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Phytochemical investigation of methanolic extracts of fruit of *Luffa acutangula* var. *amara*

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Abstract
Plants are potent source of drugs due to their Phytoconstituents. They play vital role in pharmaceutical applications of plants. Pharmaceutical biochemicals, fragrances, food colours and flavours etc. are derived from plants. For the production of pharmaceutical compounds, most of the drug industries are depend on these phytochemicals. In recent years, studies on isolation of compounds with their therapeutic uses are increasing. GC-MS (Gas Chromatograph and Mass Spectrometry) can be used to detect the phytoconstituents of plant materials. This method is best to explore all the constitents of plant.
GC-MS chromatogram analysis of the methanolic extract of fruits of *Luffa acutanguala* var. *amara* showed fourteen peaks which indicating the presence of fourteen phytochemical constituents. These compounds known to have properties like hypoglycemic, antimicrobial, antioxidant, pesticide, insecticide, flavoring agents and anti-inflammatory properties.

Keywords: Phytochemical, investigation, methanolic, *Luffa acutangula*

Introduction
Traditionally plants have been using as a potent source of drugs. They have chemical constituents called Phytoconstituents, which play vital role in pharmaceutical practices. Pharmaceutical biochemicals, fragrances, food colours and flavours etc. are derived from plants. For the production of pharmaceutical compounds, most of the drug industries are depend on these phytochemicals [1]. In recent years, studies on isolation of compounds with their therapeutic uses are increasing [2]
In United State alone, plant derivatives have a market of about 20 billion annually. only 5-15% of plants chemical potential have been explored successfully, so there is great significance to explore the plant derived chemicals [3] (The combination of Gas Chromatograph and Mass Spectrometry (GC – MS) is the best method for exploring different compounds, flavours and essences from plant source [4]. This method is versatile to detect active principles or bio components from plant sources.
Gas Chromatography Mass Spectroscopy, a hyphenated system which is a very compatible technique and the most commonly used technique for the identification and quantification purpose. The unknown organic compounds in a complex mixture can be determined by interpretation and also by matching the spectra with reference spectra [5]
The flavonoids distribution among the *Luffa* species was studied by Schilling and Heiser [6] (1988), they found the presence of luteolin and apigenin in leaves and flowers. The phytochemical screening of ethanolic extract of fruits of *Luffa acutangula* showed the presence of alkaloids, saponins, carotenoids and terpenoids and the absence of flavonoids, tannins and anthraquinones. The GC-MS of the analysis *L. acutangula* derived six components and most of them have medicinal importance [7].
GCMS analysis for Physio chemical characterization of seed oil of *Luffa acutangula* Roxb. var. *amara* was done [8] The major components were fatty acids such as lauric, myristic, plametic, stearic, oleic and linoleic acid from seed oil.
Available literature revealed that no GC-MS analysis of fruits of desired species is carried out. The present piece of work deals with the GC-MS analysis of *Luffa acutangula* var. *amara* fruits for detection of active bio components.

Materials and Methods
b. GCMS Analysis of fruit
I. Sample preparation: The fruit powder was extracted by Soxhlet extraction method, using methyl alcohol as solvent for 48 hours. The extract was dried by hot air oven.

II. GCMS analysis: The bioactive compounds were identified by GCMS analysis. It was done by using JEOL GC MATE II instrument. The set of conditions were, Front inert temperature 220 ºC, Column HP 5Ms, the oven temperature was 50-250 ºC at the rate of 10 ºC/min. Helium gas was used as carrier at a constant flow rate of 1ml/min. the ion chamber temperature and GC interface temperature was 250 ºC. the Quadruple Double focusing Analyser was used for mass analysis. Photon Multiplier tube was used for detection. Mass spectra were taken at 70eV. All data were obtained by collecting the full scan mass spectra within the scan range 50-600amu. The composition of the crude extract constituents was expressed as percentage peak area.

