

Antimicrobial activity and GC-MS analysis of Chloroform extract of *Acacia concinna* (Willd). DC.

¹Dr. Wanjare, P. D. and ²Dr. Surve, S. V.

¹Head Department of Botany, G.S. Gawande Mahavidyalaya, Umarched, Dist: Yavatmal (M.S.) India

²Assistant Professor, Department of Botany, G.S. Gawande Mahavidyalaya, Umarched, Dist: Yavatmal (M.S.) India

Abstract :

The chloroform extract of fruits of *Acacia concinna* (Willd). DC. was analyzed for antimicrobial activity against fungal isolates like *Candida albicans*, *Microsporum audouinii*, *Trichophyton rubrum*, *Trichophyton mentagrophytes* and the bacterial isolates of *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *Bacillus pumilus* by disc diffusion method (Zone of Inhibition in mm at 100 µg / disc). It was observed that chloroform extract was positive against *Trichophyton rubrum* (zone of inhibition 9 mm). GC-MS analysis study of chloroform extract of fruit shows the presence of twelve phytochemical compounds.

Introduction

Fabaceae, also called Leguminosae, is the third largest family among the angiosperms consists of more than 700 genera and about 20,000 species of trees, shrubs, vines, and herbs and is worldwide in distribution. *Acacia concinna* (Willd). DC. belongs to Fabaceae is a large climbing shrub, armed with numerous small hooked prickles, Pods and Leaves of *Acacia concinna* (Willd). DC. were used as anti-dandruff. Pods were used for some skin diseases. It acts as anti-dermatophytic (Natarajan and Natarajan 2009). The Pods contains secondary metabolites such as alkaloids, flavonoids, phytosterols, saponin, tannins, phenolic compounds, gums. In present investigation antimicrobial activity of chloroform extract of *Acacia concinna* (Willd) DC used in the treatment of Skin Disease was analyzed against eight clinically significant organisms and GC- MS analysis of *Acacia concinna* (Willd) DC. was studied to detect chemical constituents.

Material And Methods

1. Successive solvent extraction of plant material

The pod of *Acacia concinna* (Willd). DC. was collected and washed thoroughly and air dried under shade. After complete shade drying the fruit was grinded. The extraction was done by using Soxhlet's extraction method with analytical grade refluxing solvents like chloroform.

2. Antimicrobial Activity:

The extract was used for antimicrobial activity against pathogens e.g. Fungal isolates *Candida albicans*, *Microsporum audouinii*, *Trichophyton rubrum*, *Trichophyton mentagrophytes* and the

15046

bacterial isolates of *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *Bacillus pumilus* by disc diffusion method (Zone of Inhibition in mm at 100 µg / disc).

3. GC-MS (Gas Chromatography and Mass Spectroscopy)

The samples were subjected to GC-MS analysis from Central Instrumentation Laboratory (CIL), Punjab University Chandigarh. GC-MS analysis of the samples were carried out using Perkin Elmerclarus 680 with mass spectrometer clarus 600 (EI) using TurboMass ver 5.4.2 Software with NIST – 2008 Library ver. Mass spectra were recorded over 35-650 amu range with electron impact ionization energy 70 eV; a scan interval of 2 min and fragments from 50 to 600 Da. The chemical components from the different extract of plant were identified by comparing the retention times of chromatographic peaks using Quadra pole detector with NIST Library to relative retention indices. Quantitative determinations were made by relating respective peak areas to TIC areas from the GC-MS.

Result And Discussion

Table 1.1: Antimicrobial activity of fruit extracts of *Acacia concinna* (Willd). DC. by disc diffusion method (Zone of Inhibition in mm at 100 µg / disc)

Sr. No.	Micro-organism	Chloroform
1	<i>Staphylococcus aureus</i>	00
2	<i>Streptococcus pyogenes</i>	00
3	<i>Pseudomonas aeruginosa</i>	00
4	<i>Bacillus pumilus</i>	00
5	<i>Trichophyton rubrum</i>	9 mm
6	<i>Trichophyton mentagrophytes</i>	00
7	<i>Microsporangium audouinii</i>	00
8	<i>Candida albicans</i>	00

*Data represented in mean of three replicates.

