Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 7 (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Phytochemical Screening And Identified Bioactive Compounds of Leaf of Sarcochlamys Pulcherrima (ROXB.) Gaud By GC-MS

Bhaskar Pathak[*1], Jogen C. Kalita[2], Robin Bhuyan[3]

[*1]Research scholar, Department of Zoology, Gauhati University, Guwahati 781014, India.

[2]Prof& Ex Head, Department of Zoology, Gauhati University, Guwahati 781014, India. Email ID: jck@yahoo.com

[3]Prof& Head, Department of Animal Nutrition, Assam Agriculture University, Khanapara, Guwahati, Assam.

Email ID: drrobinbhuyan@yahoo.com

***Corresponding author:**

Email ID: bhaskarpathak09@gmail.com

Cite this paper as: Bhaskar Pathak, Jogen C. Kalita, Robin Bhuyan, (2025) Phytochemical Screening And Identified Bioactive Compounds of Leaf of Sarcochlamys Pulcherrima (ROXB.) Gaud By GC-MS. *Journal of Neonatal Surgery*, 14 (7), 847-853.

ABSTRACT

Sarcochlamys pulcherrima (Roxb.) Gaud. Commonly known as dogal tree in English. Rabha tribes it is called Fok xaak, as well as they consider as a sacred plant for their religious festival of Baikhyo. *Sarcochlamys pulcherrima* plant leaves are traditionally used as a natural medicine for various disorders and illness, as well as nutritional purposes.

Objectives: The study was aimed to assess the phytochemical component and biological activity compounds of *Sarcochlamys pulcherrima* leaves extract that would support both the traditional and pharmaceutical uses of its leaves**.**

Methods: The biologically active non-polar compounds are identified by GC-MS analysis and then, each of the extracts was subjected to qualitative phytochemical analysis and further subjected to a GC-MS instrument.

Results: The result of the qualitative analysis of plant extracts has a wide range of active phytocompounds are found such as alkaloids, flavonoids, glycosides, saponins, steroids, reducing sugar, tannins and terpenoids. The biologically Gas chromatography and Mass spectroscopy (GC-MS) analysis screening shows that it has various biologically active compounds present in methanolic extract of leaf of *Sarcochlamys pulcherrima*. The GC-MS analysis, various phytochemical compounds were identified in leaf extract which have the properties of anti-inflammatory, anti-microbial, cyto-toxicity and anti-bacterial properties due to the presence of secondary metabolites in the methanolic extract of leaf. The identification of bioactive compounds is based on the retention time, peak area, molecular formula and probability. Therefore, *Sarcochlamys pulcherrima* (Roxb.) Gaud is recommended as a source of significant phytopharmaceutical value.

Keywords: *GC-MS analysis, Sarcochlamys pulcherrima, methanol extract, bioactive compounds, anti-microbial, phytopharmaceutical value.*

1. INTRODUCTION

Rabha Hasong Autonomous Council area of Assam is a homeland of a large number of precious indigenous leafy vegetables, as well as herbs. These leafy vegetables and herbs are commonly use as edible vegetables and traditionally medicinal purposes. Besides they use few selected plants their customs and religious purposes, such as *Sarcochlamys pulcherrima* (*Roxb*.) *Gaud* plant species widely use their main festival "baikhyo Puja". The sub class of Rabha communities like Rongdani, Mai-Turi, Kocha Rabha, Totla Rabha, Pati Rabha, Dahari Rabha, Bitla Rabha and Modahi Rabha, all communities commonly use vegetables and medicinal purposes. They use different parts of the plants to cure illness and diseases. Leafy vegetables contain natural antioxidant, phytochemicals, phytonutrients such as various vitamins, minerals, micronutrients, dietary Fiber but no cholesterol, very little amount of fats, sugar and sodium, and low calories (Banerjee *et al.*,2012). The leaves of *Sarcochlamys pulcherrima* are widely consumed as an edible vegetable as well as natural medicinal purposes namely eye itching, diarrhoea and dysentery (Mazumder AH, *et al* 2015; Sharma UK *et al* 2011). The tender leaves of this dogol tree are used to prepared a special dish for their religious festival on the first day of Bohag Bihu, the most important state festival of assam, the Assamese people traditionally collect 101 leafy vegetables, which include *Sarcochlamys pulcherrima* also. Assamese people believe that this special recipe has some medicinal values that maintain them in good health for the whole next year (Begum SS,2007, Gogoi R 2007 *et al*.). Traditionally it is used as folk medicine and edible

