
4	Powder + 5% Iodine	Raw umber brown	Starch present
5	Powder+ 40 % NaOH + LeadAcetate	Buff brown	Cystiene Present
6	Powder + Conc.HNO_3 +Ammonia	Fulvous brown	Xanthoprotein Present
7	Powder + Sudan III	Lion brown	Oil Present

Table 3. Fluorescence study of leaves powder with different chemical reagent in Visible and U.V. light

Sr. No.	Powder with Chemical reagent	Visible light	Short wavelength	Long wavelength
1	Powder as such	Olive green	Asparagus green	Brown
2	Powder + Distilled water	Olive green	Olive drab green	Brown
3	Powder + 1N NaOH in D.W.	Brown	Dark Olive green	Black
4	Powder + 1N NaOH in Alcohol	Russet brown	Brown	Seal brown
5	Powder + 10% HCl	Dark gold-rod yellow	Forest green	Seal brown
6	Powder + Conc. HCl	Olive drab green	Lime green	Seal brown
7	Powder + Conc. HNO_3	Orange yellow	Yellow green	Seal brown
8	Powder + Conc. H_2SO_4	Bole brown	Coffee brown	Black
9	Powder + Acetone	Gold yellow	Green yellow	Brown
10	Powder + 5% KOH	Brown	Russet brown	Black
11	Powder + 5% Iodine	Olive green	Dark Olive green	Black
12	Powder + 5% $FeCl_3$	Olive green	Dark Olive green	Black

Table 4. Preliminary Phytochemical Screening of Leaf

Compound	P. ether	Benzene	Chloroform	Acetone	Ethanol	Aqueous
Colour	Dark green	Dark green	Olive green	Brown	Pink	Pink
Phenols	-	-	-	-	++	++
Anthraquinones	-	-	-	+	-	-
Flavones	-	-	-	++	++	+
Tannins	-	-	-	++	++	++
Coumarins	++	-	-	++	++	++
Saponins	-	-	-	+	++	++
Alkaloids	-	-	-	++	++	++
Xanthoproteins	-	-	-	-	-	-
Reducing sugar	-	-	+++	+++	-	+++
Glycosides	-	-	-	-	-	-
Oil	+	-	+	+	-	-

Where, +++ High, ++ Moderate, + Slight, - Negative, P. ether- Petroleum ether

Another species of *Antidesma* that is *A. ghaesembilla* Gaertn. was studied to find out pharmacognostical standardization [21]. They were carried out the microscopical study of leaf and stem. Powder microscopy, physicochemical properties, phytochemical screening, and fluorescence study of leaves. In successive extraction of petroleum ether, alcohol and water they were found that presence of Saponin, Carbohydrate, Glycosides, Steroids, Proteins, Flavonoids, Alkaloids, Fats, Oil and Phenolic compounds.

In present investigation the phytochemical study reveals that Xanthoprotein and Glycosides absent, where as Phenol, Flavones, Tannin, Coumarins, Saponin, Xanthoprotein, Reducing sugar were present in leaves. Phytochemical screening, cytotoxicity, antioxidant and antibacterial potential of *A. ghaesembilla* were studied [22]. They were reported that phytochemical screening of methanolic extract of plant shows presence of Glycosides, Tannin and Resin while carbohydrate, Saponin, Steroid and Alkaloid absent. Earlier authors reported presence of glycosides in leaves of *A. ghaesembilla*, variation in both work may be due to the change in species.

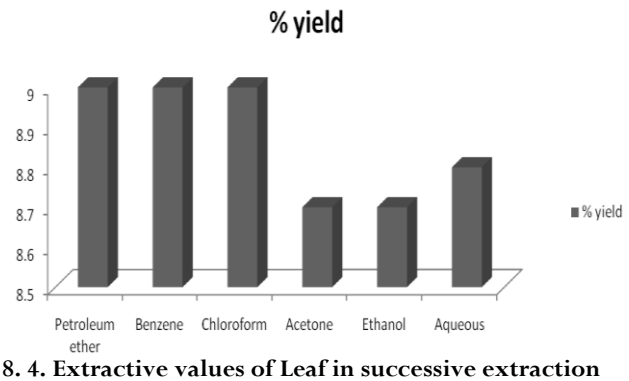

Fig 8. 4. Extractive values of Leaf in successive extraction

4. CONCLUSION

The detailed morphology of *Antidesma acidum* Retz. was carried out to support proper identification of drug. The information obtained from powder behaviour and fluorescent study preliminary phytochemical investigation will be useful in finding out genuity of drug. Thus present investigation serve as standard reference for identification and distinguishing the *Antidesma acidum* Retz. leaves from its substituent and adulterants and assist in future drug evaluation. The detailed and systematic pharmacognostical evaluation would give valuable information for the future studies

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