



Isolation of chemical compounds from leaves extract of *Crateva nurvala* (Buch.-Ham.) in Ethyl acetate by GC-MS

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Abstract

The *Crateva nurvala* (Buch.-Ham.) is species of tropical tree belong to Capparaceae family, native to the Indian subcontinent. The local name is “Varun” or “Vayvarna”. It occurred near the old temples as a sacred plant in Maharashtra, India. Different plant parts are used in folk medicine by herbal healers. Basically the plant Leaves are used to treat Kidney stone. To evaluate different medicinal property, secondary metabolite as well as compound identification, the GC-MS is very useful. The identification of chemical compound is based on peak area, retention time, molecular weight and molecular formula. Chloroform extract of The *Crateva nurvala* (Buch.-Ham.) leaves analyzed by GC-MS shows the presence of compound like Ethyl acetate extract revealed the existence of 2-Pentadecanone, 6,10,14-trimethylo, Pentafluoropropionic acid octadecyl ester, 17-Pentatriacontene, 2-Piperidinone n-[4-bromo-n-butyl]-, Behenyl chloride Beta,.Beta.-Carotene, 5,6-dihydro-5,6-dihydroxy, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol.

Key words:- The *Crateva nurvala* (Buch.-Ham.) Vayvarna, Melghat, Maharashtra, GC-MS.

INTRODUCTION

The medicinal plants always provides new compounds like antifungal, antibiotic, analgesic, alkaloids, cardiac glycosides, quinines, phenols, tannins and flavonoids have particular biological activity (Uddin, *et al.*,2017). The leaves of *Crateva nurvala* (Buch.-Ham.) extensively used in tribal medicine and Ayurveda in South Asian countries to treat rheumatic fever, ulcers, hemorrhoids, tumors gastric troubles etc. The plant is a medium sized, deciduous tree. This plant is a medium-sized, deciduous tree having much branched head. Leaves being three-foliated with petioles bear leaflets which are ovate, entire, lanceolate/obovate, acute acuminate, and reticulately veined, the lateral leaflets with petiole long. The bark is generally width with a thickness. The bark outer side is rough and appears gray to grayish brown whereas the inner side is suave and whitish brown to pale in appearance. Flowers may be whitish cream, pale yellow, or reddish yellow colored, appearing either just before or with the leaves. Fruits are spherical, hard, slim, or scaly berry. Fruits have multiple reniform seeds which are implanted in the yellow and fleshy pulp of the fruit.

The local name is “Barun” or “Vayvarna”. Different parts of this plant are used in folk medicine by tribals. It is one of the best litholitic tree and has been used throughout the ages for the treatment of urolithiasis and crystalluria (Khattar and Wal, 2012). The plant has various synonyms like Ashmarighana- Litholytic. Maharsi Susruta has mentioned varuna as a litholitic agents in treating Khpha and Vata varieties of Asmari (calculi) (Farnsworth,1990). It is used traditionally in the treatment of urolithiasis, carbuncle, nephritic disorders, breast cancer and also used as an oral contraceptive (Singh *et al.*,1983).

MATERIALS AND METHODS

The material of *Crateva nurvala* (Buch.-Ham.) (Leaves) was collected in fresh condition from the northern part of Salbardi, Amravati District, Maharashtra, India. The identification of plant done by well known taxonomist Dr. U. S. Patil, Bhartiya Mahavidyalaya, Amravati, Maharashtra. Voucher specimen has been deposited at Bhartiya Mahavidyalaya, Amravati, Maharashtra. The leaves were washed under running tap water and dried under shade then ground into a fine powder using blender and stored in plastic bottle at room temperature.

Extract preparation

The extraction of soluble compounds from *Crateva nurvala* (Leaves) was done by the Soxhlet extraction method with analytical grade solvent Ethyl acetate. The extracts obtained from the above process was evaporated and stored in cap glass vials. Ethyl acetate extract of *Crateva nurvala* (Leaves) was subject to Gas Chromatography and Mass Spectroscopy analysis from Sophisticated Instrumentation facility (SFI), School of Advance Science, Chemistry Division, VIT University, Vellore, Tamilnadu and result were obtained. The extract obtained from *Crateva nurvala* (Leaves) were subject to GC-MS for the determination of bioactive compounds.

