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Pharmacognostic studies of *Ageratum conyzoides* L.

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Abstract

Ageratum conyzoides L. is annual herb belonging to family Asteraceae. Locally it is known as 'Osadi' and is used traditionally in folk medicine. It grows in a range of habitat from dry and arid to wet conditions; accordingly colour of flowers and compactness of capitula varies. As an auspicious symbol paste of flower with saffron is put on forehead ('tilak') as mark of success. Traditionally leaves are used on boils, wounds, leprosy, skin diseases and also as bactericide. In central Africa it is used to treat pneumonia. Anatomically the leaf is characterized by anomocytic stomata, dorsiventral mesophyll and simple as well as glandular trichomes. Present investigation shows presence of alkaloids, flavonoids, flavone, phenolics, saponins and polyoses. Leaves were extracted with petroleum ether, chloroform, acetone, methanol and distilled water. TLC fingerprinting of all extracts was done for drug characterization.

Keywords: *Ageratum conyzoides* L., anatomy, phytochemistry, TLC fingerprinting

1. Introduction

Ageratum conyzoides L. (Asteraceae) is annual herb grows in a range of habitat from dry to wet conditions. Locally it is known as 'Osadi' and is used traditionally in folk medicine. Leaves are used for uterine troubles^[1]. As an auspicious symbol paste of flower with saffron is put on forehead ('tilak') as mark of success^[2]. Bioka *et.al* reported effective analgesic action in rats using aqueous extract of leaves^[3]. A paste of the leaves is used as poultice to remove thorns from the skin. A paste made of the leaves mixed with equal amounts of *Bidens pilosa*, *Drymaria cordata*, *Galingosa parviflora* and rhizome of *Zingiber officinale* is used to treat snake bites^[4]. Borthakur and Barauh (1986) Identified precocene I and precocene II. Traditionally the species is also used as bactericide^[5]. Mattos using aqueous extract of whole plant, verified effective clinical control of arthrosis, reporting a decrease in pain and inflammation or improvement in articulation mobility, after a week of treatment^[6]. Study was carried out to characterize the herb anatomically and chemically.

2. Material and Methods

Plants were collected from area around Amravati city; for identification standard floras were reoffered^[7-8]. For anatomical studies hand sections of fresh material were taken and diagrams drawn with the help of camera lucida. Anatomy of plant part used i.e. leaf was studied. Mature leaves were shade dried, powered and stored at 4°C in zip lock bag for further studies. Material was screened for presence of bioactive molecules following standard methods^[9-11]. Extracts were run in Chloroform: Benzene (4:1) phase for TLC finger printing characterization. Extracts were dried and extractive values were calculated in terms of percentage considering the weight of plant material as 100%.

3. Result and discussion

The biological and therapeutical applications of the plants of Asteraceae is the result of systematically conducted chemical and pharmacological research rather than simply of tradition. Cytotoxic sesquiterpene lactones of certain species may act as pointers for development of cancer drugs^[12]. The species are particularly rich in sesquiterpene lactones, polyacetylenes, steroids, terpenoids, alkaloids, saponins and various heterocyclic compounds.

3.1 Morphology

Annual herb, erect, hispid, 15-80 cm tall; stem terete, clothed when young with rough spreading hairs. Leaf simple, opposite or upper alternate; petiolate, 1.5-2 cm long; lamina ovate 5-3.5 cm, crenate and with ciliate margins, acute, hairy on both surfaces. Heads in dense terminal corymbs. Involucral bracts linear, acute, ciliate and with scarios margins. Pappus of 5 aristate scales, dilated at base, serulate. Corolla tubular; petals 5, white, valvate, 2-3 cm

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long, lobes ovate, acute; stamens 5, epipetalous, syngenesious. Carpels 2, syncarpous; ovary unilocular; placentation basal. Style long; stigma bifid. Achenes black, short hairy sharply angles (Fig. I- A – G).

3.2 Anatomy

Petiole Semicircular, grooved on upper side provided. Epidermis single layered covered thick thin warty cuticle; followed by single layered collenchyma on upper as well as lower side. Ground tissue parenchymatous, cells thin walled enclosing small intercellular spaces. Vasculature in the form of three separate main strands forming an arc. Vascular bundle conjoint, collateral with prosenchymatous cap on either side. Each vascular bundle with non-chlorophyllous parenchymatous sheath. Single resin canal immediately adjoining parenchymatous sheath present towards the upper side of vascular strand. (Fig. 1–2)

Lamina Dorsiventral, amphistomatous; epidermis single layered, cutinized and cuticularized. Cuticle thin; cells of lower epidermis deeply sinuate while upper epidermis shallowly sinuate; stomata anomocytic, infrequent on upper epidermis. Mesophyll differentiated into palisade and spongy parenchyma. Palisade single layered, cells densely filled with chloroplast. Spongy parenchyma 3-4 layered, cells irregular loosely placed, densely filled with chloroplast. (Fig. 3, 5 and 6)

