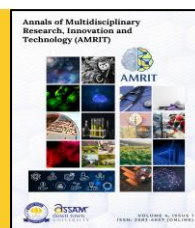




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REVIEW ARTICLE

EHNOBOTANY OF ASTERACEAE PLANTS

Morphology, Ethnobotany, Pharmacological Properties of Some Selected Species of the Asteraceae Family: A Comprehensive Review

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Abstract

The Asteraceae family is one of the largest families among dicotyledons. It includes more than one-tenth of all flowering plants and is found worldwide, except in Antarctica. Members of the Asteraceae have been used in diets and medicine for centuries. Despite their wide diversity, most members share a similar chemical composition; for instance, all species are excellent sources of inulin, a natural polysaccharide with significant prebiotic properties. They also demonstrate strong antioxidant, anti-inflammatory, and antimicrobial activities, along with diuretic and wound-healing effects. Their pharmacological properties can be attributed to a variety of phytochemical compounds. Asteraceae species have been reported to contain flavonoids, phenolic acids, coumarins, monoterpenoids, sesquiterpenes, diterpenes, triterpenes, and sterols. Various Asteraceae species have been identified and collected that have shown effectiveness and utility in treating a range of human diseases.

Keywords: *Asteraceae morphology, Nutritional benefits, Antioxidants, Phytochemistry, Medicinal plants, Bioactive compounds*

1. Introduction

The family Asteraceae is one of the largest and highly evolved, most successful families among the dicotyledons, consisting of 43 tribes, over 1600 genera, and over 33000 species, grouped into three subfamilies [1]. India has about 177 genera and 1052 species belonging to this family [2]. The family is very interesting to the taxonomists due to its great diversity of habit, habitat, morphology, and histology of vegetative and reproductive structures [3,4]. It is generally considered that the Asteraceae is a natural family, similar to Brassicaceae, Poaceae, and Apiaceae. The members of this family are easily recognized by characteristic features, which are pseudoanthial heads with a specialized type of pollen presentation mechanism and pappus structure [5], nature of fruit [6], and their

particular array of chemical weapons [7]. Though the presence of pappus is an important character in this family [8,5], in some genera, pappus is absent. It encompasses more than one-tenth of all flowering plants and is cosmopolitan, except in Antarctica (Mabberley, 2008).

The Asteraceae family is divided into three subfamilies: Asteroidea, Barnadesioideae, and Cichorioideae [9]. These plants are identified by hairy, fragrant leaves and flat clusters of small flowers at the apex of the stem. Because these flowers are available in a variety of colors, several kinds are attractive garden plants. The Asteraceae family is usually known as the aster, daisy, or sunflower family, and the name "Asteraceae" springs from the genus aster. While "Compositae" is an earlier but still valid term, it

refers to the distinctive inflorescence, a singular kind of pseudanthium seen only in a few other angiosperms (Ghazal, 2019). The Asteraceae are mostly herbs, subshrubs or shrubs, trees, or vines. Some species are commonly used and marketed as herbal remedies, implying that the Asteraceae family has substantial potential as a source of bioactive chemicals [10, 11]. They are mostly found in subtropical areas with arid and semi-arid climates, but they are known and widely distributed worldwide as well [12].

The Asteraceae family is found all across the planet, inhabiting every imaginable scenario. This family is represented in India by approximately 138 genera and 708 species, which are found primarily in the Himalayas and mountains of southern and western India. In India, there are around 18,664 species of higher plants, with nearly 900 species belonging to the Asteraceae family [13, 14].

1.1. Importance of the Asteraceae Family

Asteraceae is an economically important family that supplies products such as cooking oils, sunflower seeds, lettuce, artichokes, sweeteners, coffee alternatives, and herbal teas. Many family members are their flowers as ornamental plants, and some are important ornamental crops for cut flower industry. *Chrysanthemum*, *Gerbera*, *Calendula*, *Dendranthema*, *Argyranthemum*, *Dahlia*, *Tagetes*, *Zinnia*, and several others are some examples [15]. Widely used in medical and phytochemical journals are members of the Asteraceae family because the sesquiterpene lactone compounds found within them are an important cause of allergic contact dermatitis. The scientists discovered a roughly 20-million-year-old Asteraceae family fossil blossom. The relationships are described as antidiuretic, antipyretic, carminative, anthelmintic, anti-inflammatory, cardiogenic, and in healing dyspepsia, jaundice, leprosy, cough, asthma, ulcers, vomiting, etc. [16]. It has remarkable economic and ecological importance as vegetables, oil wells, insecticides, and ornamental garden plants [17,18].