RESULTS

The precious plant *Crateva nurvala* (Leaves) widely used by tribal medicine man to treat kidney stone. The GC-MS analysis of *Crateva nurvala* (Leaves) was carried out to identify possible chemical compound present in leaves. Ethyl acetate extract reveal the thirteen (13) peaks. These thirteen peaks indicate the presence of thirteen chemical compounds. The GC-MS chromatogram of thirteen phytochemical compounds detected. On the comparison of mass spectra of the constituents provided by NIST thirteen (13) phytoconstituents were characterized and identified like-2-Pentadecanone, 6,10,14-trimethylo, Pentafluoropropionic acid octadecyl ester, 17-Pentatriacontene, 2-Piperidinone n-[4-bromo-n-butyl]-, Behenyl chloride Beta,.Beta.-Carotene, 5,6-dihydro-5,6-dihydroxy, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol. The active compound with their retention time, Peak area%, molecular formula, molecular weight, probable structural formula and activity is reported in table no. 1.

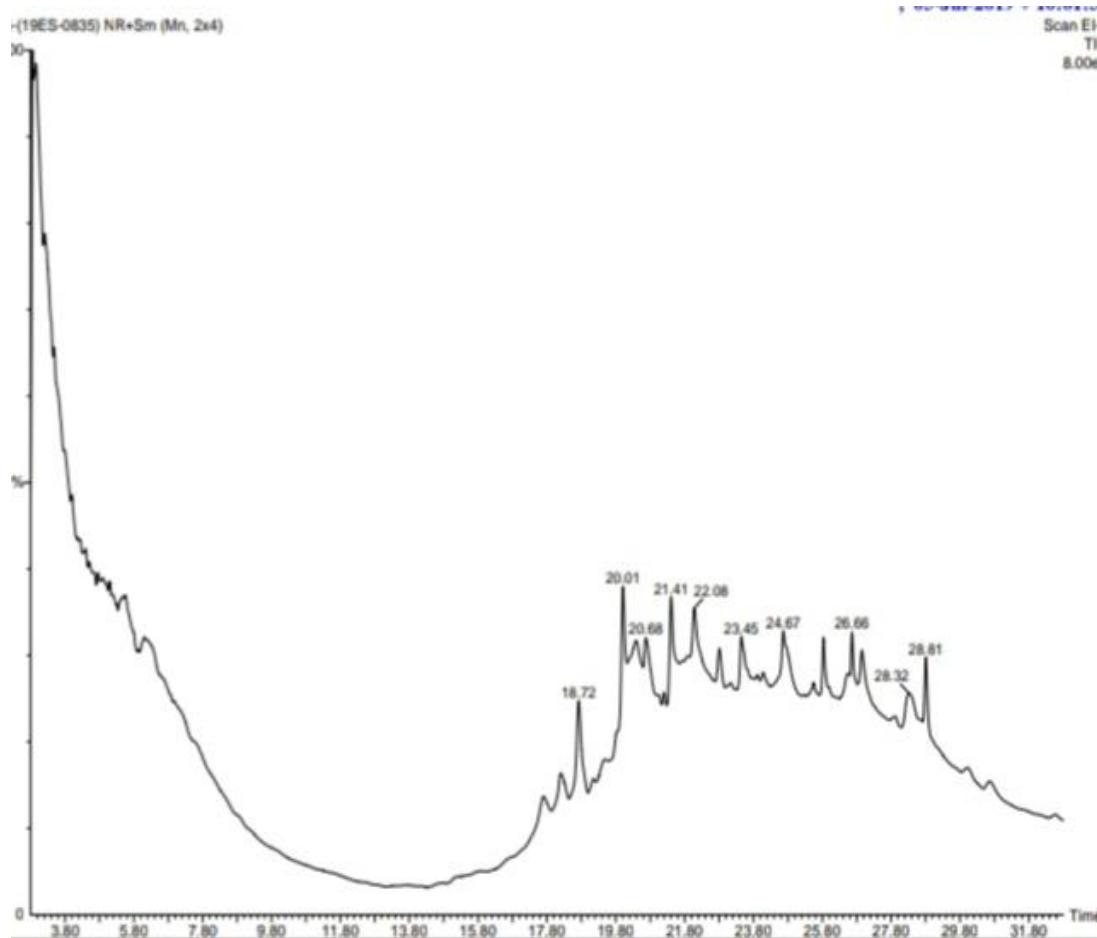



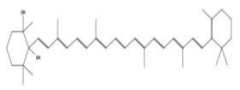



Fig. 1: GC-MS Chromatogram of *Crateva nurvala* (Buch.-Ham.) F5-(19ES-0835).

