

Ethno-pharmacology of *Sahdevi* (*Vernonia cinerea* Less.) - An important but lesser known drug of Unani System of Medicine

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ABSTRACT

Sahdevi is an Indian herb commonly found in all part of the country in rainy season. It is adopted by Arabs due to its easy availability and various important pharmacological actions and uses. It is known by different vernaculars in different parts of the country such as Mahabala in Marathi, Sadodi in Gujrati, Kukseem in Bengali and in English it is called ash-colour fleabane or purple fleabane. The herb contains β -amyrin, lupeol, β -sitosterol, stigmasterol, α -spinasterol, phenolic resin and potassium chloride etc. It contains *Dafi'-i Hummiyat* (antipyretic) *Muqawwi-i Badan* (general tonic) and *Musaffi-i-Dam* (blood purifier) actions and used for management of many disease conditions. It has been used for the management of chronic fevers like fever associated with tuberculosis. It is a priceless herb with important pharmacological action and can be used effectively in place of costly drugs.

Keywords Antipyretic, Antimalaria, Blood purifier, *Sahdevi*, Tonic, Unani

INTRODUCTION

Sahdevi is an herb *Vernonia cinerea* Less. it is also known as *Conyza cinerea* L. or *Conyza purpurea* Wall. It belongs to a Genus *Vernonia* schrebs of family Asteraceae. This Genus has herbs, shrubs, climbers or small trees (Anonymous, 1998; Hooker, 1982; Kirtikar & Basu, 1996). It has about 380 species, chiefly Tropical, and mostly American. About 58 species are found in India (Anonymous, 1998; Hooker, 1982). It is an erect rarely decumbent annual herb. It is one of the commonest Indian herbs during rainy season (Dymock *et al.*, 1890; Ghani, 1921; Khan, 1280H; Khan, 1313H; Sheerazi, 1038H). Its English name is Ash coloured fleabane and known by various vernacular names in different parts of India and world. It is mentioned in some Persian and Urdu Unani Materia medica books. All the writers described it as Indian plant and it seems to be adopted by Unani practitioner due to its easy availability and usefulness in many diseases (Khan, 1313H). It is an herb, which is nearly half yard in height. It has big, thick and hairy leaves which taper at the end. Leaves looks like Tulsi (*Ocimum spp.*), (Chugtae, 1963; Ghani, 1921; Khan, 1280H; Khan, 1313H; Khan, 1358H). *Sahdevi* is known for its antipyretic activity especially in fevers associated with infection or chronic in nature. It has other important actions such as general body tonic and aphrodisiac action. Its many actions have been verified by pharmacological studies and may be proved in clinical trial for validation of its claim in classical literature.

Geographical Distribution

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Received June 14, 2020; Accepted Aug 10, 2020; Published Nov 30, 2020
doi: <http://dx.doi.org/10.5667/CellMed.2020.0026>

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It is found throughout India (Ghani, 1921; Sheerazi, 1038H), Tropical Africa, Asia and Australia (Anonymous, 1998; Caius, 2003; Kirtikar & Basu, 1996). Indigenous to Bengal, East and West coasts and South India (Nadkarni, 2000), ascending to 8000, feet in the Himalayas and in Khasia and Peninsular hills (Anonymous, 1998; Caius, 2003). It a common weed throughout India in the rainy season (Dymock *et al.*, 1890). It grows in rainy season and during this season plant is erect and robust upto 1m tall; after rains when summer starts, it shows reduction in size forming small diffuse habit. It is divided in two types, on the basis of colour of the flower. The flower of the first type is white inside whereas upper part is purple; this type of plant is found in the paddy fields. Second type is found in the forest or deserted places and has flower which are blackish red in colour (Chugtae, 1963; Ghani. 1921; DOMAP, 2016).

Description

Classification of *Sahdevi* (*V. cinerea* Less.) (USDA, 1996).

Rank	Scientific name	Common name
Kingdom	Plantae	Plants
Subkingdom	Tracheobionta	Vascular plants
Superdivision	Spermatophyta	Seed plants
Division	Magnoliophyta	Flowering plants
Class	Magnoliopsida	Dicotyledons
Subclass	Asteridae	
Order	Asterales	
Family	Asteraceae / Compositae	Aster family
Genus	<i>Vernonia</i>	ironweed
Species	<i>Vernonia cinerea</i> (L.) Less.	little ironweed

Vernonia cinerea Less. is an erect, rarely decumbent, annual herb growing up to 75 cm in height. Stems are stiff, slender, cylindrical, grooved and ribbed, striate more or less pubescent and slightly branched, upto 17 cm in height, branches are

divaricated. Leaves are simple, alternate, petiole (the upper leaves are smallest) variable in shape, broadly elliptic or lanceolate, obtuse or acute, shortly mucronate, more or less pubescent on both sides, irregularly toothed and shallowly crenate serrate. Fruits are oblong achenes, slightly narrowed at the base, clothed with appressed white hairs and terete (not ribbed). Flowers and fruits appear during August-April. (Anonymous, 1998; Hooker, 1982; Kirtikar & Basu, 1996). Flowers are pinkish and purple, violet, small head borne in terminal corymbs, rounded or flat-topped corymbs. There are about 20 flowers at a time of 6 mm diameter, divaricated corymbs with a minute linear bract beneath each head of flowers and with small bracts in the forks of the peduncle; involucre bracts linear-lanceolate, awned, silky on the back, corolla with pubescent lobes (Anonymous, 1998; Bhattacharjee & De, 2005; Hooker, 1982; Kirtikar & Basu, 1996; Sala, 2004).