1.2. Bioactive Constituents of the Family Asteraceae

These phytoconstituents may include alkaloids, flavonoids, terpenoids, glycosides, phenolics, fatty acids, etc. in recent years, the Asteraceae family has been thoroughly explored and the presence of chemically varied natural compounds of important pharmacological and therapeutic relevance has been reported. The popular genera of this family are *Echinops*, *Artemisia*, *Wedelia*, *Spilanthes*, *Tridax*, *Chrysanthemum*, *Achillea*, *Amaranthus*, *Inula*, *Saussurea*, *Ageratum*, *Arnica*, *Aster*, *Plectrocephalus*, *Gaillardia*, *Arctium*, *Cynara*, *Anthemis*, *Cichorium*, *Xanthium*, *Dahlia*, *Taraxacum*, *Tagetes*, *Calendula*, etc., with unique volatile chemical compositions [19].

1.3. Physical description

Leaf arrangement is alternate, often appearing in basal rosette formation, and the leaves are devoid of stipules. The floral arrangement is unique for this plant family with a distinct head-like structure appearing as a single flower called a capitulum, which is a unique collection of numerous tiny flowers arranged on a

common platform called receptacle. There are two types of flowers observed within the capitulum inflorescence- ray or ligulate and disk or tubular. The central part of the capitulum is occupied by the disk florets and the periphery is arranged with the ray florets. Flowers could be unisexual or bisexual (hermaphrodites), regular or irregular, but are usually pentamerous and sympetalous with an inferior ovary. The common fruit type of Asteraceae is achenes. Androecium has five stamens united at the anthers, forming a tube-like structure around the style. Calyx is often absent and is replaced by bristles or a scaly structure in the form of a pappus. The pappus is known to help in the widespread dispersal of mature seeds via wind; mature seeds mostly do not have any endosperms [20].

Plants in the Asteraceae family show a lot of differences in their shape and appearance, both between different species and within the same species. One important feature is the flower arrangement, called the inflorescence. This arrangement has a central flower head (capitulum) surrounded by a set of leaves called phyllaries. The flower heads can vary in structure; they can be single or stalked, and they can grow in clusters or flat-topped shapes. They may also have one type of flower or two different types. The fruit of these plants is a small seed called an achene, which contains a single seed [21].

The fruit of the Asteraceae family, called a cypsela or achene, comes from a flower part called an ovary that has two carpels, is fused, and has one chamber with one seed at the bottom. Most achenes have a structure called a pappus, which is a modified version of a flower's outer part, according to many researchers [22,23]. The overall and detailed features of the fruit and seed are important for classifying species and studying their evolution. These characteristics have been used to help identify different species [24].

When flowers are not present, the characteristics of cypselae or achenes (types of seeds) are very useful for identifying different species. In the Asteraceae family, the pappus (the hair or bristles on the seeds) is an important feature for classification [25]. Achenes, which are a type of seed, can help classify and distinguish different groups within the Asteraceae family. Their variety in shape, size, pappus (the bristles or hairs on the seed), ribbing patterns, and surface texture is useful for this purpose [26,27,28,29,30].

2. Review Methods and Materials

- a) **Literature search:** Relevant research articles were gathered by looking through major scientific databases like Science Direct, Medline, Research Gate, and Google Scholar. A combination of keywords such as 'Floral morphology', 'Ethno-botany', 'Pharmacological properties', of India, were interchangeably used for searching.
- b) **Eligibility criteria:** Articles connected to the title, summary, keywords, introduction, and general content of this review were chosen. The emphasis was primarily on articles that discussed: a) health benefits of ethno-medicinal plants, b) the examination of their chemical properties, c) the traditional healing uses of wild medicinal plants from Northeast India. The reasons for excluding articles were: a) those not written in English, b) data from unreliable sources, and c) articles that

cannot be accessed in full text.

c) Selection strategy

The authors looked closely at different articles and studies about their topic. They picked only the journals that were important and met their standards. When they found any differences in opinions, they talked it over with each other to agree on a conclusion.

d) Data extraction

To collect data, the authors examined a broad range of relevant studies. They considered important details like the author's

name, the year of publication, the Asteraceae family, active compounds, and traditional uses, which were essential for their review. They also found helpful information in the introductions, discussions, and conclusions of other articles.

3. Documentation of the Review

Table 1 depicts the morphological characteristics of the different species of the family Asteraceae as evidenced by the different data and information sources, as shown under the references.

Table 1: Morphological characteristics of species of the family Asteraceae.