III. Identification of compounds: The bioactive compounds were identified based on the GC retention time and using Chemspider and Pubchem libraries. (Table 1)

Results and Discussion

Phytochemical investigation of ethanolic leaf extracts of *Luffa acutangula* showed the presence of alkaloids, phenols, saponins, tannins, terpenoids, and triterpenoids [9]. this boosts the medicinal potential of leaves. Fruit extracts of *Luffa acutangula* Roxb. Var. *amara* show Hepatoprotective activity [10]

GC-MS chromatogram analysis of the methanolic extract of fruits of *Luffa amara* showed fourteen peaks which indicating the presence of fourteen phytochemical constituents. The phytocompounds were characterized and identified by comparison of the mass spectra of the constituents with the NIST library, this phytochemical analysis has shown the presence of potent phytochemicals like flavonoids, terpenoids, tannins, glycosides sterols, phenols and saponins. These potentials of phytocomponents can be used in bioprospecting of *Luffa amara.*

The result clearly indicates that *Luffa acutangula* var. *amara* has many components with varied medicinal properties that can be exploited for the treatment of many diseases. The various phytochemicals which contribute to the medicinal activities of the plant were shown in Table 1.

Table 1: GCMS analysis of methanolic extract of fruit of *Luffa acutangula* var. *amara*

Sr. No.	Name of Compound	Molecular formula	Mol. Wt.	Uses
1	2-cyclohexane-1-one,2-methyl-5-(1-methylethenyl)-s	$C_{10}H_{14}O$	150	Insect control [11] food flavor industries, delays potato sprouting [12]
2	Benzene,1-methoxy-4-(1-propenyl)	$C_{10}H_{12}O$	148	Antimicrobial, Antifungal [13] flavouring agent [14] anticockroach [15]
3	10-Acetoxy-5-Oximino-5H-dibenzo(a,d)cycloheptene,o-(2-acetylmethylaminoethyl)	$C_{22}H_{22}N_2O_4$	378	Antimicrobial [16]
4	3-Dimethylamino-2-(-4-chlorophenyl)-thioacrylic acid, thiomorpholide	$C_{15}H_{19}ClN_2S_2$	326	Antifungal
5	Phenol,2-methoxy-4-(1-propenyl)	$C_{10}H_{12}O_2$	164	In the formulation of perfumes, shaving products, and skin care products. functions as a fragrance ingredient and as a flavoring agent [17]
6	(+) salsolidine	$C_{12}H_{17}NO_2$	207	Management of cardiovascular disorders [18]
7	Ethanone,1-(2-(5-hydroxy-1,1-dimethylhexyl)3-methyl-2cyclopropen-1-yl)	$C_{14}H_{24}O_2$	224	------
8	9,9-Bi-9H-fluorene,9,9-dimethoxy	$C_{28}H_{22}O_2$	390	Cyclic compounds useful in the treatment of dyslipidaemia, atherosclerosis and diabetes, pharmaceutical compositions and preparation process [19]
9	2-Piperidinone,N-(4-bromo-n-butyl)-	$C_9H_{16}BrNO$	233	Antipsychotic [20]
10	3-Octyne,7-Methyl	C_9H_{16}	124	Fungicidal, Antacid, Bronchodialator, Vasodialator, Anticoagulant [21]
11	3-Methyl-2-Octyl-1H-quinolin-4-one	$C_{18}H_{25}NO$	271	Nasal decongestants, antihistamines, cough suppressants anti-inflammatory [22]
12	2-(2-Hydroxyethyl)-7,7,9-trimethyl-1,2,4-triazospiro (4,5) decane-3-thione	$C_{12}H_{23}N_3OS$	257	Anti-inflammatory and antioxidative potential
13	9,12-Octadecadienoyl chloride,(Z,Z)	$C_{18}H_{31}ClO$	298	Antiepleptic, Analgesic, antiviral, antibacterial
14	1-Oxacyclopentadecan-2-one,15-ethenyl-15-methyl	$C_{17}H_{30}O_2$	266	Flavouring and Fraganance agent

Conclusions

The results of GCMS analysis of fruit clearly indicate the presence of varied medicinal components, responsible for antimicrobial, insecticidal and antidiabetic activities and allelopathic behaviour of plant extracts.