Midrib With a ridge on upper side; epidermis single layered, cuticle comparatively thick; 1-2 layered collenchymatous hypodermis present below the epidermis; upper ridge completely filled with collenchyma. Ground tissue

parenchymatous; cells large, thin walled, enclosing small intercellular spaces. Vasculature in the form of central crescent of three strands. Vascular bundle accompanied by one or two large resin ducts. Each vascular bundle conjoint, collateral, accompanied by cap on either side. (Fig. 4)

Trichomes Simple as well as glandular. Simple trichomes uniseriate, multicellular of two types, 1. Smooth walled – Uniseriate 3-7 celled; usually with pointed terminal cell; wall thin. 2. Rough warty walled – Uniseriate two celled; lower cell long, terminal one inflated at base, sharply pointed, thick walled; wall rough, warty. Glandular trichomes are of two types, 1. Short gland with unicellular stalk and unicellular glandular head. 2. Long staled glands with biseriate, multicellular stalk and four celled head. These are confined along veins only. (Fig. 9-11)

Vascular supply of three traces, anomocytic stomata dorsiventral mesophyll and presence of resin canals are in confirmation with general features of Asteraceae ^[13].

3.4 Phytochemistry

In present investigation plant material was screened for 15 biomolecules of these six were found to be present in the material studied. (Table1). Presence of flavonoids, flavones, alkaloids, phenolics saponins and polyoses in present investigation is in confirmation with earlier reports of Ming ^[14]. Plant extracted in petroleum ether, chloroform, acetone, methanol, and water were subjected to TLC finger printing for characterization (Table 2). It was also found that maximum contents are soluble in water while minimum in acetone (Table 3).

Table 1: Phytochemical Profile

S. N.	Test	Response	Intensity	Inference
1	Iridoids			
	a) Acubin Type	Light Yellow	–	Absent
	b) Harpagide	Light Yellow	–	Absent
2	Alkaloids			
	a) Mayer's Reagent	Green ppt	–	Absent
	b) Dragendorff's Reagent	Brown ppt	++	Present
3	c) Wagner's Reagent	Brown ppt	+++	Present
	Anthraquinones			
	Test – a			
4	Test – b	Light Green	–	Absent
	Test – c	Orange	–	Absent
	Cardenolide			
5	Test – a	Orange	–	Absent
	Test - b	Reddish Yellow	–	Absent
	Flavonoids			
6	a) Shinoda Test	Orange Colour	+	Present
	b) Flavonol Test		–	Absent
	c) Flavanol Test	Pale Yellow	–	Absent
	d) Flavone, Flavonol, Flavanone Test	Orange	+++	Present
	e) Rao & Sheshadri Test (Flavanone)	Blue	–	Absent
7	Simple Phenolics Test a) With FeCl ₃	Green	++	Hydraquinone/ Catechol/β-naphthol
	Test b) with addition of NaOH	Green	++	Hydroquinone
	Test c) Excess FeCl ₃	Yellow	+	
8	Leucoanthocyanin Test	Brown	–	Absent
9	Steroids/Triterpenoid Test			
	Test a	Light Green	+	Present
	Test b (Steroidal nucleus)	Brown	–	Absent
10	Tannin			
	Test a) Tannin	No ppt	–	Absent
	Test b) Pseudo Tannin	Yellow	–	Absent
11	Saponins			
	Test a)			
	Test b) Fatty and Organic Acids	Stable Froth	+++	Present
12	Juglone	Dark Green	–	Absent