The zone of inhibition of 9 mm against pathogen *Trichophyton rubrum* was observed in Chloroform extract. Chloroform extracts showed positive microbial zone of inhibition against *Trichophyton rubrum*. Chloroform extracts was found non-reactive to other test organisms.

2.1. H1: GC-MS analysis of *Acacia concinna* (Willd). DC.

GC-MS was carried out to study and to determine the possible chemical components from pods of *Acacia concinna* (Willd). DC. The chromatogram of Chloroform extract clearly shows the presence of twelve peaks indicating presence of twelve phytochemical compounds detected was shown in Fig. 2.1 H1. The twelve phytoconstituents were characterized and identified on comparison of the mass spectra of the constituents provided by NIST library. The chloroform extract of *Acacia concinna* (Willd). DC. pods analyzed by GC-MS shows the presence of compounds like Cyclohexasiloxane, dodecamethyl-, Phenol,2,4-bis(1,1-dimethylethyl)-, Dodecanoic acid, Tetradecanoic acid, 7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8-dione, n-Hexadecanoic acid, Palmetic anhydrade, (E)-9-Octadecanoic acid ethyl ester, n-Tetracosanol, Oleic acid, eicosyl ester, 17-Pentatriacontene, Milbemycin,b 13-Chloro-5-demethoxy-6,28-epoxy-5-(hydroxylmino)-25-(1-methylethyl)-(6R,13R,25R). The active compound with their retention time (RT), % peak area, Compound analyzed, molecular formula, probable structural formula and activity reported are presented in Table- . 2.2 H1.

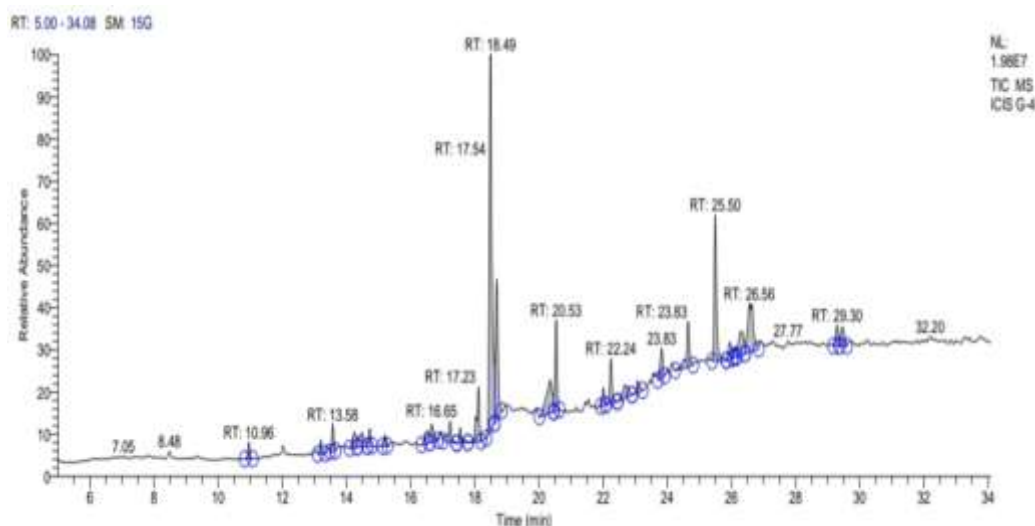
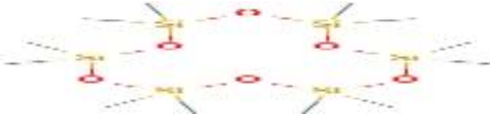
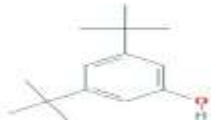


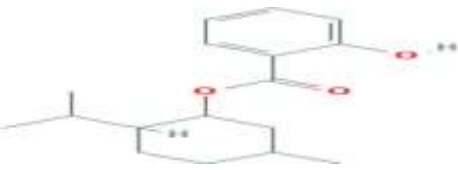




Fig. 2.1 H1 : GC-MS chromatogram of *Acacia concinna* (Willd). DC.