Species	Habit	Stem	Leaves	Flowers	Fruits	References
<i>Acilepis saligna</i>	Perennial herbs	Erect, branches inconspicuously ribbed, sericeous or glandular pubescent	Alternate, lanceolate or elliptic-lanceolate, scabrous with whip-shaped hairs and capitate glands, margin is serrate	Terminal or axillary panicles, receptacle flat, hairy, involucre campanulate, pappus is persistent in 1 series, reddish or white bristles	–	[31]
<i>Ageratum conyzoides</i>	Annual herbs	Branched at middle, reddish in color, robust, apex green, white pubescent	Petiole white villous, median leaves are ovate, elliptic, or oblong, base obtuse, apex acute	Capitula is small, involucre campanulate, phyllaries 2- 2-seriate, lanceolate-oblong, glabrous in shape, limb purplish in color, with 5 lobes, pappus is present	Achenes black	[32]
<i>Bidens pilosa L.</i>	Annual herbs	Stems are 30-180 cm in diameter, and the upper part is pubescent	Blade and primary lobes are ovate to lanceolate, base cuneate, apex acute	Capitula radiata or dicoid, involucre terminate, phyllaries oblanceolate, ray florets are white, and disc florets are yellowish	Achenes black, linear-fusiform in shape	[32,24]
<i>Cyanthillium cinereum</i>	Annual herb	Erect, young branches conspicuously ribbed, serious, fulvous pubescent to greyish pubescent and glandular.	Alternate, lanceolate or ovate to broadly ovate, upper surface sericeous, lower surface fulvous with hairs, lateral veins 5-7 pairs.	Terminal or axillary, corymbose panicles, flat receptacles and involucre are campanulate, pappus is persistent, in 2 series of white or fulvous bristles	–	[31]

<i>Decaneuropsis vagans</i>	Scandent shrubs or liana	Slender or climbing, bark thin, yellowish, young branches terete, minutely grooved, brownish pubescent	Alternate, elliptic obovate or ovate-lanceolate, glandular on both surfaces, apex acute or acuminate	Terminal, paniculate, capitula numerous, campanulate, receptacle flat, involucre narrowly campanulate or slightly oblong to cylindrical, pappus is reddish		[33]
<i>Enhydra fluctans</i>	Soft aquatic herbs	Stout, cylindric, fleshy, prostrate in the lower part	Subsessile, oblong or linear-oblong shape, surface globous, base amplexicaul, apex obtuse or acute	Capitula is 8-10 mm in diameter, number of phyllaries is 4, involucre dorsally globous, outer pair is larger, ovate-oblong, apex round, paleae rigid and sparsely pubescent, lamina of ray florets is 3-4 lobed in apex, while disc florets are 5 lobed	Achenes obovoid-cylindric	[34]
<i>Gymnanthemum amygalinum</i> (DC.) H. Rob. & Skvarla	Shrubs	Moderate to densely branched, terete with solid pith	Alternate, highly variable in shape and size, lanceolate to oblanceolate, some ovate	Terminal, densely corymbiform, with small bractioles, capitula 11-35 flowers, campanulate, small creamy white, phyllaries ovate to elliptic, pappus is persistent, capillary bristles	-	[35]
<i>Helianthus annuus</i>	Annual and 1-3 meters in height	Unbranched, round with internodes	Ovate, upper leaves alternate along the stem, while lower leaves are opposite	Capitulum comprising composite heads of 1000-2000 individual ray and disc florets	Achene	[36]

<i>Monosis volkamerifolia</i>	Evergreen small tree	Erect, bark grey, young branches unconsciously ribbed, whip tomentose	Alternate, oblanceolate or obovate, apex acute, base long attenuate to cuneate	terminal, thyrsoid- paniculate, capitula numerous, campanulate, receptacle flat, involucres narrowly campanulate or slightly oblong- cylindrical, phyllaries ovate to oblong, pappus is whitish	-	[13]
<i>Sonchus oleraceous L.</i>	Annual or biennial herbs	Hollow, herbaceous base is soft	Leaf blades spatulate or oblong-obovate or lanceolate in shape, base auriculate	Peduncle stipitate- glandular, rarely glabrous in shape, phyllaries stipitate- glanded, corolla ligulae shorter than tubes, sypselae reddish brown in color, ellipsoid, compressed, winged, involucres and pappus are present	-	[32]
<i>Syndrella nodiflora(L.) Gaert.</i>	Annual herbs	Branched, erect, and soft	Opposite, petiolate, blade ovate to elliptic in shape, leaf base cuneate- rounded in shape	Capitula radiate, sessile or solitary, involucres cylindric to campanulate, phyllaries persistent, striate, lanceolate, herbaceous to papery, receptacle convex, paleae linear to lanceolate, base flat or cupped, ray florets seriate, disc florets bisexual, corolla yellow in colour, lamina ovate-linear	-	[37]
<i>Tagetes erecta L.</i>	Annual, aromatic herbs, perennial shrubs	Erect, branched	Pinnately compound, leaflets are lanceolate to linear lanceolate	Flower heads are solitary or arranged in corymbs, ray florets are typically yellow, orange, or multi- colour, disc florets are usually yellow or orange	Achenes, elongated and black	[28]