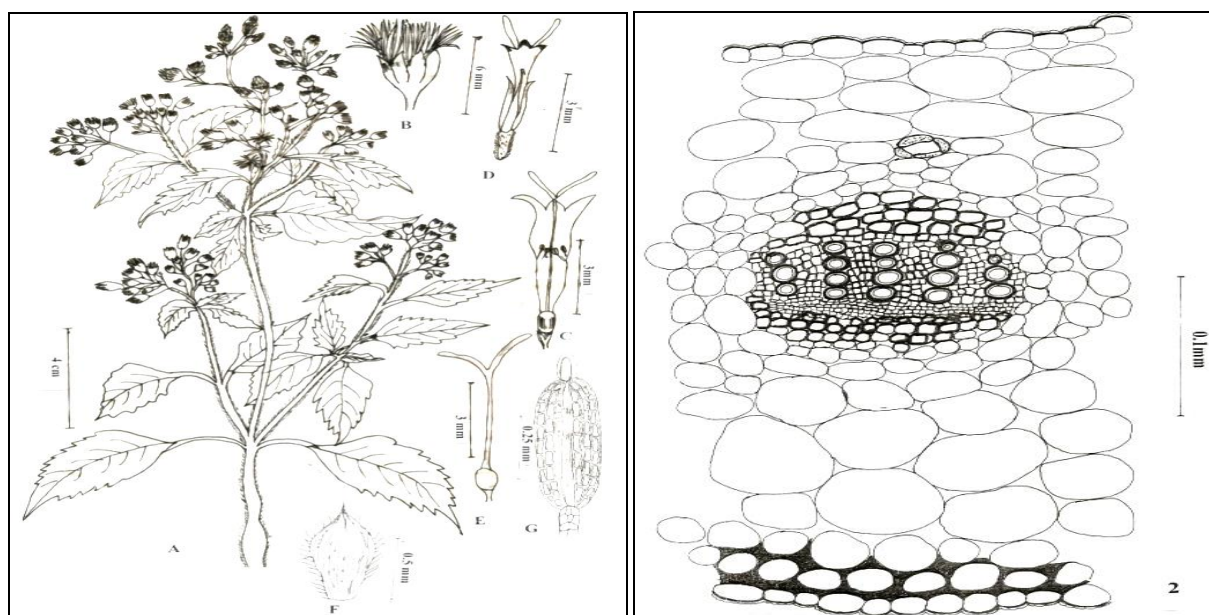
12	Emodins	Pale Yellow	-	Absent
13	Polyoses	Red	+++	Present
14	Polyuronoides	Light Brown	-	Absent
15	Anthracene glycosides	Colourless	-	Absent

Table 2: Extractive Value

Sr. No.	Name of Plant	Extractive Value %				
		Petroleum Ether	Chloroform	Acetone	Methanol	Aqueous
1.	<i>Ageratum conyzoides</i>	36.20	31.25	19.50	46.11	48.55

Table 3: TLC fingerprinting of extracts in mobile phase- Chloroform: Benzene (4:1)

Name of extract	Developers	Number of spot	Rf value	Colour
Petroleum ether	H ₂ SO ₄	Nil	-	-
	Iodine	02	0.106 0.366	Brown Light Yellow
Chloroform	H ₂ SO ₄	04	0.100	Light Green
			0.166	Yellow Green
			0.253	Light Green
			0.393	Green
	Iodine	05	0.100	Light Green
			0.093	Brown
			0.187	Green
			0.312	Light Green
Acetone	H ₂ SO ₄	04	0.066	Light Yellow
			0.100	Green
			0.173	Light Yellow
			0.260	Green
	Iodine	04	0.066	Light Brown
			0.113	Dark Green
			0.312	Green
			0.533	Light Green
Methanol	H ₂ SO ₄	04	0.100	Yellow Green
			0.160	Green
			0.293	Light Green
	Iodine	03	0.420	Light Yellow
			0.090	Yellow
			0.193	Green
Water	H ₂ SO ₄	Nil	-	-
	Iodine	Nil	-	-