Table:- GC-MS Analysis of *Crateva nurvala* (Buch.-Ham.) (F5)-(19ES-0835).

r.No	Retention Time	Peak area (%)	Compound Analyzed	Molecular formula	Molecular weight	Probable structural Formula	Activity reported
1	18.190	3.598	2-Pentadecanone, 6,10,14-trimethylo	C ₁₈ H ₃₆ O	268		Antibacterial
2	18.705	8.182	Pentafluoropropionic acid octadecyl ester	C ₂₁ H ₃₇ O ₂ F ₅	416		No activity reported
3	20.015	7.495	17-Pentatriacontene	C ₃₅ H ₇₀	490		Antibacterial Antiviral
4	20.385	13.899	17-Pentatriacontene	C ₃₅ H ₇₀	490		Antibacterial Antiviral
5	20.651	8.859	17-Pentatriacontene	C ₃₅ H ₇₀	490		Antibacterial Antiviral
6	21.401	8.658	17-Pentatriacontene	C ₃₅ H ₇₀	490		Antibacterial Antiviral
7	22.051	20.031	2-Piperidinone n-[4-bromo-n-butyl]-	C ₉ H ₁₆ O NBr	233		Antimicrobial Anti-inflammatory Antioxidant
8	22.796	3.483	17-Pentatriacontene	C ₃₅ H ₇₀	490		Antibacterial Antiviral

9	23.432	2.940	Behenyl chloride	C ₂₂ H ₄₅ Cl	344		No activity reported
10	24.662	9.687	17-Pentatriacontene	C ₃₅ H ₇₀	490		Antibacterial Antiviral
11	26.953	3.328	17-Pentatriacontene	C ₃₅ H ₇₀	490		Antibacterial Antiviral
12	28.324	5.451	.Beta.,Beta.- Carotene, 5,6- dihydro-5,6- dihydroxy	C ₄₀ H ₅₈ O ₂	570		No activity reported
13	28.804	4.389	3,7,11,15- Tetramethyl-2- hexadecen-1-ol	C ₂₀ H ₄₀ O	296		Anti- inflammatory diuretic

DISCUSSION

The ethyl acetate extracts of leaves of *Crateva nurvala* was under taken to ensure the presence of different bioactive substances. Different phytochemicals shows biological activity such as 2-Pentadecanone, 6,10,14-trimethyl-antibacterial, 17-Pentatriacontene-antibacterial and antiviral, Piperidinone n-[4-bromo-n-butyl]- antimicrobial anti-inflammatory and 3,7,11,15-Tetramethyl-2-hexadecen-1-ol- anti-inflammatory, diuretic. Phytoconstitutes characterized in the current experiment are subject to be beneficial in pharmaceutical sciences (Osama, *et al.*, 2017). D-Allose reported from the plant shows hepatoprotective, immunosuppressant, antioxidant, and anticancer activity (Moniruzzaman, *et al.*, 2018). Similar compound screened in the leaves ie. D-Allose is the most active compound in MECN, reported to inhibit mitochondrial reactive oxygen species in Neuro2A cells (Ishihara, *et al.*, 2011). The knowledge of this initial investigation can be anticipated as an interpretation in the exploration of a novel and financially valued drug molecules (Gezahegn, *et al.*, 2015). The study suggests the decoction of *Crataeva nurvala* is effective in the management of urolithiasis (Hadizadeh, *et al.*, 2003). Kaempferol Responsible for Antiinflammatory, antioxidant, spasm, antiulcer, in diuretic (Agarwal, *et al.*, 2010).

CONCLUSIONS

The study concludes that the *Crateva nurvala* (Buch.-Ham.) (Leaves) is highly effective and more curability as Antimicrobial, Anti-inflammatory, Antiviral, diuretic, and Antioxidant property. This type of GC-MS analysis is step towards confirm the medicinal components in the plant showing biological activity and research should be undertaken for detailed study of plant for therapeutic utilization in kidney stone.

Conflict of interest statement

We declare that we have no conflict of interest.

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