Fig.1 Market sample of *V. cinerea* Fig.2 Young plant of *V. cinerea*



Fig.3 Mature plant of *V. cinerea*

Selected Vernacular names

The different vernacular names mentioned in various books are given below (Khan, 1313H; Ghani, 1921; Lubhaya, 1977; Chugtae, 1963; Kirtikar & Basu, 1996; Dymock *et al.*, 1890).

Bengali	Kalajira, kukseem, kukshim, peetpushpi, kukur-songa, vedila.
Ceylon	Chitivyarchen, kalainir
English	Ash-colour fleabane, purple fleabane, vernonia ash-coloured fleabane, purple fleabane, yellow barleria
French	Ayapanasauvage, vernoniacendre.
Gujrati	Sadodi, sadardi, shedardi, sadeori, sadori.
Hindi	Dandotpala, daudotpala, kalgira, kaljiri, sadodi, sadori, sahadevi, sahadeyi, sandri
Hindi	Dandotpala, sahadevi, sadodi, sahadei, daudotpal, sadori
Indochina	Bacdau.
Kannada	Dandothpala, gaayadoppalu, gaayathoppalu, kaaduhogesoppu, karehindee, karehindi, karihindisoppu, karivyaaadi, sadodi, sahadevi

Malayalam	Pirina, puam-curundala, puvamkuruntal, puvankuruntal, puvankurutala, puvvamkurunila, puvvamkuruntala
Malyalam	Puvankuruntal, pirina, puvankurutala
Marathi	Osari, sadodi, sahadaevi, sahadevi, sahadvei, sayadevi
Marathi	Osari, sadodi, mahabala
Mauritius	Ayapana, sauvage
Persian	Danipola, Daankani, Dandkalas
Punjabi	Sahadevi, kodyali
Sanskrit	Sahadevi, ardhaprasadana, dandotpala, devasasha, devika, gandhavalli, govandani, saha, keshrupa, vishvadeva, devi, mahabala, keshvardhani
Sinhalese	monarakudumbia, monerakudimbeya, mukuthipundu
Tamil	Seerachengashuneer, cakatevi, cirilai, cenkalunir, mukuttipuntu, neycatti, puvamkurundal, sagadevi, sahadevi, sirashengalanir, tevakantam,
Telugu	Garitakammi, garitikamma, gharitikamini, gherittekammina, sahadevi
Tibetan	Sa de ba, sa ha de ba
Urdu	Shehdevi buti

Sahdevi (*V. cinerea* Less.) in Unani System of Medicines

It is an herb, which is nearly half yard in height. It has big, thick and hairy leaves which taper at the end. Leaves look like Tulsi (*Ocimum spp.*) and green in colour. Leaves become smaller in summer and winter in comparison to their original size in rainy season. Stems are numerous and thin, having hairs on the surface. Flowers which are 25-30 at a time are whitish blue or reddish blue in colour. Two types of flowers are found in *Sahdevi* on the basis of their place of origin. If it grows in paddy fields it has purple flower which is white inside, if it grows in other places it has blackish red flowers (Chugtae, 1963; Ghani, 1921; Khan, 1313H; Khan, 1358H). It has numerous small seeds which are like Tukhm-e-kahu (*Lactuca sativa* L.) but are smaller than it. Seeds have small hairs like spun cotton. Root is like root of *Resha-e-Khatmi* (*Althea officinalis* L.) (Chugtae, 1963; Dayal, 1933; Ghani, 1921; Khan, 1313H; Khan, 1358H).

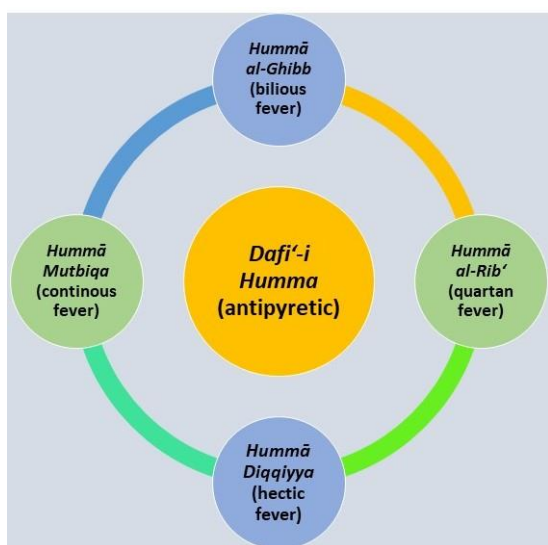
The *Mijāz* (temperament) of *Sahdevi* is *Bārid Ratb* (Cold & Wet) as suggested by majority of the Unani physicians. It is described *Muzir* (harmful) for cold temperament people because of its own cold temperament. The corrective drugs used for its harmful effects are *Filfil Siyah* (*Piper nigrum* L.) and *Shahad* (honey). The *Badal* (substitute) of *Sahdevi* is *Binola patti* (leaves of *Gossypium herbaceum* L.) but it is strongly recommended to use original drug as far as possible. The *Miqdār-i Khurak* (dose) of dry herb is 3-7 gm while in fresh form it may be used upto 12 gm as per classical Unani literature (Chugtae, 1963; Daljeet, 1974; Ghani, 1921; Hakeem, 1343H; Khan, 1280H; Khan, 1313H; Lubhaya, 1977; Sheerazi, 1038H).