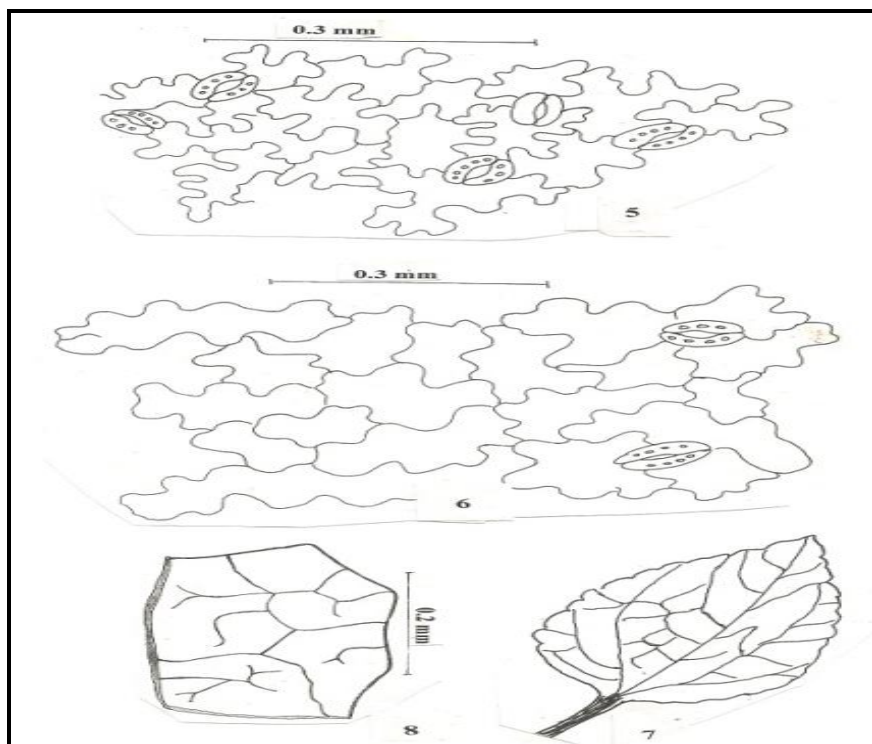
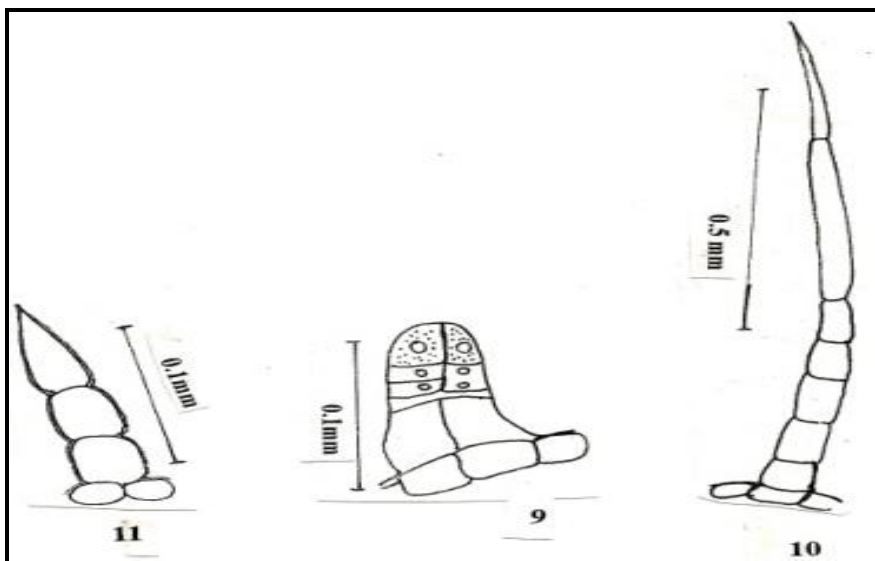
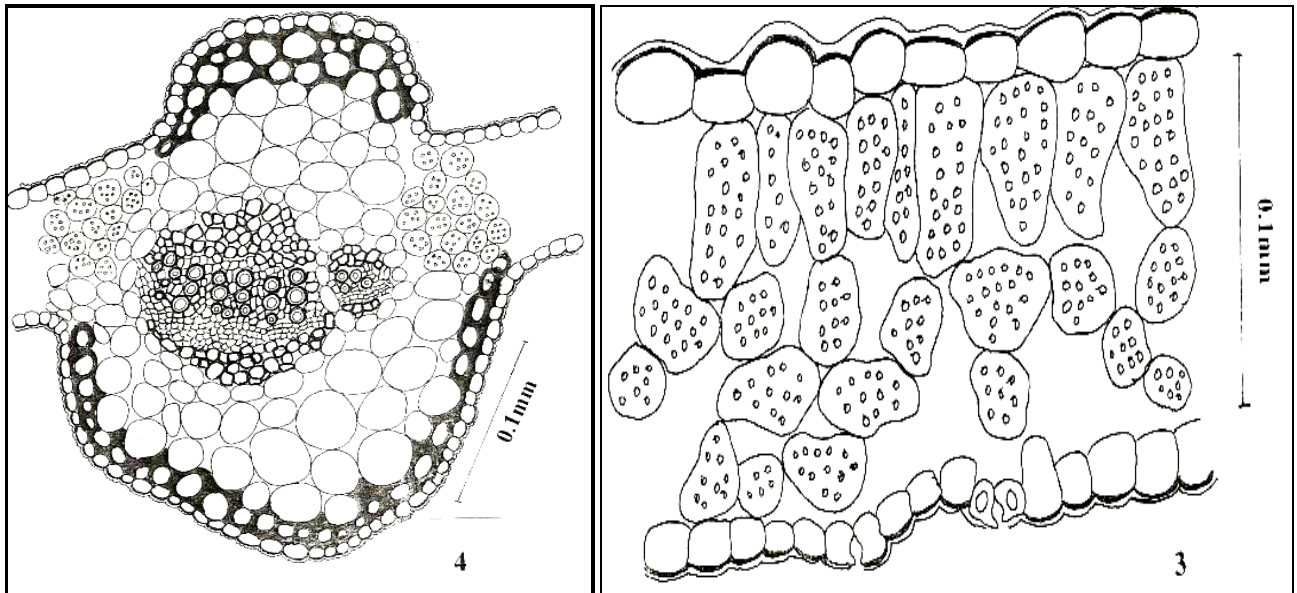


Fig A to G: Twig & Flower parts Fig. 2 T.S. Petiole 3. Lea lamina 4. Midrib 5 to 8 Stomata and Veination, 9 to 11 Trichomes

4. Conclusion

It is thus concluded that *Ageratum conyzoides* can be exploited for preparation of different drug for the treatment of various diseases.

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