vegetables by different tribes and communities of Assam in India and in neighbouring countries (Mazumder AH, Das J, Gogoi HK, Paul SB, *et al*. 2015). To treat eye itching, boils diseases and fever blisters, leaf of this plant is highly effective (Rahman MA *et al* 2007). Young shoots, leaves and fruits are used as edible vegetables (Singh B et al2012 and Sawian JT *et al* 2007). Leafy vegetables are good source of natural phytochemicals (Duma mara *et al*,.2014). leafy vegetables are especially important for growing children and women whose metabolism is burdened by pregnancy and lactation period (Baskar Rajan G et *al*2005).

The therapeutic properties of a plant depend upon the biologically active compounds present in the plant parts employed in the preparation in medicine, *Sarcochlamys pulcherrima* is being used by tribal people particularly Rabha, Bodo and Gado in Rabha Hasong Autonomous Council area of Assam.

Sarcochlamys pulcherrima (Roxb)Gaud is a small evergreen tree found in the tropical rain forest and open and damp secondary forests on the floodplains in Bhutan, Myanmar, Indonesia, Sikkim and Thailand (Mazumder AH 2014, Das J 2014, Gogoi HK 2014, Chattopadhyay P 2014, Singha L 2014). The plant grows wild both hilly and plains region in the northeastern part of India. Study report shows that many ethnic tribes and communities in the states of Assam, Meghalaya, and Nagaland of India, as well as in Bangladesh use this plant leaves traditionally as vegetables and medicines (Begum SS et al). *Sarcochlamys pulcherrima* is known by different vernacular names among different tribes and communities, such as mechaki (Assamese), (Begum SS *et al* 2007, Singh B 2012 *et al*) Fok xaak (Rabha), Ombe (Missing), Ad umbra (Bodo), Michiaki (Garo) (Sharma UK *et al* 2011, Singh B 2012 *et.al*). The medicinal property of a plant depends upon the physiologically active biochemical compounds called secondary metabolites. (Kavitha, R). The plants can synthesize more than one thousand phytochemicals but all phytochemicals are not essential for human health. GC-MS technique is the best sensitive technique used for separation and identification of the many structurally complex components that are present in plant extracts. The objective of this research was carried out for identification of volatile physiologically active compounds in methanolic extract of *Sarcochlamys pulcherrima* by GC-MS. Soxhlet extraction was subjected the qualitative analysis and further subjected to GC-MS instrument.

Description of the experimental materials: *Sarcochlamys pulcherrima* (Roxb) Gaud under family Urticaceae. *Sarcochlamys pulcherrima* is known by different vernacular names among different tribes and communities, such as mechaki (Assamese), (Begum SS *et al* 2007, Singh B 2012 *et al*.) Fok xaak (Rabha), Ombe (Missing), (Sharma UK *et al* 2011) Ad umbra (Bodo), Michiaki (Garo) (Singh B 2012 *et al*.) *Sarcochlamys pulcherrima* is a medium evergreen shrub or small tree and it is called Dougal