Therapeutic actions (*Afa'al*) and uses of *Sahdevi* (*V. cinerea* Less.)

The different pharmacological action of *Sahdevi* mentioned in Unani literature regarding *Sahdevi* are given here. Some important pharmacological action as mentioned in literatures are *Dafi-i Hummiyat* (antipyretic), *Mudirr-i Bawl* (diuretic), *Mumsik-i Mani* (retentive of semen), *Muqawwi-i Badan* (general tonic), *Musaffi-i Dam* (blood purifier), *Mushtahī* (appetizer), *Musakkin-i Dam* (neutralizing the heat of sanguine), *Musakkin-i Safra* (neutralizing the heat of yellow bile), and *Mufattit-i Hasāh* (lithotriptic) (Ali, 1860; Ali, 1914; Arshi, 1929; Chugtae, 1963; Ghani, 1921; Hakeem, 1343H; Kabir al-Din 1955; Kabir al-Din 2007; Khan, 1280H; Khan, 1313H; Khan,

1358H; Lubhaya, 1977; Sheerazi, 1038H)

On the basis of its actions mentioned above *Sahdevi* has been used in the management of many disease conditions. It is very useful in the management of various fevers especially chronic or infectious fever. It is used in the management of *Hummā al-Ghibb* (bilious fever), *Hummā al-Rib'* (quartan fever), *Hummā Diqqiyya* (hectic fever) and *Hummā Mutbiqa* (continuous fever) (Ali, 1860; Ali, 1914; Arshi, 1929; Chugtae, 1963; Dayal, 1933; Fazlullah, 1877; Ghani, 1921; Hakeem, 1343H; Hasan, 1865; Kabir al-Din, 1955; Khan, 1280H; Khan, 1313H; Khan, 1358H; Lubhaya, 1977; Zaki, 1890). It has special action as *Māni'-i-Nawbat* (prevents episodes in intermittent fevers like Malaria), and it can be used to avoid episodes of fevers in Malaria or other intermittent fevers. It is also very useful in fever associated with tuberculosis (Ghani, 1921; Khan, 1358H; Khan, 1313H; Lubhaya, 1977).



It modulates *Akhlat* (humours) in the body and corrects *Ghalaba-i-Safrā'* (preponderance of yellow bile) (Ali, 1860) and *Josh-i-Khūn* (preponderance of sanguine) (Kabir al-Din 1955; Kabir al-Din 2007). It has been used for the treatment of *'Usr al-Bawl* (dysurea) (Ali, 1914; Fazlullah, 1877; Hasan, 1865; Khan, 1358H; Lubhaya, 1977; Zaki, 1890;), *Hasāh wa Raml al-Kulya* (nephrolithiasis) (Lubhaya, 1977; Khan, 1313H) and *Sozāk* (Gonorrhoea) (Chugtae, 1963; Kabir al-Din 1955; Kabir al-Din 2007; Khan, 1358H; Lubhaya, 1977;) due to its diuretic actions. It is very effective in *Nazf al-Dam* (haemorrhage/bleeding) and *Nafth al-Dam* (hemoptysis) when used with Misri (crystallized sugar lumps) to stop bleeding (Chugtae, 1963; Ghani, 1921;

Kabir al-Din 1955; Lubhaya, 1977). Application of paste of its root powder with human urine is very effective in treatment of *'Irq Madīnī* (drancunculosis) (Arshi, 1929; Chugtae, 1963; Ghani, 1921; Khan, 1313H; Sheerazi, 1038H).

Application of its root as *Tilā* (liniment) on penis produces *Mumsik* (retentive of semen) action and useful in condition of premature ejaculation (Ali, 1914; Arshi, 1929; Chugtae, 1963; Fazlullah, 1877; Ghani, 1921; Hakeem, 1343H; Hasan, 1865; Khan, 1280H; Khan, 1358H; Khan, 1313H; Sheerazi, 1038H). Its local application on skin increases redness of the skin (7, 8). It is used with Sikanjabeen in *Salas al-Bawl* (urinary incontinence). It is an important ingredient in the process of preparation of *Kushta Seemab* (calx of mercury) (Arshi, 1929; Fazlullah, 1877; Ghani, 1921; Zaki, 1890). It is also useful in treatment of *Bawāsīr* (haemorrhoid) (Ali, 1860). It is also used to cure general debility and sexual debility (Chugtae, 1963; Khan, 1358H).