<i>Tridax procumbans</i> L.	Annual or perennial herbs	Branched, slender, procumbent	Shortly petiolate, blade ovate or lanceolate, base cuneate, apex acuminate	Capitula solitary, phyllaries seriate, elliptic, outer is greyish white and inner is purplish, ray florets white, and disc florets are yellow. Pappus is shiny	Achenes are brown or oblong	[32]
<i>Vernonia arborea</i>	Tree	Young branches, inconspicuously ribbed, ferruginous pubescent	Alternate, elliptic to oblong, puberulous with filiform hairs, apex acuminate or caudate, base cuneate or oblique	Terminal or axillary, thyrsoid-paniculate, capitula narrowly campanulate, receptacle flat, involucre narrowly campanulate or slightly oblong cylindrical, phyllaries green or purple, pappus is persistent in 2 series of bristles	-	[35, 13]
<i>Xanthium strumarium</i> L.	Annual and branched herb	Erect, solitary, simple, stout, hairy appear in green, reddish brown, often red spotted	Simple, ovate, heart-shaped shape and opposite, irregular lobed with leaf margins	Occurs in several to many short pediculate axillary or terminal racemes	Cylindrical to ovate, two-chambered bur, granular, covered with hooked prickles projecting from the apex of the bur, brownish to reddish when mature	[32,38]

Table 2: Ethnobotany and Pharmacological properties of selected species of Asteraceae.

Botanical name	Vernacular name	Parts used	Medicinal uses	Pharmacological properties	References
<i>Acilepis saligna</i>	Willow-Leaf Vernonia	Leaves, barks, roots	Fever, rheumatism, and skin conditions.	Anti-inflammatory, antibacterial, and antioxidants	[31]
<i>Ageratum conyzoides</i> L.	Billy goat weed	Leaves and twigs	Check bleeding, wound healing. Root juice is also used as an anthelmintic.	Anticancer, antioxidant, analgesic, antipyretic, anti-inflammatory, anthelmintic,	[39,40,41,42,43, 44,45]

				antidiabetic, antimicrobial, antibacterial	
<i>Bidens pilosa L.</i>	Blackjack, Spanish needle, Beggar's tick, Pitchfork, and Cobbler's peg.	Whole plant, Leaf	Used in wound healing, ulcers, eye and ear problems, hepatitis, urinary tract infection, malaria, and skin inflammation	Antidiabetic, antitumoral, antimicrobial, hepatoprotective, antioxidant, and antimycobacterial	[46, 45]
<i>Baccharoides anthelmintica L.</i>	Bacchari wormwood.	Seeds, leaves	Diabetes, vata and kapha, asthma, paralysis, phlegmatic discharges,	–	[47, 48]
<i>Cyanthillium cinereum</i>	Purple fleabane, sahadei	Whole plant	Diarrhoea, cough, smoking cessation, asthma, and tumours.	Antioxidant, antitumor, antibacterial, antimicrobial, anti-helminthic, anti-hyperglycemic.	[49]
<i>Eclipta alba</i> (Linn) Hassk	False daisy	Entire plant	Fresh leaves are useful for elephantiasis, liver diseases, and dropsy. Although juice is used in jaundice and fever.	Antioxidant, antimicrobial, antibacterial, hepatoprotective	[44, 50, 51, 52]
<i>Eclipta prostrata L</i>	False daisy or Ink plant	Leaves and shoots	Used as an antiseptic in fresh cuts and wounds, leaf extract is given in dysentery with vomiting. Leaves are also used as a hair conditioner as well as a tonic, for jaundice and fever.	Anthelmintic, Hepatoprotective, antidiabetic, antimicrobial, antioxidant, anticancer	[53,54,45,55,56, 57, 58]
<i>Enhydra fluctuans</i>	Marsh herb, Water cress	Leaves, Stems, whole plants	Skin disease, constipation, gastric and ulcer problems, inflammations, smallpox, diabetes	Analgesic, anti-inflammatory, anti-cancer, anti-helminthic, antimicrobial, antidiabetic, antioxidant, and hepatoprotective activity	[59,60,61,62,63, 64, 65]
<i>Eupatorium odoratum</i> Linn.	Siam weed	Leaves, flowers	The leaves and flower tops can be used as medicine to induce vomiting, clearing the intestines and healing wounds.	Anti-oxidant, astringent, antimicrobial, antiseptic, wound healer, analgesic, antipyretic, antibacterial, antifungal activity	[44,66,67,68,69, 70]
<i>Gymnanthemum amygdalinum</i>	Bitter leaf, African bitter leaf	Seed, leaves, roots, and fruits	Amoebic dysentery, gastrointestinal disorders, liver disorders, bronchitis, diabetes, malaria,	Antimicrobial, antifungal, antibacterial	[71,72, 73,74,75]