tree in English. Its height 3 to 6 meters tall in length. It has pubescent branchlets, covered with soft hair, leaves alternate, narrowly lanceolate, toothed, caudate acuminate, inflorescence spike, flowers dioecious; fruit achene, enclosed in fleshy perianth (Mazumder AH *et al*.). Flowering and fruiting occur in winter seasons. It is distributed tropical rain forest and open and damp secondary forests on the flood plains in Bhutan, Myanmar, Sikkim, Thailand and Indonesia (Mazumder AH 2014 *et al*.). the plants grow wild habitat in hilly and plains region in the northeastern part of India. It is reported that many ethnic tribes and communities in the state of Assam, Meghalaya, and Nagaland in India, as well as in Bangladesh use this plant leaves as edible vegetables, as well as natural medicine to cure few ailments and diseases (Begum SS *et al*,.2007, Singh B *et al* 2012). Study reveals that triterpenoids isolated from *Sarcochlamys pulcherrima* (Roxb.) Gaud. (Ghosh C, Bhowmik J, Ghosh. R, Das.M, Sandhu P, Kumari M, Acharjee. S, et.al (2020).

2. MATERIALS AND METHOD

Study area: The experimental materials were collected from Rabha Hasong Autonomous Council area of Assam, particularly Rabha dominated village Bhoiskhuli, which is geographically located at 25° 50' to 26º.10" N and 90° 00E to' 15" E. They are sharing its boundary East Kamrup district, west Dhubri district, North Barpeta, Bongaigoan and Dhubri district of Assam. The study area of Rabha Hasong Autonomous Council, Dudhnoi. Autonomous state covering Joyramkuchi G.P. in Goal Para district to Rani G.P. in kamrup district. Presently as many as 779 tribal revenue villages with a total population of more than six lakhs (approx.) has been notified by the Hon'ble Governor of Assam as under RHAC. The major tribes are Rabha, Bodo, Garo and other communities. (RHAC,2020).

Collection and proper authentication of Plant materials: Fresh young leaves used for the investigation were collected from Rabha Hasong Autonomous Council area of Assam, particularly from Bhoiskhuli area of Goalpara District. The Plant materials were identified with consultation of standard literature such as “Flora of Assam” written by Kanji Lal, U.N. The Plant was authenticated by Department of Botany, Guahati University and was deposited in department. The information of traditional commonly used were collected from respondents of this area, through semi structure standard questionaries.

Preparation of Plant Extracts: Freshly collected leaves of *Sarcochlamys pulcherrima* (Roxb.) were washed with running tape water and the leaves were cut into small pieces. The leaves were dried under shades for two weeks. The properly dried leaves were powered in an electric blender. The powered materials were kept in airtight containers to avoid the humidity and then stored at room temperature until use in laboratory. The 200gram dry powered samples were extract with methanol by continuous hot percolation using Soxhlet extractor for 24 hours. The extract was filtered through use of What man no. 41

filter paper separately, and the extract were concentrated in vacuum at 60º c using a rotary evaporate the methanol from it. To evaporate the remaining solvent, the extract was kept in an oven at a temperature of 40-50º C for 8 hours. The residues were kept separately in airtight containers and stored at 4º C for further use.

Preliminary Phytochemicals Analysis: The methanol extracts were used for qualitative identification of various secondary metabolites were carried out by using standard methods ((Harborne, J.B.1998, Sofowra, A *et al*. 19 93, Yadav, RNS and Agarwala, Munin 2011.)

Gas Chromatography- Mass Spectroscopy (GC-MS): GC-MS plays a key role in the analysis of unknown volatile components of plant origin. The chemical compositions of methanol extract of leaf of were subjected to GC-MS analysis. GC-MS analysis of these extracts *Sarcochlamys pulcherrima* were carried out using the equipment GC Clarus450 Perkin-Elmer system comprising an AOC-20i auto sampler and gas chromatograph interfaced to a mass spectrometer (GC-MS) instrument employing the following condition: Equipped with a column Elite-5MS, fused silica capillary column (30m x 0.25I.D x 0.25 µm); helium gas was used as carrier gas at a constant flow rate of 1ml/min and an injection volume 2ml was employed.

