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Investigation of phytochemical constituents from *Ageratum conyzoides* and *Bidens pilosa*

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Abstract

The samples investigated were screened for alkaloids, flavonoids, aurone, chalcone, flavone, flavone, flavonol, leucoanthocyanins, glycosides, HCN, saponins, tannins, phenols, steroids, coumarins, chromenes, terpenoids, and cardenolides. Phytochemicals act in numerous ways to assist the body in combating diseases and health problems. They combined with some biomolecules to neutralize activity of scavenging free radicals before they can cause damage within the body. The consumption of phytochemicals enhances reduction in the emergence of degenerating diseases. The antimicrobial activity of *Ageratum conyzoides* and *Bidens pilosa* leaves could be due to the abundant presence of alkaloids and flavonoids. Other flavonoid constituents such as aurone, chalcone, flavonoids, flavone, flavonol and leucoanthocyanin detected in the investigated parts of *Ageratum conyzoides* and *Bidens pilosa* in the present study may have aided the antibacterial activity of the plant. Tannins have astringent properties, hasten the healing of wounds and inflamed mucous membrane. Studies have shown that saponins although nontoxic, can generate adverse physiological responses in animals that consume them. They exhibit cytotoxic effect and the growth inhibition against a variety of cell making them have anti-inflammatory and anticancer properties.

Keywords: Phytochemical, *Ageratum conyzoides* and *Bidens pilosa*, leaf, stem, root and flower

Introduction

Phytochemical studies have attracted the attention of plant scientists due to the development of new and sophisticated techniques. These techniques played a significant role in giving the solution to systematic problems on the one hand and in the search for additional resources of raw materials for pharmaceutical industry on the other hand. Plant synthesizes a wide variety of chemical compounds, which can be sorted by their chemical class, bio synthetic origin and functional groups into primary & secondary metabolites. Knowledge of the chemical constituents of plants is desirable, not only for the discovery of therapeutic agents, but also because such information be of value in disclosing new resources of such chemical substances (Mojab *et al.* 2003) [1].

Among the 120 active compounds currently isolated from the higher plants are widely used in modern medicine, today 80 percent show a positive correlation between their modern therapeutic use and the traditional use of the plants from which they are derived (Fabricant, 2001) [2]. The phytochemical interaction and trace components may alter the drug response in ways that cannot currently be replicated with a combination of few purative active ingredients. Pharmaceutical researchers recognize the concept of drug synergism but note that clinical trails may be used to investigate the efficacy of a particular herbal preparation, provided the formulation of that herb is consistent (Izhaki, 2002) [3].

There is evidence that using some alternative medicines especially those evolving herbs, metals, minerals or other materials involves potentially serious risks including toxicity (Panchabhai and Kulkurani, 2008) [4]. With the development of natural product chemistry, the potential of chemotaxonomy is now being increasingly obvious. The application of chemical data to systematics has received serious attention of a large number of biochemists & botanists (Sharanabasappa *et al.* 2007) [5]. The screening of plant extracts of plant products for antimicrobial activity has shown that higher plants represent a potential source of novel antibiotic prototypes (Afolayan, 2003) [6]. Hence during the present investigations phytochemical screening of *Ageratum conyzoids* and *Bidens pilosa* of Rewa city is carried on with a view to analyse the presence of chemical constituents that included primary &

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secondary metabolites, with a view to recommend their application in pharmaceutical industry.

Material and Methods

In the present study *Ageratum conyzoides* and *Bidens pilosa* plants are selected. Both are members of the family Asteraceae.

Ageratum conyzoides and *Bidens pilosa* are a common weed of gardens, cultivated fields and waste lands. The plants are grown in open, partial shaded and dens shaded places, both in grazed and ungrazed areas. Both species are also reported on disturbed grounds such as cleared areas in forest, uncultivated fields, path and road sides etc. Identification of the plants was done with the help of various floras.

The commonly employed technique for removal of active substances from crude drug is called extraction. It involves the use of different solvents. 100 gms. of the shade dried plant material is extracted in "Soxhlet Extraction Apparatus" successively with 500 ml. of each of the following solvents – P. ether, Benzene, Chloroform, Acetone & Ethanol (95%) each time before extracting with next solvent, the plant material is dried. Finally, the drug plant is macerated with water for 24 hrs to obtain the aqueous extract (Kokate 2001, 2005) [7-8]. Each extract is concentrated by distilling off the solvent. The extract obtained with each solvent is weighed and its percentage is calculated in term of the shade dried weight of the plant material. The colour and consistency of each extract is noted.

Results and Discussion

The phytochemical constituents present in following tables 1-2.