References

1. Velmurugan P, Kamaraj M, Prema D. Phytochemical constituents of *Cadaba Trifoliata* Roxb. root extract. International Journal of Phytomedicine. 2010; 2:379384.
2. Erturk S, Mortele K, Tuncali K, Saltzman J, Lao R, Silverman S. AJR Am J Roentgenol. 2006; 187:1531-15355.
3. Balasubramanian B, Pogozelski W, Tullius T. DNA strand breaking by the hydroxyl radical is governed by the accessible surface areas of the hydrogen atoms of the DNA backbone. Proc. Natl. Acad. Sci. USA. 1998; 95:9738-974
4. Mellon F. Mass Spectrometry of Natural Substances in Foods. RSC Bood Analysis Monograps, Ed. Belton. The Royal Society Chemistry Cambridge, U.K, 2000.
5. Aneesh S. Asian J Pharm Clin Res, 2013; 6(3):68-74.
6. Heiser CB, Schilling EE. Phylogeny and distribution of Luffa (Cucurbitaceae). Biotropica. 1988; 20:185-191.
7. Suryanti V, Marliyana DS, Astuti I. Chemical Constituents of *Luffa acutangula* (L.) Roxb Fruit. IOP

Conference Series: Materials Science and Engineering, 2017, 193.
8. Kalyani GA, Ramesh CK, Krishna V. Extraction and characterization of Luffa acutangula var amara seed oil for antioxidant activity. International Journal of Research in Ayurveda and Pharmacy. 2011; 2(5).
9. Valerie AS, Anna I, Christal T, Felicia AU, Jelani FB, Bamanga R. Antimicrobial and Physicochemical Evaluation of Luffa acutangula Leaf Extracts. Advances in Materials. 2017; 2(6):80-85.
10. Rahman MM, Ahmed A, Sunny SS, Md. Atanu SH, Faruque A, Rana MS. In-vitro Evaluation of Cytotoxic and Anthelmintic Activity of Luffa acutangula, Luffa aegyptiaca and Momordica cochinchinensis. British Journal of Pharmaceutical Research. 2014; 4(2):267-277.
11. Environmental protection agency Pesticide Products; Registration Application. Federal Register. 2009; 74(41):9396-9397.
12. De Carvalho CCCR, Da Fonseca MMR. Carvone: Why and how should one bother to produce this terpene. Food Chemistry. 2006; 95(3):413-422.
13. De M, De AK, Sen P, Banerjee AB. Antimicrobial properties of star anise (*Illicium verum* Hook f). Phytother Res. 2002; 16(1):94-5.
14. Philip R. Ashurst chavicol Food Flavorings, 1999.
15. Chang KS, Ahn YJ. Fumigant activity of (E)-anethole identified in Illicium verum fruit against Blattella germanica. Pest Manag. Sci. 2002; 58(2):161-6
16. Yunnikova LP, Akent'eva TA, Aleksandrova GA. Pharm Chem J 2013; 46:723.
17. Atsumi T, Fujisawa S, Tonosaki K. A comparative study of the antioxidant/prooxidant activities of eugenol and isoeugenol with various concentrations and oxidation conditions. Toxicol *In vitro*. 2005; 19(8):1025-33.
18. Zagorevskii VA, Bendikov ÉA, Mirzoyan RS. Pharm Chem J. 1982; 16:539
19. (PubChem database Patent US6528538)
20. National Center for Biotechnology Information. PubChem Database; Patent=US6528538,
21. National Center for Biotechnology Information. PubChem Database; Patent=US5599815,
22. National Center for Biotechnology Information. PubChem Database; Patent=EP0630370.