The injector initial temperature is set at 60ºC and maximum temperature 350ºC. Total GC running time was: 39.00 mi. Instrument Type: PE Auto System GC with built-in Auto sampler; channel parameters. Data will be collected from channel B. Delay time: 0.00 min. Run time: 39.00 min. Sampling Rate: 1.5625 pts/s. Channel A Channel B. Signal Source DetA DetB. Analog Output INT. Attenuation 0 0. Offset 5.0 mV 5.0 mV . Auto sampler Method. Syringe Capacity: 5.0 µInjections Speed: Normal. Viscosity Delay :0 Pre-injection Solvent Washes: 0. Post-injection Solvent Washes (A): 2. Wash/Waste Vial Set: 1. Pre-injection Sample Washes: 2. Carriers Parameters Carriers Parameters. Carrier A control: PFlow – He. Column A length: 60.00 m. Split Ratio: 20.0: 1. Initial Set point: 1.00 ML/MIN. Diameter: 250 µm. Initial Hold: 999.00 min. Injection Volume: 1.0 µL. Sample Pumps: 6Detector A Detector B Detector A: 0°C. Auxiliary (NONE): 0°C. Heated Zones. Injector A: PSSI. Initial set point: 280 C. Initial Hold: 999.00min. Oven Program. Injector B: NONE. Set point: OFF. Cryogenics: Off; Initial Hold: 1.00 min.

Interpretation on mass spectrum of GC-MS was conducted using the database with consultation of library search. The name of the compound, molecular weight, retention time, peak area, chemical formula and biological activity.

Statistical Analysis: All the qualitative test/ analysis were performed in triplicate.

3. RESULTS

Preliminary Phytochemicals Analysis: The distribution of different phytochemicals constituents in methanol extract of *Sarcochlamys pulcherrima* leaf were evaluated qualitatively and shown in **Table 1.**

TABLE 1: PRELIMINARY PHYTOCHEMICAL ANALYSIS OF METHANOLIC EXTRACT LAF OF SARCOCHLAMYS *PULCHERRIMA*.

SL No	Phytochemical constituents	Test/Reagent	Results
1	Alkaloid	Wagner's test	+
2	Reducing sugar	Fehling test	+
3	Steroids	Aceticacid+Chloroform+conc. H2SO4	+
4	Proteins	Millions test	+
5	Saponins	Foam test	-
6	Glycosides	Liebermann's test	+
7	Carbohydrate	Benedict's test	+
8	Flavonoids	Alkaline reagent test	+
9	Terpenoids	Nollers test	+
10	Amino acid and protein	Ninhydrin test	+

11	Phenols	Phenol test (Ferric chloride test)	+
12	Tannins	Braemar's Test	+

Note: + = present, - = absent

From **Table1**, it was observed that a lot of active biochemical compounds like alkaloids, reducing sugar, steroids, tannins, phenols, amino acids and proteins, terpenoids, flavonoids, glycosides were present in the leaf of *Sarcochlamys pulcherrima* which attributes natural antioxidant properties. These compounds are known for their natural antioxidant, anti-microbial, anti-inflammatory and anti-cancer properties, making the leaf extract a potential source of natural remedies for various health condition and phytopharmaceutical value.