Sr. No	Retention Time	Peak area %	Compound Analyzed	Molecular formula	Probable Structural Formula	Activity reported
1	10.96	0.81	Cyclohexasiloxane, dodecamethyl-	$C_{12}H_{36}O_6Si_6$		Antiperspirant, Glow skin and hair
2	13.58	1.36	Phenol,2,4-bis(1,1-dimethylethyl)-	$C_{14}H_{22}O$		Antibacterial, Antifungal
3	14.25	1.56	Dodecanoic acid	$C_{12}H_{24}O_2$		Antifungal
4	16.52	1.45	Tetradecanoic acid	$C_{14}H_{28}O_2$		Skin cleanser
5	18.12	3.87	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8-dione	$C_{17}H_{24}O_3$		Antiallergic, Antibacterial, Anti-inflammatory, Demulcent
6	18.49	25.38	n-Hexadecanoic acid	$C_{16}H_{32}O_2$		Anti-itching, Antiirritant
7	18.69	8.94	Palmetic anhydrade	$C_{32}H_{62}O_3$		Antiirritant, Demulcent





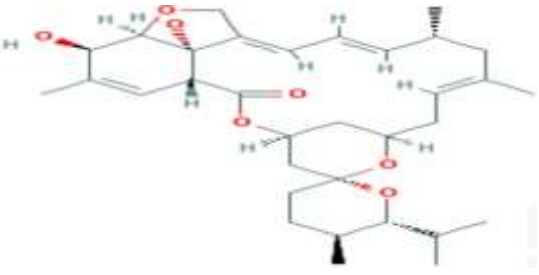
8	20.34	5.25	(E)-9-Octadecanoic acid ethyl ester	C ₂₀ H ₃₈ O ₂		Skin hydrator
9	20.53	5.00	n-Tetracosanol	C ₂₄ H ₅₀ O		Antiallergic, Antidermatitic, Antiedemic, Anti-inflammatory
10	22.01	0.93	Oleic acid, eicosyl ester	C ₃₈ H ₇₄ O ₂		Skin hydrator
11	23.83	2.14	17-Pentatriacontene	C ₃₅ H ₇₀		Antiseptic
12	26.11	0.85	Milbemycin, b 13-Chloro-5-demethoxy-6,28-epoxy-5-(hydroxylmino)-25-(1-methylethyl)-(6R,13R,25R)	C ₃₃ H ₄₆ ClN ₇ O ₇		Antiitching, Antiallergic, Antidermatitic, inflammatory

Table 2.2 H1 : GC-MS Analysis of *Acacia concinna* (Willd). DC.

Conclusion

The plant species *Acacia concinna* (Willd). DC. (Fruits), extract was positive against *Trichophyton rubrum*. The data obtained after GC-MS analysis of plant used in skin diseases revealed the presence of chemical constituents like Cyclohexasiloxane, dodecamethyl- which is used as antiaging skin and hair conditioner, lubricant, antiperspirant scalp treatment,

deodorant and skin lightener agents. N-Hexadecanoic and Palmetic anhydrade, obtained from GC-MS analysis of plants used as anti-inflammatory, antiallergic, absorbent, demulcent, antiitch and antidermatic agents. The study would be helpful for treating skin diseases.

References

Anonymous (1952). The Useful Plants of India. *Publication and Information Directorate*, CSIR, New Delhi, 606.

Anonymous (1985). Wealth of India-Raw materials. New Delhi: Publication and Information directorate, CSIR, 419.

Asolkar, L. V., Kakkar K. K. and Chakre O. J. (1992). Glossary of Indian Medicinal Plants with Active Principles, C.S.I.R., New Delhi, 1 : 34-58.