***Sahdevi* (*V. cinerea* Less.) in other complementary System of Medicines**

Sahdevi is commonly used in Ayurveda and other folk medicines in different countries. Its actions are mentioned as antidote, antibacterial, antifungal, anti-inflammatory, antiviral, anodyne, diuretic, lithotriptic, anthelmintic, anticancer, diaphoretic, stomachic, astringent and tonic (Anonymous, 1998; Bhattacharjee & De, 2005; Caius, 2003; Dymock *et al.*, 1890; Kirtikar & Basu, 1996; Nadkarni, 2000; Sala, 2004; Trivedi, 2002;).

The decoction or infusion of the whole herb is used to manage strangury and spasm of bladder, fever and to heal wounds and sores. Whole herb with quinine is used to treat Malaria. Juice of whole herb is used in incontinence of urine, colic and piles. Its root is used in sunstroke and dropsy. Its leaves have been used in scorpion stings, amoebiasis and cough. Poultice of the leaves is used in herpes, eczema, ringworm and guinea worm. The paste of the whole herb with little ghee is effective in leucorrhoea. Oil prepared by boiling with the juice of the leaves have showed beneficial effects on elephantiasis when applied locally. Its flowers are useful in conjunctivitis and rheumatism. Its seeds are used in flatulence, dysuria, leucoderma, psoriasis and leprosy. *Sahdevi* is also used in asthma and bronchitis and constipation (Anonymous, 1998; Bhattacharjee & De, 2005; Caius, 2003; Khare, 2007; Kirtikar & Basu, 1996; Nadkarni, 2000; Sala, 2004; Singh & Khan, 1990; Trivedi, 2002).

Chemical Constituents of *Sahdevi* (*V. cinerea* Less.)

Many pharmacological active chemical constituents have been isolated from *V. cinerea*. The leaves of *V. cinerea* showed 64 flavonoids, 13 saponins, 36 alkaloids, and 108 terpenoids present in it (Alara *et al.*, 2018). Different pharmacological action can be attributed to these active constituents.

S.No.	Chemical	References
1.	(-)-clovane-2,9-diol	Zhu <i>et al.</i> , 2009
2.	24-hydroxytaraxer-14-ene (triterpene)	Rastogi <i>et al.</i> , 1995
3.	3 β -acetoxyurs-19-ene (triterpenoid)	Rastogi <i>et al.</i> , 1998; Misra <i>et al.</i> , 1993
4.	8 α -(4-hydroxymethacryloyloxy)-hirsutinolide-13-O-acetate	Chea <i>et al.</i> , 2006
5.	8 α -epoxymethacryloyloxy-hirsutinolide-13-O-acetate	Chea <i>et al.</i> , 2006
6.	8 α -tigloyloxy-hirsutinolide	Chea <i>et al.</i> , 2006
7.	8 α -tigloyloxy-hirsutinolide-13-O-acetate	Chea <i>et al.</i> , 2006
8.	8 α -(2-methylacryloyloxy)-hirsutinolide	Chen <i>et al.</i> , 2006

