

Comparative evaluation of standardisation parameters between *Wedelia* genus species

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Abstract

Genus *Wedelia* belonging to family Asteraceae has great importance in Ayurvedic, Sidhha and Unani etc. traditional medicinal systems. In the recent past, number of attempts has been made to compare and evaluate the different species of plants belonging to the same genus. The use of the plants, plant extracts and pure compounds isolated from natural sources has always provided a foundation for modern pharmaceutical research. In present article comparative study between *Wedelia biflora* and *Wedelia chinensis* has been made for parameters like ash content, soluble extracts, moisture content, pH, toxic heavy metals, pesticide residue and microbial load etc.

Keywords: Asteraceae, *Wedelia biflora*, *Wedelia chinensis*, Ayurvedic drugs, Standardisation.

Introduction

Wedelia chinensis Merrill. (Syn. *Wedelia calendulaceae*) (Asteraceae) is a small, highly branched annual herb, commonly known as “Pilabhamgara” or “Bhringraj” in Hindi and is a reputed herb of Ayurveda, Sidhha and Unani system of medicine^[1]. This is a perennial herb, with light camphor like odour. It grows in wet places. Leaves are used in cough and cephalgia. Plants are the source for semisynthetic and traditional herbal medicines which are still used in the primary health care system in some parts of the world. The past decade has seen considerable change in opinion regarding ethno-pharmacological therapeutic applications. The presence of various active constituents in plants has urged scientists to examine these plants with a view to determine potential wound healing properties.

The herb contains wedelolactone and demethyl wedelolactone (Coumestans derivatives) possessing potent anti-hepatotoxic activity and is incorporated as a major ingredient in a number of potent anti-hepatotoxic phyto-pharmaceuticals formulations. It is useful in the treatment of osteoporosis of knee and also possesses anti-inflammatory activity^[2-3]. It contains large amount of phenolic constituents which generally show anti-inflammatory activity so, its wound healing activity has also been studied in details^[4]. In several rural areas, extracts of dries leaves of these plants is applied to wounds as they have wound healing property. The fresh juice from the leaves of *Wedelia chinensis* has been used by Ayurvedic physicians in India for external use to treat skin problems, dermatitis, eczema and acne^[5].

This herb is said to possess properties similar to those of *Eclipta alba*. The leaves are used for dyeing grey hair and for promoting their growth; their juice is used for tattooing, the colour produced being a deep indelible blue black. The root is pounded and used as a black dye with salts of Iron. The leaves are regarded as tonic. These are useful in cough, cephalgia and diseases of the skin especially alopecia. Whole plant is used to cure Jaundice. A decoction of the herb is used in uterine haemorrhage and menorrhagia. An ethanolic extract (5%) of the plant inhibits the growth of Ehrlich's ascites carcinoma cell lines. It is also found to affect the central nervous system^[6].

These Plants contain glycosides, reducing sugars, the expressed fatty oil. This oil contains black dye, tannin, carotene, chlorophyll, saponin, phytosterol, waxy compound, resin. The leaves contain isoflavonoids and wedelolactone, the latter is the lactone of 5,6 -dihydroxy-2- (2,6- dihydroxy-4-methoxyphenyl) benzofuran -3- carboxylic acid and is analogous in structure to coumestrol, an estrogen from clover, triterpenoid saponin chikusettin, isoflavonoids, normedelo lactone and wedelo lactone. These plants show rooting at nodes. Leaves are opposite, sub sessile, lanceolate-oblong, entire or irregularity Crenate, Serrate. Heads are solitary, bright yellow, oblong, axillary peduncles, Achenes acute, pubescent.

Wedelia biflora Linn. DC. is a rambling, perennial, climbing shrubs, found near the eastern and western sea-coasts of Andaman. Stems are semi- woody; leaves are ovate, serrate. The young leaves are used as a flavouring agent in food preparations. The pounded leaves are used for preparing a poultice for cuts, ulcers, sores and varicose veins. A decoction of the roots and leaves is prescribed for stomach-ache. The leaves are also credited with diuretic properties. The flowers are violently purgative. The leaves and stems are said to be toxic to goats^[7-8]. The leaves contain a fair amount of protein, but have a high content of fibre. They also contain alkaloids. The aqueous extract of the leaves and stems is toxic to American cockroaches^[9-11].