			headache, malaria		
<i>Helianthus annus L.</i>	Sunflower	Flower, leaves, seeds, roots	Cardiovascular disease, a chronic inflammatory condition, cancer, and diabetes.	Anti-inflammatory, analgesics, cardiovascular activity, antimicrobial, antidiabetic, anti-cancerous.	[76,77,78,79,60, 80,81]
<i>Mikania micrantha</i> H.B.K	Chinese creeper, bitter vine, hemp vine	Leaves, stems, roots	Used in dysentery and diarrhea, skin diseases, headache, wound healing, the leaves extract is used to cure eye problems, snake bite, and scorpion sting.	Antibacterial, anti-tumor, cytotoxic, analgesic, anti-inflammatory, anti-cancer, antioxidant	[44,45]
<i>Spilanthus acmella</i> Murr.	akarkara plant	Stem, leaves, flowers	Used in toothache, throat, gum infections, and tuberculosis	Antipyretic, anti-inflammatory, antifungal, analgesic, antiseptic, antibacterial, and antimalarial	[44,82,83,84,85]
<i>Spilanthus paniculata</i> Clarke	Phakphet	Leaves, Flowers, whole plant	Plant parts are used in stomach problems, constipation, and chewing the flowers can help with toothaches	Hepatoprotective and antioxidant activity.	[44,45,85]
<i>Syndrella nodiflora</i>	Syndrella weed	Leaves	cardiac distress, stop wound bleeding	Anti-inflammatory, anti-oxidant, anti-proliferative, antimicrobial activity,	[86,87,88]
<i>Tagetes erecta</i>	Marigold, genda, sanarei	Flower, leaves,	Kidney disease, muscular pains, piles, fever, liver disease.	Antibacterial, anti-inflammatory, antioxidant, anticancer, antidiabetic,	[89,90, 91, 92, 93]
<i>Tridax procumbens</i> Linn.	Coat buttons, Tridax Daisy, Mexican Daisy	Leaves, whole plant	Used as folk medicine such as ulcer, hair tonic. Leaves can be used in skin disease, liver disorder, gastritis, heartburn, dysentery and severe diarrhea	Antioxidant, anti-bacterial, anti-fungal, anti-malarial, anti-cancer, Anti-inflammatory Activity, hepatoprotective, anti-coagulant, anti-microbial, insect repellent, wound healing activity	[94]
<i>Vernonia arborea</i>	Tree vernonia	Leaf	Worm,	antifungal	[95]

<i>Xanthium strumarium L.</i>	Chota dhatura, chota gokhuru, ghagra, cocklebur	Fruit, leaves, root, and aerial part	Fever, salivation, appetite, diuretic, malaria.	Anti-cancer, anti-inflammatory, analgesic effect, insecticidal, antioxidant, antimicrobial, antidiabetic, antilipidemic, antiviral	[96,97]
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Table 3: Medicinal plants used for the treatment of respiratory diseases.