9.	8 α -(2-methylacryloyloxy)-hirsutinolide-13-O-acetate	Chen <i>et al.</i> , 2006
10.	8 α -(4-hydroxy tigloyloxy)-hirsutinolide-13-O-acetate	Chen <i>et al.</i> , 2006
11.	8 α -tigloyloxyhirsutinolide	Chen <i>et al.</i> , 2006
12.	8 α -tigloyloxy hirsutinolide-13-O-acetate	Chen <i>et al.</i> , 2006
13.	8 α -(2-methylacryloyloxy)-1 β ,4 β -epoxy-1 α -methoxy-10 β H-germacra-5E,7(11)-dien-12,6-olide	Chen <i>et al.</i> , 2006
14.	8 α -(2-methylacryloyloxy)-1 β ,4 β -epoxy-1 α -methoxy-13-O-acetate-10 β H-germacra-5E,7(11)-dien-12,6-olide	Chen <i>et al.</i> , 2006
15.	8 α -(4-hydroxy tigloyloxy)-10 α -hydroxy hirsutinolide-13-O-acetate	Chen <i>et al.</i> , 2006
16.	8 β -(3-chloro-2-hydroxy-2-methylpropanoyloxy)-4 β ,6 α ,10 β -trihydroxyl-13-ethoxy-7(11)-guaiaen-12,6-olide	Chen <i>et al.</i> , 2006
17.	Alpha spinasterol	Duke, 1996; Dhar <i>et al.</i> , 1968; Venkateswara, 1962; Rastogi, <i>et al.</i> , 1995; Khare, 2007
18.	Apigenin	Zhu <i>et al.</i> , 2009
19.	Apigenin-4'-O-beta-D-glucoside	Zhu <i>et al.</i> , 2009
20.	Arachidic acid (seed)	Duke, 1996
21.	Behenic acid	Duke, 1996
22.	Beta amyryn (triterpene)	Duke, 1996; Dhar <i>et al.</i> , 1968; Venkateswara, 1962; Khare, 2007
23.	Beta amyryn acetate (triterpene)	DOMAP, 2016; Khare, 2007; Duke, 1996; Zhu <i>et al.</i> , 2009
24.	Beta amyryn benzoate	DOMAP, 2016
25.	Beta sitosterol (sterols)	Duke, 1996; Dhar <i>et al.</i> , 1968; Venkateswara, 1962; Khare, 2007
26.	Campesterol	Rastogi <i>et al.</i> , 1995
27.	Caryolane-1,9beta-diol	Zhu <i>et al.</i> , 2009
28.	Chrysoeriol	Zhu <i>et al.</i> , 2009
29.	Fat	Duke, 1996
30.	HCN	Duke, 1996
31.	Hirsutinolide-13-O-acetate	Chen <i>et al.</i> , 2006
32.	Hyperin	Zhu H, 2009
33.	Linoleic acid	Duke, 1996
34.	Lupeol (triterpene)	Duke, 1996; Dhar <i>et al.</i> , 1968; Venkateswara, 1962; Khare, 2007
35.	Lupeol acetate (triterpene)	Duke, 1996; Dhar <i>et al.</i> , 1968; Venkateswara, 1962; Khare, 2007; Misra <i>et al.</i> , 1993; Zhu <i>et al.</i> , 2009
36.	Luteolin	Zhu <i>et al.</i> , 2009
37.	Luteolin-7-mono beta-D-glucoside (seed)	Duke, 1996; Zhu <i>et al.</i> , 2009
38.	Luteolin-7-monobeta- D-glucopyranoside (aerial part)	Khare, 2007
39.	Myristic acid	Duke, 1996
40.	Oleic acid	Duke, 1996
41.	Palmitic acid	Duke, 1996
42.	Pentaynene (flower)	Duke, 1996
43.	Phenolic resin	Dhar <i>et al.</i> , 1968; Venkateswara, 1962; Khare, 2007
44.	Piptocarphin D	Chen <i>et al.</i> , 2006
45.	Potassium chloride	Dhar <i>et al.</i> , 1968; Venkateswara, 1962; Khare, 2007
46.	Quercetin	Zhu <i>et al.</i> , 2009
47.	Sesquiterpenoid (10 in numbers)	Chen <i>et al.</i> , 2006
48.	Stigmasterol	Duke, 1996; Dhar <i>et al.</i> , 1968; Venkateswara, 1962, Khare, 2007
49.	Thermopsoside	Zhu <i>et al.</i> , 2009
50.	Vernocinoline A (sesquiterpenoid)	Chen <i>et al.</i> , 2006
51.	Vernolic acid (seed)	Duke, 1996
52.	Vernolide-A (sesquiterpene lactones)	Kuo <i>et al.</i> , 2003; Chen <i>et al.</i> , 2006
53.	Vernolide-B (sesquiterpene lactones)	Kuo <i>et al.</i> , 2003; Chen <i>et al.</i> , 2006
54.	Vernolides C (sesquiterpene lactones)	Chen <i>et al.</i> , 2006
55.	Vernolides D (sesquiterpene lactones)	Chen <i>et al.</i> , 2006

Pharmacological and Clinical activities of *Sahdevi* (*V. cinerea* Less.)

Antipyretic, analgesic and anti-inflammatory activities

The methanolic extract of the complete plant of *V. cinerea* was found equally effective at the dose of 500 mg/kg as standard drug paracetamol (Gupta *et al.*, 2003). Significant analgesic activity was showed by Chloroform extract (CE), Methanol extract (ME) and Petroleum Ether extract (PEE) in acetic acid-induced writhing test and mechanical induced pains. A potent and significant suppressant activity showed by CE, ME and PEE in carrageenin-induced paw oedema model in rats. The antipyretic activity also showed by ME and CE in a yeast suspension-induced hyperthermia (Iwalewa *et al.*, 2003). The antipyretic, analgesic and anti-inflammatory activities were also proved in mice model by methanolic extract of *V. cinerea* (Bashar, 2014).

The methanol extract in a dose of 250 and 500 mg/kg has demonstrated significant anti-inflammatory activity in carrageenin, histamine and serotonin induced rat paw edema and cotton pouch induced granuloma (Mazumder *et al.*, 2003). The flower extract of *V. cinerea* showed beneficial effect in adjuvant induced arthritic rats and ameliorated arthritic effects so confirming its anti-inflammatory activity (Latha *et al.*, 1998 Kumar 2009). Ethanolic extract of *V. Cinerea* exhibited favorable effects in vincristine-induced peripheral neuropathic pain. These effects may be due to its antioxidative, neuroprotective and calcium channel inhibitory actions (Thiagarajan, 2012). These studies have proved and validated the Unani claims of actions and uses of *V. Cinerea* mentioned in literature. Its antipyretic activities are well documented in Unani literature and can be verified by animal studies and clinical trial in chronic fevers.

Antimalarial activity

Complete plant and root of *V. Cinerea* has showed anti-malarial activity by having anti-plasmodium activity (Simonsen, 2001). Three major sesquiterpene lactones i.e. 8 α -tigloyloxy-hirsutinolide-13-O-acetate, 8 α -(4-hydroxymethacryloyloxy)-hirsutinolide-13-O-acetate and vernolides D exhibited significant antiplasmodial activity on chloroquine resistant Plasmodium falciparum strain (Chea A, 2006). This activity has validated the claim of Unani medicine where it is prescribed in malarial fever. It is effective even against chloroquine resistant strain so proving that natural form of drugs is more effective and no resistance develops in it.