Materials

Plant material

The whole plant samples of *Wedelia biflora* Linn. and *Wedelia chinensis* Linn were collected in December, 2009 from National Institute of Ayurvedic Pharmaceutical Research, Patiala. Samples were washed in running water and air-dried. The powdered samples were then studied for physiochemical evaluation.

Results and Discussions

Whole plant samples of the *Wedelia biflora* Linn. and *Wedelia chinensis* Linn were collected and analyzed the various standardisation parameters. Preliminary phytochemical results showed the presence or absence of certain phytochemicals in the plant samples. The tests performed using various test methods and extracts. Phytochemical test revealed the presence of quinone, coumarin, flavone, steroid, glycosides, terpenoid, tannin and alkaloid results are given in Table1.

Table 1. Preliminary phytochemical test of *Wedelia biflora* Linn. and *Wedelia chinensis* Linn.

S. No.	Natural product	Test performed	<i>Wedelia biflora</i> Linn.	<i>Wedelia chinensis</i> Linn.
1.	Alkaloid	Mayer's test Dragendorff's test Wagner's test Hager's test	+ve	+ve
2.	Coumarin	Alkaline test	+ve	+ve
3.	Flavone	Shinoda test	+ve	+ve
4.	Steroid	Liebermann-Burchard reagent	+ve	+ve
5.	Tannin	Neutral FeCl ₃	+ve	+ve
6.	Glycoside/Sugar	Molisch's test	+ve	+ve
7.	Terpenoid	Noller's test	+ve	+ve
8.	Saponin	NaOH solution	+ve	+ve

The presence of heavy metals namely Arsenic, Mercury, Cadmium and Lead was analyzed in the sample. The concentration of all the heavy metals was found below the WHO permissible limits^[12-13]. Aflatoxin, organochlorine pesticide residues, organophosphorous pesticides, Pyrethroids and microbial contamination were not detected in the samples.

Physio-chemical parameters of the samples are shown in Table 2. The pH value of *Wedelia biflora* and *Wedelia chinensis* was found to be 6.9 and 6.10 respectively. Deterioration time of the plant material depends upon the amount of water present in plant material. If the water content is high, the plant can easily be deteriorated due to fungal contamination. The loss on drying at 105°C in samples was found to be 13.69% for *Wedelia biflora* and 12.63% and *Wedelia chinensis*. Analytical results showed total ash value content were 14.14% *Wedelia biflora* and 12.45% for *Wedelia chinensis*. The water-soluble extractive value of *Wedelia biflora* and *Wedelia chinensis* was found to be 17.96 and 21.73 respectively.

Table 2: Physico-chemical parameters of *Wedelia biflora* Linn. and *Wedelia chinesis* Linn.

S.No.	Parameters	<i>Wedelia biflora</i> Linn.	<i>Wedelia chinesis</i> Linn.
1.	pH (10% w/v aqueous solution)	6.90	6.10
2.	Total Ash (w/w %)	14.14	12.45
3.	Acid insoluble ash (w/w %)	1.86	3.25
4.	Loss on drying at 105°C (w/w %)	13.69	12.63
5.	Water soluble extractive (w/w %)	17.96	21.73
6.	Alcohol soluble extractive (w/w %)	4.61	5.92
7.	Heavy metals		
	Mercury	Below permissible limit	Below permissible limit
	Lead	Below permissible limit	Below permissible limit
	Cadmium	Below permissible limit	Below permissible limit
	Arsenic	Below permissible limit	Below permissible limit
8.	Microbial contamination		
	Test for E.coli/g	Absent	Absent
	Test for Salemonella/g	Absent	Absent
	Test for S. aureus/g	Absent	Absent
	Test for P. aeruginosa/g	Absent	Absent
	Total viable count/g	Absent	Absent
	Total fungal count/g	Absent	Absent
	Total enterobacteriaceae/g	Absent	Absent

Conclusion

The present study revealed different physicochemical parameters which can be used for authentication of the crude samples. This study revealed that both the species have the same constituents as they gave the positive identification tests. The variation in the values of physic -chemical parameters indicated the difference in content and presence of some other constituents. The samples exhibited a set of diagnostic characters, which will help to identify the drug in dried condition.

It has been concluded from this study that estimation of heavy metals and pesticides residue, aflatoxin and microbial contamination is highly essential for raw drugs or plant parts used for the preparation of compound formulation drugs. The periodic assessment is essential for quality assurance and safer use of herbal drugs.

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