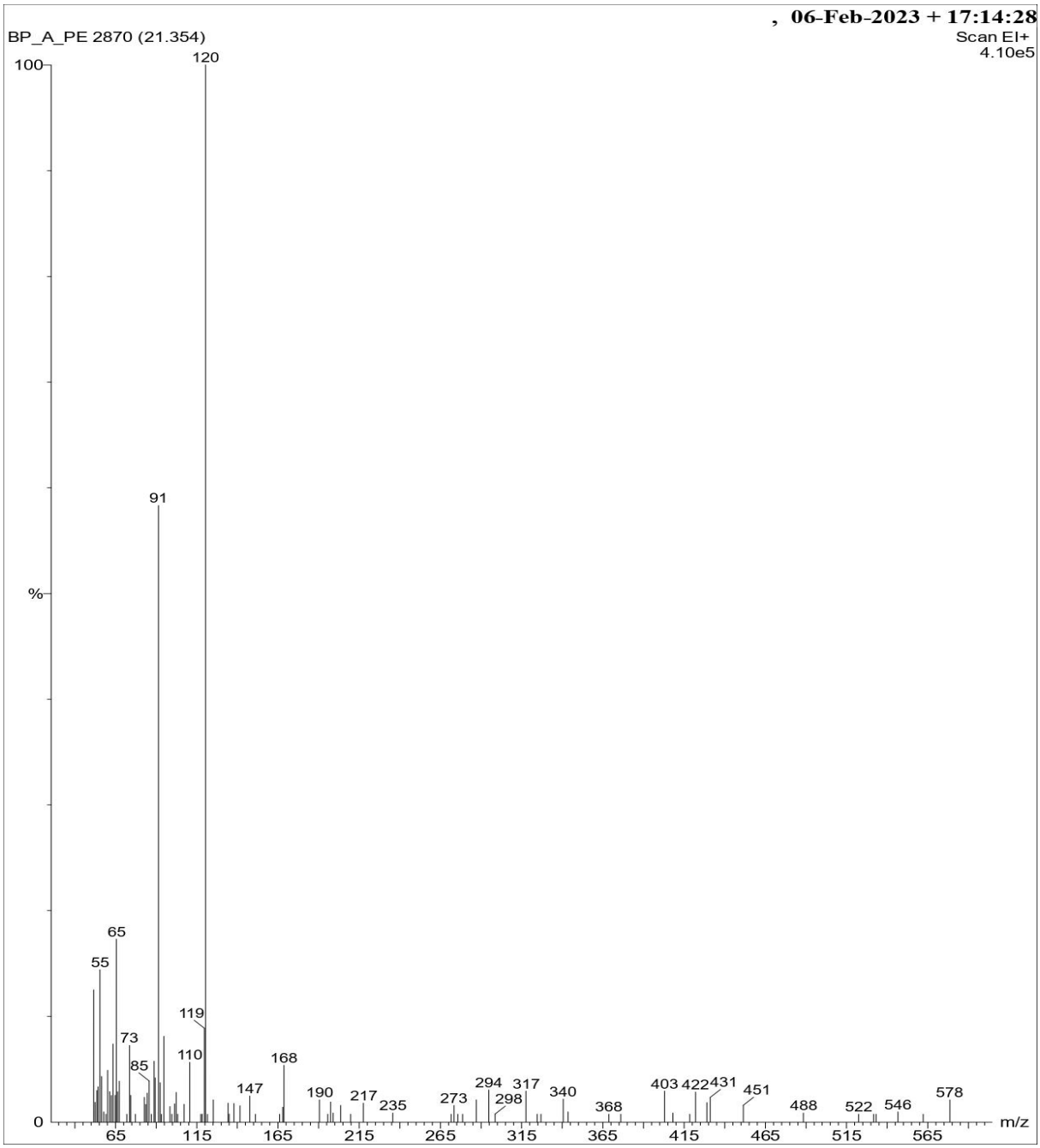

Figure 1: GC-MS chromatogram high peak area of methanol extract of leaf *Sarcochlamys pulcherrima* (*Roxb.*) *Gaud*