Anti-oxidant activity

Antioxidant activity of hydroalcoholic extract of *V. Cinerea* was confirmed by inhibiting DPPH in dose dependent manner (Mehta J, 2019). Scavenging of the hydroxyl radical, superoxide and nitric oxide by methanolic extract of *V. Cinerea* was proved in a study. *V. Cinerea* was also found to inhibit the Phorbol-12-myristate-13-acetate (PMA) induced Superoxide generation in mice (Kumar, 2009).

Anti-diabetic and reproductive performance activity

V. Cinerea has shown promising action of significantly restoring the testicular function and testosterone concentration in diabetic male rats. In high dose it has showed anti-diabetic activity and significantly improved the sperm count (Pomjunya A, 2017). The carbon tetrachloride fraction of methanolic stem, bark and leaves extract of *V. Cinerea* has shown antidiabetic activity by significantly reducing the blood glucose levels in alloxan-induced diabetic rats (Haque MA, 2013). The Unani claim of its

aphrodisiac activity has been confirmed by improving sperm count.

Anti-ulcer activity

V. Cinerea has shown moderate anti *H. pylori* activity, suggesting its anti-ulcer activities because *H. pylorus* is strongly associated with duodenal and gastric ulcers (Wang YC, 2005).

Anti-diuretic activity

The chloroform extract of the leaf of *V. Cinerea* has shown hypernatraemic, hyperkalaemic and hyperchloraemic diuretic action. Methanolic and aqueous extracts showed effective antidiuretic effects which supports the Unani claim that the plant can be used to cure urinary incontinence (Adeboye JO, 1997).

Anti-microbial activity

The broad spectrum of antibacterial activity has shown by benzene extract of *V. Cinerea* (Gupta, *et al.*, 2003). The methanolic extract of *V. Cinerea* showed antimicrobial activity against *C. by* completely inhibiting *Candida albicans* growth and also exhibited prolonged anti-yeast activity (Latha, 2011). The hydroalcoholic extract of *V. Cinerea* showed good antimicrobial activity against gram positive bacteria (Mehta J, 2019). In a study it was shown that *V. Cinerea* does not exhibit any apparent toxicity and may be used as an antimicrobial agent in known dosages (Latha, 2010).

CONCLUSION

Sahdevi is an Indian drug and probably adopted by Unani practitioners due to its easy availability and large numbers of pharmacological actions. It contains more than fifty chemical compounds the important compounds are flavonoids, terpenoids and saponins along with alkaloids. It is very useful drug for fever especially in intermittent fevers like fever in Malaria. It is reported that if used before episodes of fever it prevents fever to appear which is unique quality of any drug. It has proved by many studies that it has antimicrobial activity against various microbes as well as fungi. Its antimicrobial activity proves its effectiveness in fevers of different origins. It has shown antiulcer activity which is also unique as most modern drugs used for fever produces ulcer as adverse effects. Various animal studies prove its analgesic, antipyretic and anti-inflammatory activities therefore confirming its classical use against different fevers. It may be used in arthritis which is confirmed by animal study but not mentioned in classical literature. It has proven anti-malarial activity even against chloroquine resistant Plasmodium falciparum strains, proves its use in malaria as per literature. It improves sexual performance by improving sperm count in diabetic patients thus proves its importance in sexual debility due to diabetes.

It is a priceless herb commonly found everywhere but have important pharmacological actions. Its easy availability makes it important drug for management of various ailments and it can be used in place of costly drugs or endangered herbs. Its other activities mentioned in Unani literature such as lithotriptic activity, blood purifier activity, general tonic activity and appetizer activity may be explored in animal as well as in human being to confirm the claim mentioned in Unani literature. In last it can be concluded that *V. Cinerea* is an important herb of Unani medicine and it should be used frequently by physicians according to its vast pharmacological actions as per classical literature for safe effective and cost-effective treatment.

ACKNOWLEDGEMENTS

The authors are thankful to Prof. Asim Ali Khan, Director General, CCRUM, New Delhi for providing the necessary facilities and infrastructure.

CONFLICT OF INTEREST

The authors have no conflicting financial interests.

REFERENCES

Adeboye JO, Asije W, and Awe SO. Diuretic and Antidiuretic Activity of the Leaf Extracts of *Vernonia cinerea* (Less.) (Fam. Compositae), *Phytotherapy Research*, 1997;11:454-456

Alara OR, Abdurahman NH, Ukaegbu CI, Azhari NH & Kabbashi NA. Metabolic profiling of flavonoids, saponins, alkaloids, and terpenoids in the extract from *Vernonia cinerea* leaf using LC-Q-TOF-MS, *Journal of Liquid chromatography & related technologies*, 2018;41(11):722-731

Ali A. *Maqalat-e-Ahsani*, (Kanpur, India, Dar Matba, Nami Nawal Kishore), pp.83, 1914,

Ali MN. Nasirul Moalijeem, (Lucknow, India: Matba Alwi Muhammad Ali Bakhsh), pp. 62, 127, 1860

Anonymous. The Wealth of India 'Raw Materials', (New Delhi, India: C.S.I.R.), Vol.10, pp.448-49, 1998

