

INVESTIGATION OF BIOACTIVE CHEMICAL CONSTITUENTS OF *AGERATUM CONYZOIDES* LEAVES EXTRACT

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ABSTRACT

GC-MS chromatogram analysis of the Methanolic extract of *Ageratum conyzoides* Fig-1 showed 40 peaks which indicating the presence of various phytochemical constituents. On comparison of the mass spectra of the constituents with the NIST 11 & WILEY 8 libraries. some major chemical constituents listed below with their nature and biological applications. The various phytoconstituents which contribute to the medicinal activities like antimicrobial, antifungal, antioxidants. Anticancer, Anti-inflammatory, antipyretic and analgesic

Keyword:- Phytochemicals, Bioactive, Extraction etc.

INTRODUCTION-

Ageratum conyzoides belongs to family Asteraceae .The genus *Ageratum* is derived from the Greek words 'ageras' meaning non-aging which refers to long life-time of plant and the species epithet 'konyz' is the Greek name of *Inula helenium* which resembles the plant. *Ageratum conyzoides* Linn. (Family Asteraceae, Tribe Eupatorieae) is an annual herb with a long history of traditional medicinal use in the tropical and sub-tropical region of the world, commonly known as Billy goat weeds. The stems and leaves are covered with fine white hairs; the leaves are ovate and up to 7.5 cm long. The flowers are purple to white. The plant grows commonly in the proximity of habitation, thrives in any garden soil and is very common in waste places and on ruined sites. Throughout most common and abundant, especially in wetter situation and shade. (Dhore MA, 1986). It has a peculiar odor likened in Australia to that of a male goat and hence its name 'goat weed' or ' billy goat weed'. The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents (Nostro A et al, 2000). Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defense mechanism and protect from various diseases. Phytochemicals are primary and secondary compounds. Chlorophyll, proteins and common sugars are included in primary constituents and secondary compounds have terpenoid, alkaloids and phenolic compounds (Krishnaiah D et al ,2007). Terpenoids exhibit various important pharmacological activities i.e., anti-inflammatory, anticancer, anti-malarial, inhibition of cholesterol synthesis, anti-viral and anti-bacterial activities (Mahato SB & Sen S, 1997). Terpenoids are very important in attracting useful mites and consume the herbivorous insects (Kappers IF et al ,2005). Alkaloids are used as anaesthetic agents and are found in medicinal Plants (Hérouart D et al ,1988). The fresh leaves of *Ageratum conyzoides* are rubbed between both palms until well macerated; the juice is squeezed into the wound and covered by a leaf. Dressing this is generally done once a day and the process of healing is said to be enhanced.

MATERIAL AND METHOD

Collection of plant material

The fresh leaves of *Ageratum conyzoides* plant were collected from Melghat region Dist-Amravati (Maharashtra) The experimental site is located between coordinates 20.91° N, 77.75°E and an altitude of 342 m in foothills of Central India experiencing the subtropical climate during winter season in the month Feb 2016 and the Authentication of plant was confirmed by botanist (Dr.S.K Tippat, Department of Environment Science, Art, Commerce & Science College Amravati).

Preparation of plant extract

The plant were dried over ambient temperature and the dried sample were grind properly and dried powder sample was extracted in Methanol at 65°C, by using soxhlet apparatus and extracts were concentrated by gradually evaporating the respective solvent on rotary evaporator . The concentrated extract was collected in sterile bottles and kept in a cool and dark place prior to analysis. (U.S.Khandekar et al 2015)

PHYTOCHEMICAL ANALYSIS

Phytochemical investigation reveals the presence of various phytochemicals which are having antibacterial, antioxidant activities. The important phytochemicals found in leaf extracts are alkaloid, terpenoids, phytosterols, cumarine and glycosides. These were further investigated by GC MS analysis.(Harborne et al 1973, Sofowara et al, Sazada et al.)

GAS CHROMATOGRAPHY AND MASS SPECTROSCOPY

Shimadzu GC-MS benchtop double-focusing magnetic sector mass spectrometer operating in electron ionization (EI) mode with TSS-2000 software was used for all analyses. Low-resolution mass spectra were acquired at a resolving power of 1000 (20% height definition) and scanning from m/z 25 to m/z 700 at 0.3 seconds per scan with a 0.2 second inter-scan delay. High resolution mass spectra were acquired at a resolving power of 5000 (20% height definition) and scanning the magnet from m/z 65 to m/z 750 at 1 second per scan. Identification of the chemical constituents was done on the basis of retention index (RI) using a mass spectra library search NIST 11& WILEY 8 and by com-paring the mass spectral and retention data with literature. The relative amounts of individual components were calculated based on the GC peak area (FID response) without using a correction factor.