Sl. No.	Botanical name	Vernacular name	Plant part used	References
1	<i>Aertimisiadubai</i>	Titeypati	Leaf and young leaves	[98]
2	<i>Ageratum conyzoids</i>	Goatweed	Leaves	[99]
3	<i>Artemisia bienis</i>	Biennial wormwood	Leaves	[100]
4	<i>Artemisia maritima</i>	Sea wormwood, old woman	Aerial part	[101]
5	<i>Aster amellus</i>	Italian starwort	Roots	[102]
6	<i>Cichorium endivia</i>	Cultivated endive	Seeds	[101]
7	<i>Cichorium intybus</i>	Chicory	Whole plant	[101]
8	<i>Conyza sumatrensis</i>	Sidji (lamso)	Leaves	[103]
9	<i>Cousinia stocksii</i>	Naryan band	Gum and roots	[101]
10	<i>Eclipta prostrata</i>	Bhringraj, white head	Leaf	[99]
11	<i>Erigemn canadensis</i>	Canada fleabane	Whole plant	[103]
12	<i>Inula grantioides</i>	Cutch inula	Whole plant	[101]
13	<i>Kussureccostus</i>	Kuth, costus	Roots	[102]
14	<i>Lactuca serriola</i>	Prickly lettuce	Whole plant	[101]
15	<i>Lobelia inflata</i>	Indian tobacco, puke weed	Aerial part	[104]
16	<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed	Leave	[101]
17	<i>Saussurea atkinsonii</i>	Lousia saw- wort	Aerial part	[101]
18	<i>Spilanthes paniculata</i>	Toothache plan	Flower, aerial part	[105]
19	<i>Sphaeranthus indicus</i>	East Indian globe thistle	Whole plant	[106]
20	<i>Tagetes erecta</i>	Genda phool, French marigold	Flowers, whole plant	[102]
21	<i>Tridax procumbens</i>	Bhringraj	Leaf	[107]
22	<i>Tussilago farfara</i>	Colt's foot	Leaves	[101]
23	<i>Vernonia anthelmentica</i>	Iron weed	Seeds	[101]
24	<i>Veaernoniacinera</i>	Little ironweed sahadevi (hindi)	Roots	[108]

Table 4: Medicinal plants used for anti-dermatological activities.

Sl. No.	Botanical name	Vernacular name	Plant part used	References
1	<i>Ageratum conyzoids</i>	Billy goat weed, jangli pudina	Leaves	[109]
2	<i>Aspilia natalensis</i>	Wild creeping sunflower	Leaves	[110]
3	<i>Artemisia annua</i>	Wormwood or sweet sagewort	Aerial part	[111]
4	<i>Artemisia biennis</i>	Biennial wormwood	Leaves	[112]
5	<i>Artemisia dubai</i>	Mugwort	Root	[113]
6	<i>Artemisia nilagirica</i>	Indian wormwood, kunj	Leaves	[114]
7	<i>Anaphalis neelgerriana</i>	Pearly everlasting	Leaf and head paste	[115]
8	<i>Artemisia vulgaris</i>	Common mugwort	Aerial parts, essential oil	[116]
9	<i>Aspilia africana</i>	Wild sunflower	Leaves	[117]
10	<i>Centaurea benedicta</i>	Holy thistle	Whole part	[110]
11	<i>Calendula offkinolis</i>	Pot marigold	Leaves, flowers	[102]

12	<i>Chrysocoma ciliata</i>	Beesbossie	Whole plant	[110]
13	<i>Eclipta alba</i>	Bhringaraj	Leaves	[118]
14	<i>Eclipta prostrata</i>	Bhringaraj, white head	Whole plant	[109]
15	<i>Pluchea lanceolata</i>	Rasna	Leaves	[120]
16	<i>Senecio concolor</i>	Idambiso or ibohlololo	Leaves	[110]
17	<i>Sonchus asper</i>	Spiny sow- thistle	Leaves	[119]
18	<i>Sonchus oleraceus</i>	Milk thistle, sow thistle or smooth sow thistle	Whole plant	[110]
19	<i>Sphaeranthus indicus</i>	East Indian global thistle	Leaves l	[120]
20	<i>Tagetes erecta</i>	Marigold	Leaves	[115]
21	<i>Tagetes patula</i>	Genda	Leaf, root	[99]
22	<i>Venidium arctotooides</i>	Bittergousblom, bitterblom	Leaves	[110]

Table 5: Medicinal plants used as an immunity booster.

Sl. No.	Botanical name	Vernacular name	Plant part used	References
1	<i>Bidens pilosa</i>	Black fellows	Whole plant	[121]
2	<i>Cristium arbense</i>	Thistle, field thistle	Root	[122]
3	<i>Echinacea sp.</i>	Purple coneflower	Petals	[123]
4	<i>Eclipta prostrata</i>	Bhringaraj, white head	Whole plant	[121]
5	<i>Erigeron annuus</i>	Annual fleabane, daisy fleabane	Flowers	[124]
6	<i>Sonchus asper</i>	Prickly sow-thistle spiny sow-thistle	Leaves	[119]
7	<i>Tagetes minuta</i>	Common marigold	Leaves	[125]
8	<i>Tridax procumbens Linn</i>	Bhringaraj	Leaves	[126]

Table 6: Medicinal plants used as urogenital problems.