Arshi MMN. *Mufradat-e-Arshi*, (Lahore, Pakistan, Kutubkhana Arshi Dhanola, Pratap Press), pp. 338, 1929

Bashar MK, Ibrahim M, Sultana I, Hossain MI, Tasneem Z, Kuddus MR, Rashid RB and Rashid MA. Preliminary Phytochemical Screenings and Antipyretic, Analgesic and Anti-inflammatory Activities of Methanol Extract of *Vernonia cinerea* Less. (Fam: Asteraceae), *European Journal of Medicinal Plants*, 2014;4(10):1178-1185

Bhattacharjee SK and De LC. Medicinal Herbs and Flowers. (Jaipur, India: Avishkar Publishers, Distributors), pp.264-65, 2005

Caius JF. The Medicinal and Poisonous Plants of India. (Jodhpur, India: Scientific Publishers), pp.373, 2003

Chea A, Hout S, Long C, Marcourt L, Faure R, Azas N, Elias R. Antimalarial Activity of Sesquiterpene Lactones from *Vernonia cinerea*, *Chem Pharm Bull (Tokyo)*, 2006;54(10):1437-9.

Chen X, Zhan ZJ and Yue JM. Sesquiterpenoids from *Vernonia cinerea*, *Natural Product Research*, 2006; 20(2):125-129

Chughtae GM, Chughtae F. Rahnuma-e-Aqaqeer. (Lahore, Pakistan: Siddiqui Publication Urdu Bazaar), Vol.2, pp.203-06, 1963

Daljeet S. Unani Dravgudadarsh, (Lucknow, India: Ayurvedic and Tibbi Academy), Vol.2, pp.647, 661, 1974

Dayal K. *Vedic Nighantu*, (New Delhi, India, Kutub Khana Anjuman Taraqqi-e-Urdu), pp. 130, 1661933.

DOMAP. Database of medicinal and aromatic plants in Rajasthan, Birla Institute of Scientific Research, 2016. Available at: [https://bioinfo.bisr.res.in/project/domap/plant_details.php?plantid=0134&bname= Vernonia%20cinerea](https://bioinfo.bisr.res.in/project/domap/plant_details.php?plantid=0134&bname=Vernonia%20cinerea) (accessed on 14th May, 2020)

Duke. Dr. Duke's Phytochemical and Ethnobotanical Databases, National Agricultural Library, Agricultural Research Service, USDA.gov, 1996. Available at: <https://phytochem.nal.usda.gov/phytochem/plants/show/2087?et=> (Accessed on 06 June, 2020)

Dymock W. *Pharmacographia Indica*, (Byculla, India: Bombay Education Society's Press), Vol.2, pp.224, 299, 1890

Fazlullah M. Makhzanul Mufradat Maroofba Jamiul Advia, (Lucknow, India: Dar Matba Anwar Muhammad), pp.142, 1877

Ghani HMN. Khazeenat-ul-Advia, (Lucknow, India: Matba Munshi Naval Kishore), Vol.1, pp.839, 876, 1921

Gupta M, Mazumder UK, Manikandan L, Bhattacharya S. Evaluation of Antipyretic Potential of *Vernonia cinerea* extract in rats. *Phytotherapy Research*, 2003;17(7):804-06.

Gupta M, Mazumder UK, Manikandan L, Halder PK, Bhattacharya S, Kandar CC. Antibacterial Activity of *Vernonia cinerea*, *Fitoterapia*, 2003;74(1-2):148-50.

Hakeem MA. Bustan-ul-Mufradat, (Lucknow, India: Idare-Taraqqee Urdu Publication), pp. 210, 1343H

Haque MA, Abdullah CS, Romana B, Rafique MB, Zia-ul-Huda GM, Hossain SF, Bilkis B. Evaluation of anti-diarrheal and anti-diabetic activities of the stem, barks and leaves of the plant *Vernonia cinerea* (Family: Asteraceae), *Journal of Applied Pharmaceutical Science*, 2013;3(01):69-72

Hasan B. Jamiul Mufradat, (Kanpur, India: Dar Matba Hussaini), pp. 64, 1865

Hooker JD. Flora of British India, (New Delhi, India: Bishan Singh Mahendrapal Singh Publisher), Vol.3, pp.233-34, 1982

Iwalewa EO, Iwalewa OJ, Adeboye JO. Analgesic, antipyretic, anti-inflammatory effects of methanol, chloroform and ether extracts of *Vernonia cinerea* Less. leaf, *Journal of Ethnopharmacology*, 2003;86:229-234

Kabir al-Din, Hakim Muhammad (1894-1976 AD), (5th Edition), Kitabul Adviya, Vol. II, Makhzanul Mufradat, Daftar al-Masih, Bazar Nur al-Umara', Hyderabad Deccan, 1955, pp. 246.

Kabir al-Din, Hakim Muhammad (1894-1976AD), *Ilmul Advia Nafeesi*, (New Delhi, India, Aijaz Publishing House, Darya Ganj), pp. 301, 2007.