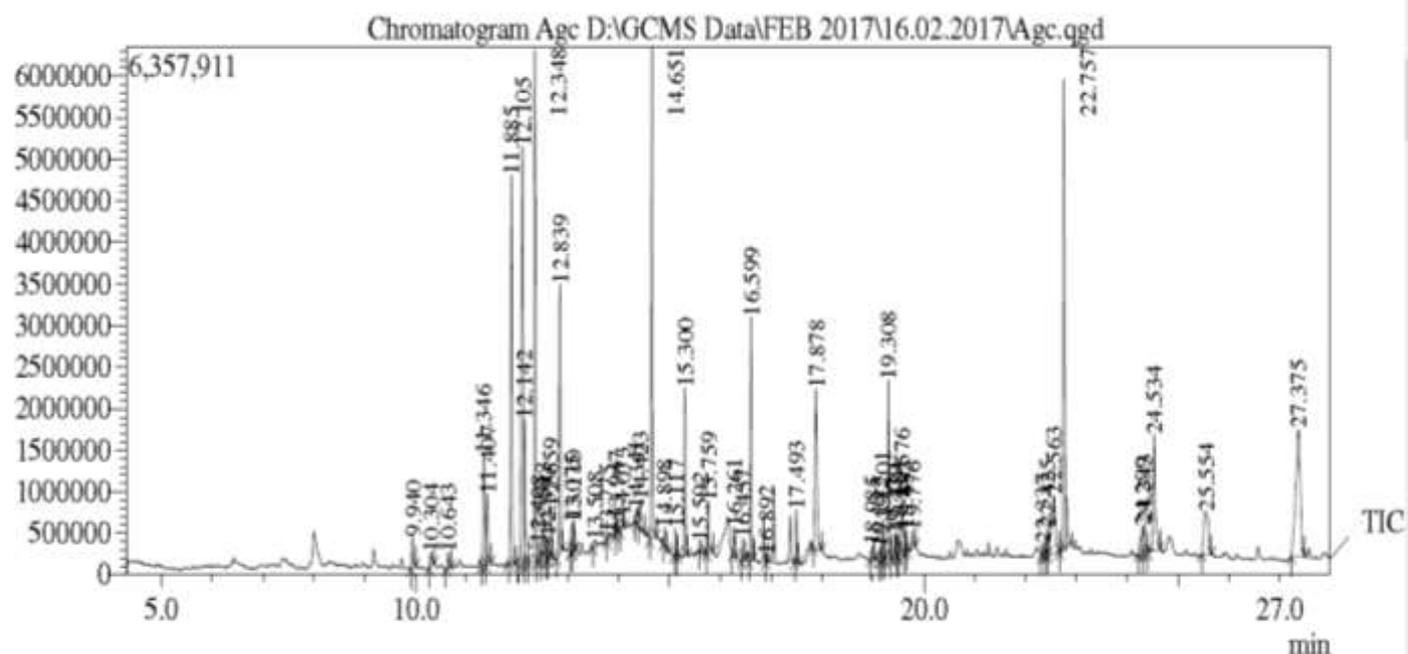


Fig 1. GC MS of Methanolic extract of leaves of *Ageratum conyzoides*

Some major bioactive chemical constituents are listed below with their nature and biological applications. The various phytoconstituents which contribute to the medicinal activities like antimicrobial, antifungal, antioxidants. Anticancer, Anti-inflammatory, antipyretic and analgesic are given below.

Table 1. Major Constituents tentatively identified by GC-MS analysis of *Ageratum conyzoides* leaves