Baghel, M. (2002). Ethnobotanical and Phytochemical studies of the plants of Sawai Madhopur tehsil Ph.D Thesis, Univesity of Rajasthan Jaipur.

Bhukya, Babu Rao (2014). Evaluation of preliminary phytochemical on various medicinal plants, *IJAMSCR*, 2 (1): 79-82.

Chopda, M.Z., and Mahajan, R.T. (2009).Wound healing plants of Jalgaon district of Maharashtra State, India. *Ethnobotanical Leaflets*, 13 : 1-32.

Chopra, R. N., Nayar, S.L., Chopra, I.C. and Verma, B.S. (1956). Supliments to Glossary of Indian Medicinal plants, Publications and information Directorate, Hillside Road, New Delhi.

Gupta, Dabur R., Manda,l A., Singh, T.K. D.D., Bajpai. V., Gurav, A.M., Lavekar G.S. (2007). Antimicrobial activity of some Indian medicinal plants. *Afr. J. Trad, CAM* 4(3):313-318.

Jagtap, S. D., Deokule, S. S. and Bhosle, S.V. 2006. Some unique ethnomedicinal uses of plants used by the Korku tribe of Amravati district of Maharashtra, India, *Journal of Ethnopharmacology* 107 463–469.

Jain, S. K. (1991). Contribution to Indian Ethnobotany, Scientific Publisher Jodhpur.

Jain, S.K., (ed) (1981). Glimpses of Indian Ethnobotany, Oxford and IBH Publishing co. New Delhi.

The Wealth of India (1982). Vol-X, CSIR, New Delhi: 100-104.

Tiwari, A.K. (2015). Indigenous knowledge for treating skin disease in some selected District of Chhattisgarh. *International Journal of Recent Scientific Research*, 6 (2) :2654-2657.

Williamson, E. M. 2002. Major Herbs of Ayurveda, Churchill Livingstone, China: 279-282.

Xavier, Vergeese raja and Sivaraj, Rajeshwari (2012). Antibacterial activity of bark extract of *Acacia concinna*, *International Journal of Pharma Sciences and Research*, 3: 488-490.

- Jagetia, G.C., Baliga, M.S. and Venkatesh, P. 2005. Influence of seed extract of *Syzygium cumini* (Jamun) on mice exposed to different doses of γ -radiation, *J Radiat Res*, 46 (1): 59-65.
- Jagtap, S. D., Deokule, S. S. and Bhosle, S.V. 2006. Some unique ethnomedicinal uses of plants used by the Korku tribe of Amravati district of Maharashtra, India, *Journal of Ethnopharmacology* 107 463–469.
- Jain, S. K. 1991. Contribution to Indian Ethnobotany, Scientific Publisher Jodhpur.
- Jain, S.K., (ed) 1981. Glimpses of Indian Ethnobotany, Oxford and IBH Publishing co. New Delhi.
- Sengupta, P. and Das, P. B 1965. Terpenoids and Related compounds Part IV, Triterpenoids the stem –bark of *Eugenia jambolana* Lam, *Indian Chem. Soc*, 42(4): 255-258.
- Shyamala, Gowri S. and Vasantha, K. 2010. Phytochemical screening and antimicrobial activity of *Syzygium cumini* (L.) (Myrtaceae) leaves extract, *International Journal of Pharm Tech Research*, 2 (2): 1569 – 1573.
- Singh, Ajeet and Navneet 2018. Ethnobotanical uses, antimicrobial potential, pharmacological properties and phytochemistry of *Syzygium cumini* Linn syn. *Eugenia Jambolana* (jamun) – A Review, *IJIPSR*, 6(01): 32-47.
- Stefanello, M. E., Pascoal, A. C., and Salvador, M. J. 2011. Essential oils from neotropical Myrtaceae: chemical diversity and biological properties. *Chem. Biodivers.* 8, 73–94.
- The Wealth of India 1982. Vol-X, CSIR, New Delhi: 100-104.
- Williamson, E. M. 2002. Major Herbs of Ayurveda, Churchill Livingstone, China:279-282.