Khan MA. Muheet-e-Azam, Matba. (Kanpur, India: Nizami), Vol.2, pp.70, 84, 1313H

- Khan RA. Tazkiratul-Hind Almaroofba Yadgar-e- Razae, Vol.2, pp.10-11, 38-39, 1358
- Khan S. Taleef-e-Shareefi, Dar-us-Salam, Delhi, 1280, pp.123, 129.
- Khare CP. Indian Medicinal Plants, (New York, USA: Springer-Verlag New York), pp.616, 699-700, 2007
- Kirtikar KR and Basu BD. Indian Medicinal Plants, (Delhi, India: Sri Satguru Publications), Vol.2, pp.1322-24, 1996
- Kumar PP and Kuttan G, *Vernonia cinerea* L. scavenges free radicals and regulates nitric oxide and proinflammatory cytokines profile in carrageenan induced paw edema model, *Immunopharmacology and Immunotoxicology*, 2009; 31(1): 94–102
- Kuo YH, Kuo YJ, Yu AS, Wu MD, Ong CW, Yang LM, *et al.* Two Novel Sesquiterpene Lactones, Cytotoxic Vernolide-A and Vernolide-B, from *Vernonia cinerea*, 2003;51(4):425-26.
- Latha LY, Darah I, Jain K & Sasidharan S. Toxicity study of *Vernonia cinerea*, *Pharmaceutical Biology*, 2010;48(1):101-104
- Latha LY, Darah I, Jain K, Sasidharan S. Effects of *Vernonia cinerea* Less. Methanol Extract on Growth and Morphogenesis of *Candida Albicans*, *Eur Rev Med Pharmacol Sci*, 2011;15(5):543-9.
- Latha RM, Geetha T, Varalakshmi P. Effect of *Vernonia cinerea* Less. Flower Extract in Adjuvant-Induced Arthritis, *Gen. Pharmac*, 1998;31(4):601-606
- Lubhaya HR. Bayanul Advia, (Delhi, India: Goswami Pharmacy), Vol. 2, pp. 40-47, 1977
- Mazumder UK, Gupta M, Manikandan L, Bhattacharya S, Haldar PK, and Roy S. Evaluation of anti-inflammatory activity of *Vernonia cinerea* Less. extract in rats, *Phytomedicine*, 2003;10:185-188.
- Mehta J, Joshi PM, Kushwaha P, Parkhe G. In-vitro Antioxidant Activity and Antimicrobial Activity of Hydro alcoholic extracts of *Vernonia cinerea*, *Journal of Drug Delivery & Therapeutics*. 2019; 9(1):225-228
- Misra TN, Singh RS, Srivastava R, Pandey HS, Prasad C, Singh S. A New Triterpenoidal From *Vernonia cinerea*, *Planta Med*, 1993;59:458-460
- Nadkarni KM. Indian Materia Medica, (Bombay, India: Bombay Prakashan, Pvt. Ltd.), Vol.1, pp. 203, 354, 531, 2000
- Pomjunya A, Ratthanophart J and Fungfuang W. Effects of *Vernonia cinerea* on reproductive performance in streptozotocin-induced diabetic rats, *Journal of veterinary medical science*, 2017;79(3): 572–578
- Rastogi RP and Mehrotra BN. Compendium of Indian Medicinal Plants, CDRI, (New Delhi, India: Lucknow and Publication & Information Directorate), Vol.4, pp.753, 1995
- Sala AV. Indian Medicinal Plants, (Chennai, India: Orient Longman private Ltd.), Vol.5, pp.358, 2004
- Sheerazi NMAHA. Alfaz-ul-Advia, (Lucknow, India: Matba Nami Munshi Naval Kishore), pp.165, 1038H
- Simonsen HT, Nordskjold JB, Smitt UW, Nyman U, Palpu P, Joshi P, Varughese G. In vitro screening of Indian medicinal plants for anti-plasmodial activity. *J Ethnopharmacol*, 2001;74:195–204
- Singh VK and Khan AM. Medicinal Plants and Folklores, (New Delhi, India: Today and tomorrow's Printers and Publishers), pp. 48, 50, 73, 84, 134, 154, 1990
- Thiagarajan VRK, Shanmugam P, Krishnan UM and Muthuraman A. Ameliorative effect of *Vernonia cinerea* in vincristine-induced painful neuropathy in rats, *Toxicology and Industrial Health*, 2012, 1–12
- Trivedi PC. Ethnobotany, (Jaipur, India: Avishkar Publishers, Distributors), pp.302-03, 352, 2002
- USDA. United States Department of Agriculture, National Resources Conservation Services, <https://plants.usda.gov/core/profile?symbol=GYSY>, USDA.gov, 1996. (Accessed on 2 June, 2020).
- Wang YC, Huang TL. Screening of anti-Helicobacter pylori herbs deriving from Taiwanese folk medicinal plants, *FEMS Immunology and Medical Microbiology*, 2005;43:295–300
- Zaki, MM. *Makhzan-ul-Mufridat maroofba Khawasul Adviya*, 2nd edition, (Saharanpur, India, Sheikh Muhammad YameenTajirKutub), pp. 104, 1890.
- Zhu H, Tang Y, Min Z, Gong Z. Bioactive Constituents From Whole Herbs of *Vernonia cinerea* (II), *Zhongguo Zhong Yao ZaZhi*, 2009;34(21):2765-7