Sl. No.	Botanical name	Vernacular name	Plant part used	References
1	<i>Artemisia herba-alba</i>	White wormwood	Leaves and flowers	[127]
2	<i>Artemisia nilagirica</i>	Indian wormwood	Leaf and stem oil	[128]
3	<i>Blumea laciniata</i>	Cutleaf Blumea, cutleaf false oxtongue	Whole plant (shrub)	[129]
4	<i>Blumea mollis</i>	Soft blumea	Whole plant	[130]
5	<i>Blumea oxyodonta</i>	Spiny leaves of Blumea	Leaf	[131]
6	<i>Calendula officinalis</i>	Scotch marigold	Leaves, flowers	[102]
7	<i>Eclipta alba</i>	False daisy	Leaves and flowers	[132]
8	<i>Eupatorium cannabinum</i>	Holy rope	Leaves and roots	[133]
9	<i>Lactuca sativa</i>	Lettuce, garden lettuce	Leaf, stem	[134]
10	<i>Sphaeranthus indicus</i>	East Indian global thistle	Whole plant (herb)	[120]
11	<i>Traxacum officinale</i>	Pitachumki, dandelion	Aerial parts, roots	[102]
12	<i>Xanthium strumarium</i>	cocklebur	root	[135]

Table 7: Medicinal plants used for cardiovascular disease.

Sl. No.	Botanical name	Vernacular name	Plant part used	References
1	<i>Ageratum conyzoids</i>	Billy goat weed	Root	[129]
2	<i>Artemisia absinthium</i>	Wormwood	Aerial part	[136]
3	<i>Artemisia campestris L.</i>	Field wormwood	Aerial part (leaves, stalk and stem)	[137]
4	<i>Bidens Pilosa L.</i>	Spanish needles, beggar's ticks, devil's needles	Leaf	[136]
5	<i>Blumea laciniata</i>	Cutleafblumea, cutleaf false oxtongue	Herb	[129]
6	<i>Chamaemelum nobile (L)</i>	Chamomile	Whole plant	[138]
7	<i>Cynara scolymus L.</i>	Global artichoke	Leaf	[139]
8	<i>Gundelia tournetorti L.</i>	Kuub	Seeds	[140]
9	<i>Inula cappa DC</i>	Sheep's ear	Whole plant (Shrub)	[129]

10	<i>Laumaea intybacea</i>	Lettuce	Whole plant	[136]
11	<i>Sonchus wightianus</i>	Wight's sow-thistle	Root	[129]
12	<i>Stevia rebaudiana (Bert.) bertonii</i>	Sweet leaf, sugar plant	Leaf stem	[99]
13	<i>Tridax procumbens L.</i>	Ghamra or coat buttons	Leaves	[136]

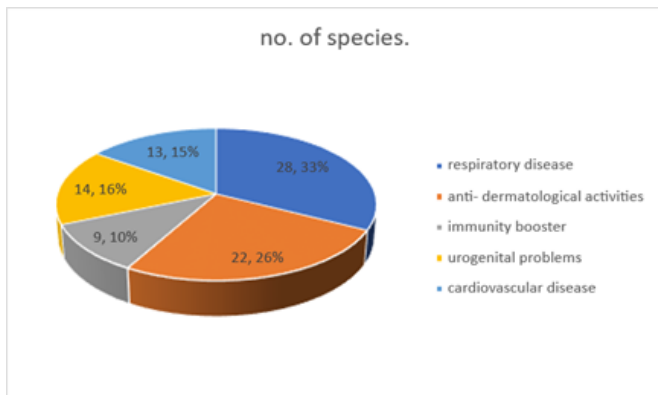


Figure 1 (a): Diagram (a) shows the number of species used to treat different diseases.

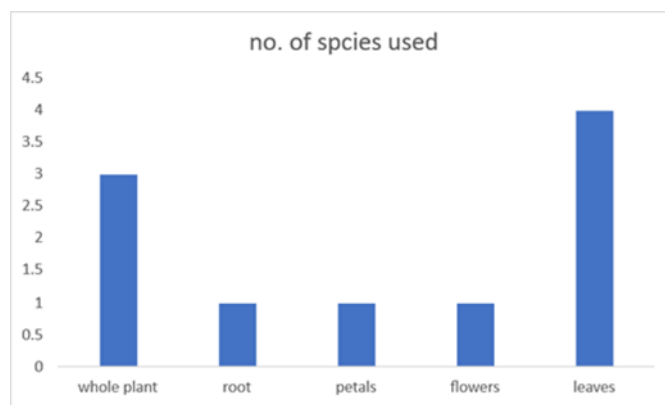


Figure 1(d): Diagram (d) shows the number of plant parts used to treat the immunity booster disease.