Table 1: Phytochemical screening of leaf, stem, root and flower of *Ageratum conyzoides*

Phytochemical	Leaf	Stem	Root	Flower
Alkaloids	+++	+	+	+
Flavonoids	+++	++	+	++
Aurone	++	-	+	+
Chalcone	+	+	+	+
Flavonol	+	-	-	+
Flavone	+	-	-	-
Leucoanthocyanin	+	-	-	-
Tannins	+++	++	+	++
Saponins	++	+	+	+
HCN	+	+	+	+
Glycosides	+	+	+	+
Steroids	+	+	-	+
Cumarins	+	+	-	+
Charomones	+	+	-	+
Terpenoids	+	+	-	+
Resins	+	+	+	-
Cardenolides	+	+	+	+
Phenol	++	+	+	+

Key; +++ = Present in high concentration

++ = Present in moderate concentration

+ = Present in low concentration

- = Absent

HCN= Cyanic acid

Table 2: Phytochemical screening of leaf, stem, root and flower of *Bidens pilosa*

Phytochemical	Leaf	Stem	Root	Flower
Alkaloids	+	-	-	+
Flavonoids	++	++	+	+
Aurone	++	-	-	+
Chalcone	+	+	+	+
Flavonol	+	-	-	++
Flavone	+	+	-	-
Leucoanthocyanin	+	-	-	+
Tannins	+++	++	+	++
Saponins	++	+	+	+
HCN	+	+	-	+
Glycosides	+	+	+	+
Steroids	+	-	-	-
Cumarins	+	+	-	+
Charomones	++	+	-	+
Terpenoids	++	+	-	+
Resins	+	+	+	-
Cardenolides	+	+	+	+
Phenol	++	+	+	+

Key; +++ = Present in high concentration

++ = Present in moderate concentration

+ = Present in low concentration

- = Absent

HCN= Cyanic acid

Phytochemicals (Table 1 & 2) screening revealed the presence of alkaloids, flavonoids, tannins, saponins, and cyanic acid (HCN) in the investigated parts of *Ageratum conyzoides* and *Bidens pilosa*. Pure isolated alkaloids and their synthetic derivatives have been used as analgesic, antispasmodic and bactericidal agent. Flavonoids have shown antibacterial, anti-inflammatory, antiallergic, anti-mutagenic, and antiviral, anti-thrombotic and vasodilatory activity. They also have the ability to scavenge hydroxyl radicals, super oxide anions and lipid peroxy radicals. They also show tumour inhibiting activity in animals. The presence of tannins and saponins in the present study could be attributed to the use of *Ageratum conyzoides* in treating wounds, prevention of blood loss. The glycosides and Cyanic acid content of plant is important due to their adverse effect on the respiratory chain, both compounds are low in the investigated samples in this study. Steroidal compounds are important in pharmacy due to their relationship with sex hormones. The presence of phenol in the investigated samples studied indicates that the plant *Ageratum conyzoides* can be used as an anti-microbial agent. Likewise the *Bidens pilosa* can also used in skin diseases. This is because phenol and phenolic compounds have been extensively used in disinfection. Resins are effective against skin abrasion, coumarins play important role as blood anti-coagulants, terpenes fight malaria and cancer. Where as chromones and cardenolides also found in the investigated parts of *Ageratum conyzoides* and *Bidens pilosa* are important phytochemicals and may have added to the medicinal value of the plant.

Phytochemicals act in numerous ways to assist the body in combating diseases and health problems. They combine with some biomolecules to neutralize activity of scavenging free radicals before they can cause damage within the body

Okaka and Okaka (2001)^[9]. Phytochemicals (Tables 1 & 2) screening revealed the presence of alkaloids, flavonoids, tannins, saponins, and cyanic acid (HCN) in the investigated parts of *Ageratum conyzoides* & *Bidens pilosa*. Flavonoids according to (Alan and Miller, 1996)^[10] have shown antibacterial, anti-inflammatory, antiallergic, anti-mutagenic, and antiviral, anti-thrombotic and vasodilatory activity. They also have the ability to scavenge hydroxyl radicals, super oxide anions and lipid peroxy radicals (Alan and Miller, 1996, Okwu, 2004)^[10-11]. The antimicrobial activity of *Ageratum conyzoides* & *Bidens pilosa* leaf could be due to the abundant presence of alkaloids and flavonoids. Other flavonoid constituents such as aurone, chalcone, flavonoids, flavone, flavonol and leucoanthocyanin detected in the investigated parts of *Ageratum conyzoides* & *Bidens pilosa* in the present study may have aided the antibacterial activity of the plant. Tannins have astringent properties, hasten the healing of wounds and inflamed mucous membrane (Okwu and Okwu, 2004)^[12]. Studies have shown that saponins although nontoxic, can generate adverse physiological responses in animals that consume them. They exhibit cytotoxic effect and the growth inhibition against a variety of cell making them have anti-inflammatory and anticancer properties. The presence of phenol in the investigated samples studied indicates that the plant *Ageratum conyzoides* & *Bidens pilosa* can be used as an anti-microbial agent.

Conclusion

The present study has shown that chemical profiles of parts of *A. conyzoides* and *Bidens pilosa* studied contains phytochemicals, macronutrients and aminoacids. These compounds could be behind the medicinal properties of *A. conyzoides* and *Bidens pilosa* explored in traditional medicine. Phytochemicals (Tables 1 & 2) screening revealed the presence of alkaloids, flavonoids, tannins, saponins, and cyanic acid (HCN) in the investigated parts of *Ageratum conyzoides* & *Bidens pilosa*.

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