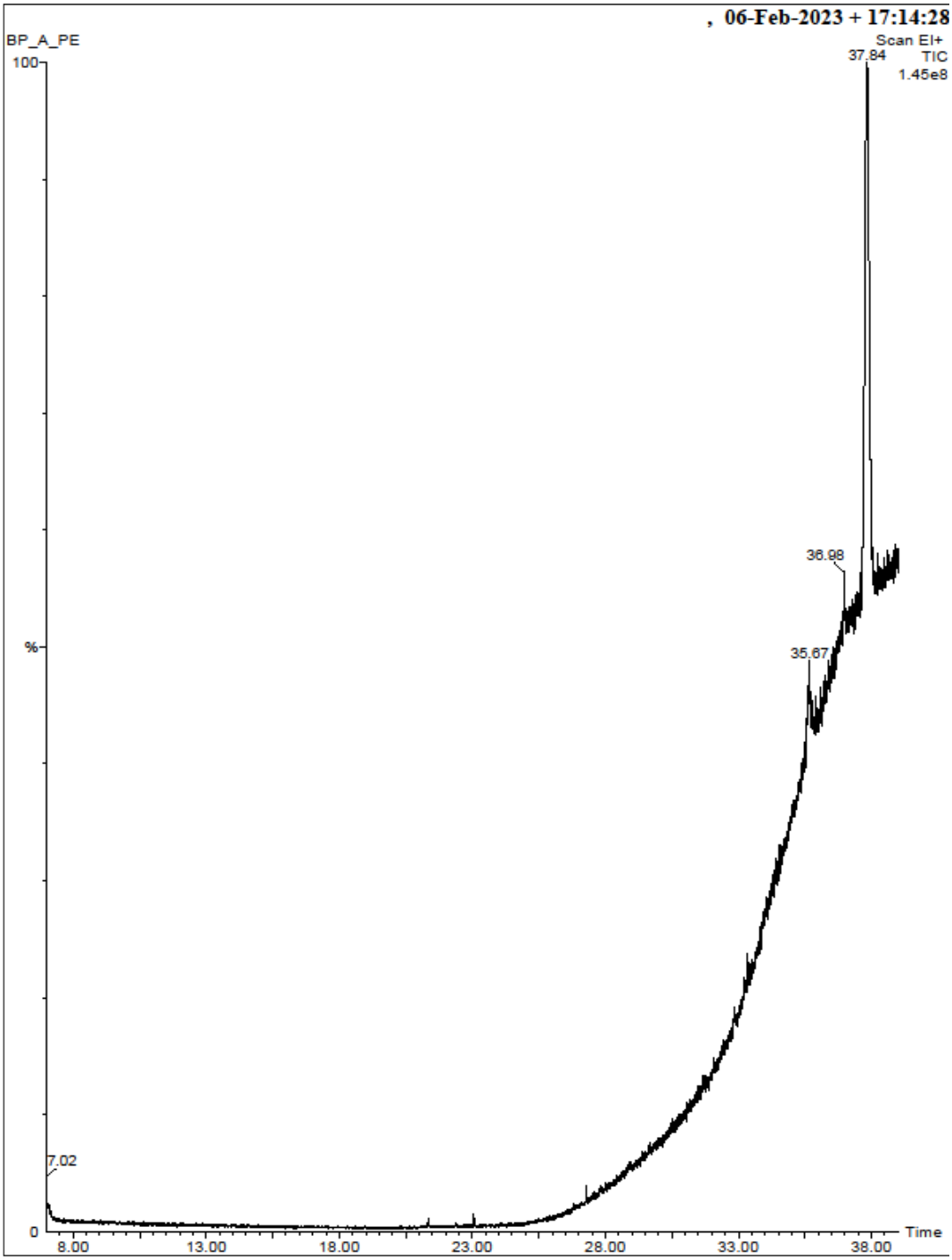

Figure 2: GC-MS chromatogram of methanol extract of leaf *Sarcochlamys pulcherrima* (*Roxb*.) *Gaud*

Table 2: Activity of bioactive compound identified in methanol extract of leaf *Sarcochlamys pulcherrima* (*Roxb*.) Gaud.