S.N	R.T	Peak Area %	Name of the Compound	Molecular formula	M.W	Nature of Compound	Biological applications
1	11.34	2.60	Methyl 3-(2-hydroxyphenyl) propionate	C ₁₀ H ₁₂ O ₃	180.20	Propionic, alcoholic	Antiasthmatic, antipuritic
2	11.40	1.34	GAMMA-MUROLEN	C ₁₅ H ₂₄	204.35	Enzyme	Anticancer
3	11.88	6.78	(-)-BETA-CARYOPHYLLEN	C ₁₅ H ₂₄	204.35	Bicyclic sesquiterpene	Anti-inflammatory, antipyretic, analgesic
4	12.15	9.99	CHROMEN-2-ONE	C ₉ H ₆ O ₂	146.14	benzopyran	Antidiabetic
5	12.14	3.06	cis-.beta.-Farnesene	C ₁₅ H ₂₄	204.35	Olefin, alcoholic, hydrophobic	Antimicrobial
6	12.34	9.63	Precocene I	C ₁₂ H ₁₄ O ₂	190.23	benzopyran	Insecticides
7	14.65	8.56	Precocene II	C ₁₃ H ₁₆ O ₃	220.26	Phenolic alcohol	Insecticidal reagent
8	15.30	2.40	EVODINNOL	C ₁₄ H ₁₆ O ₄	248.27	Benzopyran ketone	Anticancer
9	15.75	1.12	TETRADECANOIC ACID	C ₁₄ H ₂₈ O ₂	228.37	fatty acid	Microbial biosurfactants
10	16.59	3.37	(E)-PHYTOL	C ₂₀ H ₄₀ O	296.54	Acrylic diterpene alcohol	Antioxidant, anti-inflammatory
11	17.87	4.02	HEXADECANOC ACID	C ₁₆ H ₃₂ O ₂	256.42	Palamitic acid ester	Antioxidant Pesticides
12	19.30	2.68	PHYTOL ISOMER	C ₂₀ H ₄₀ O	296.54	Alcoholic	Antimicrobial antidiabetic, anticancer

* Source: Dr.Duke's phytochemical and ethno botanical databases [Online database].

CONCLUSION

The study reveals the presence of Various phytoconstituents which contribute to the medicinal activities like antimicrobial, antifungal, antioxidants. Anticancer, Anti-inflammatory, antipyretic and analgesic. The presence of various bioactive compounds in the *Ageratum conyzoides* justifies the use of whole plant for various ailments by traditional practitioners. The species is believed to possess various biological activities due to presence of various phytochemical contents. It offers many opportunities to investigate the various functions and prospects in pharmaceutical studies. The pharmacological properties of *Ageratum conyzoides* seem to have been determined; the mechanism of these principles is still unknown. The bioassay guided for isolation and identification of the bioactive components are still needed and detailed researches are also required to reveal the structure activity relationship of these active constituents.

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REFERANCES

- [1] Dhore MA. Flora of Amravati district with special reference to the distribution of tree species. Ph.D. Thesis, Amravati University, Amravati, 1986:144-145
- [2] Nostro A, Germanò MP, D'angelo V, Marino A, Cannatelli MA (2000) Extraction methods and bioautography for evaluation of medicinal plant antimicrobial activity. Lett Appl Microbiol 30: 379-384.
- [3] Krishnaiah D, Sarbatly R, Bono A (2007) Phytochemical antioxidants for health and medicine: A move towards nature. Biotechnol Mol Biol Rev 1: 97-104.
- [4] Mahato SB, Sen S (1997) Advances in triterpenoid research, 1990-1994. Phytochemistry 44: 1185-1236.
- [5] Kappers IF, Aharoni A, van Herpen TW, Luckerhoff LL, Dicke M, et al. (2005) Genetic engineering of terpenoid metabolism attracts bodyguards to Arabidopsis. Science 309: 2070-2072.
- [6] Hérouart D, Sangwan RS, Fliniaux MA, Sangwan-Norreel BS (1988) Variations in the Leaf Alkaloid Content of Androgenic Diploid Plants of *Datura innoxia*. Planta Med 54: 14-17.
- [7] U.S.Khandekar, S.K.Tippat, et al. chemical composition and pharmacognestic study of crude plant extract of *Vernonia elaeagnifolia*, International Journal of Pharma and Bio Sciences. Int J Pharm Bio Sci 2015 ; 6(3): (B) 7 – 15, 2015.
- [8] Harborne IB. Phytochemical methods: A guide to modern techniques of plant analysis. Edn 2, Chapman and Hall, New York, 88-185, 1973. Trease, GE and Evans WC. A textbook of Pharmacognosy. Edn 13, Balliere Tindall. Ltd, London, 115-222, 1989.
- [9] Sofowara A. Medicinal Plants and Traditional Medicine in Africa. Spectrum Books Ltd., Ibadan, Nigeria, 289-300, 1993.
- [10] W.C Evans, G.E Trease, Texebook of Pharmacognosy. 11th ed. Macmillian Publishers. Brailliar Tiridel Canada 1989.
- [11] Sazada S, Verma A, Rather AA, Jabeen F and Meghvansi MK. Preliminary phytochemicals analysis of some important medicinal and aromatic plants. Adv. In Biol. Res; 3:188-195, 2009.