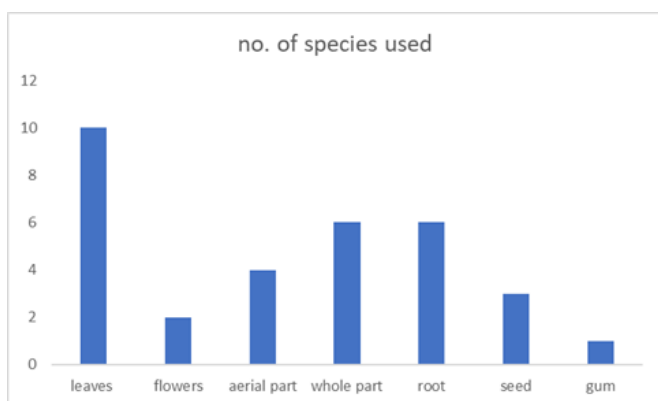


Figure 1 (b): Diagram (b) shows the number of plant parts used to treat respiratory disease.

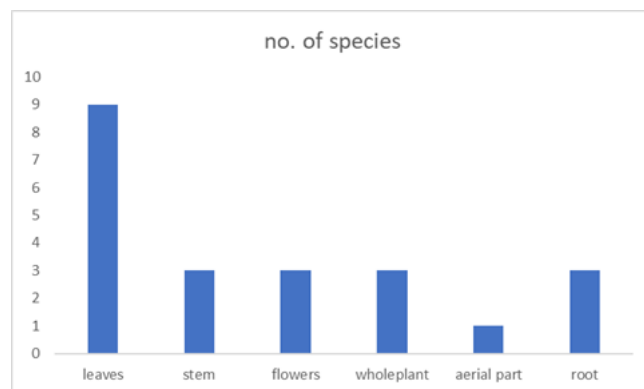


Figure 1 (e): Diagram (e) shows the number of plant parts used to treat Urogenital disease.

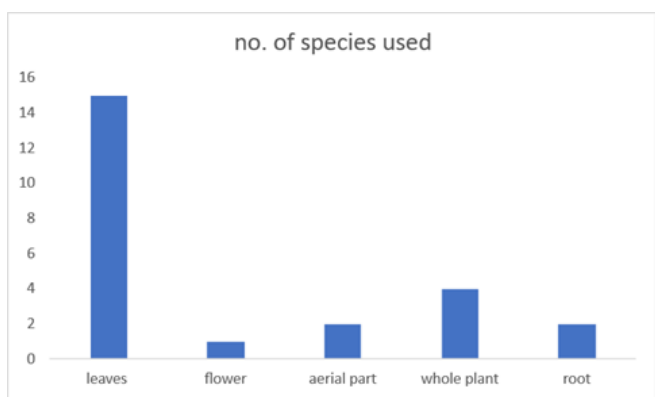


Figure 1 (c): Diagram (c) shows the number of plant parts used to treat anti-dermatological activities

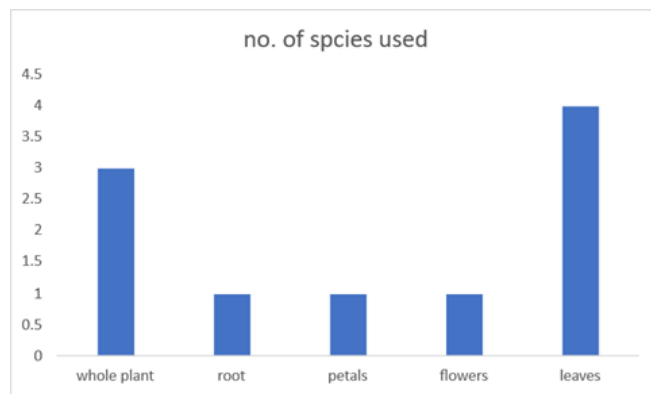


Figure 1 (f): Diagram (f) shows the number of plant parts used to treat cardiovascular diseases.

4. Conclusion

Various plant species belonging to the Asteraceae family show a lot of promise for their botanical, chemical, nutritional, and medicinal properties. The review study shows these plants have long been used in traditional medicine for a range of health issues and have various important medicinal activities. There is a great need for more research to explore its additional healing benefits and the ways it works. These plants could be an important source for herbal medications in the pharmaceutical sector down the line.

Conflict of Interest

The authors declare that there is no conflict of interest.

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