Name of the compounds	Retention time(min)	Peak area (%)	Molecular Weight	Chemical Formula	Reported Biological Activity
Benzaldehyde,4-methyl	21.35	2.11	120	C_8H_8O	Antioxidant, cytotoxicity and antibacterial
Cyclotrisiloxane, Hexamethyl	35.67	5.67	222	$C_6H_{18}O_3Si_3$	Antimicrobial and antioxidant activity
4-Tert-octylphenol, TMS derivative	36.98	18.83	278	$C_{14}H_{22}O$	No reported activity
Cholest-5-en-3-ol (3 beta)-,3-phenyl-2-propenoate	37.8	11.08	516	$C_6H_8O_4$	Antimicrobial activity and prominent antioxidant

Table 2. The results revealed that the of chief bioactive compounds are viz., 1. Benzaldehyde, 4-methyl-, 2. Cyclotrisiloxane, Hexamethyl-, 3.4-Tert-octylphenol, TMS derivative and 4. cholest-5-en-3-ol (3. beta.)-, 3-Phenyl-2-Propenoate was found as the major compounds in the methanol extract of leaf *Sarcochlamys pulcherrima* (Roxb.) Gaud.The GC-MS study of the methanol extracts of leaf of *Sarcochlamys pulcherrima* (Roxb.) Gaud Shown the presence of lots of phytochemicals constituents which strength contributes to the medical bioactive of the plant. GC-MS mass spectra detected some compounds from methanol extracts *of Sarcochlamys pulcherrima* (Roxb.) Gaud.

4. DISCUSSION

Qualitative screening is very essential task to determine the phytochemicals compounds present in medicinal plants (Kavitha, R 2021). In Assam, particularly in Rabha Hasong Autonomous Council Area tribal and rural people traditionally consume *Sarcochlamys pulcherrima* (Roxb.) Gaud Leaf as well as used folk medicine. The identified bioactive chemical compounds have prominent anti-bacterial activity, antimicrobial activity, cytotoxicity and natural antioxidant properties

5. CONCLUSION

Based on the results obtained in the present investigation, it may be concluded that the biological activity of the identified bioactive compounds used for anti-bacterial, anti-microbial, anti-cancer activities, and cytotoxicity (Goswami MJ.2024 *et al.*) It is reported that the crude methanolic extract of *S. pulcherrima* contains significant exploratory and sedative activity as well as moderate anxiolytic activity (Alam MN, *et al*,.2015).

Therefore, *Sarcochlamys pulcherrima* (Roxb.) Gaud is recommended as a source of phytopharmaceutical value. The information of the present study needs through phytochemicals investigation along with clinical trials. Study reveals that this leafy vegetable has nutritional value. We can recommend for uses of various medicinal purposes. However, further studies are necessary on *Sarcochlamys pulcherrima* (Roxb.) Gaud can lead to the discovery of new drug(s) and therapeutics of various ailments.

Conflict of interest: The authors declare that there is no potential conflict of interest. Authors also declare that no financial as well as personal relationships with other people or organization.

Authors contributors: All the authors participated in the research work, collection of data, analysis and writing of the original draft, preparing of the tables and figures, review, corrections and critical inputs added to the manuscript. All the

authors approved the final article and we declare that all the information is correct to the best of our knowledge and belief.

6. ACKNOWLEDGEMENT

The authors are thankful to Dr.P. Barooah, Research associate, Guwahati Biotech Park where I have done my GC-MS analysis. I would like to extend my sincerest gratitude to the Prof& Head, Department of Animal Nutrition, Assam Agriculture University, Khanapara, Guwahati, Assam, for his encouragement and support.

REFERENCES

[1] Alam MN, Abeden J, Islam R, Sayeed MA, Chowdhury S, Chowdhury A, Essha IJ, and Taasin SF (2015): Evaluation of In-vivo Neuropharmacological Effects of *Sarcochlamys pulcherrima* Leaf Extract in Animal Model. European Journal of Medicinal Plants. 11(2): 1-8 ISSN: 2231-0894.

[2] Banerjee A, Datta J.K., Mondol N.K. (2012) Biochemical changes in leaves of mustard under the influence of different fertilizers and cystocele. *Journal of Agricultural technology*, vol. 8(4). P1397-1411.

[3] Baskar Rajan, G (2005). Leafy vegetables page 1-175.

[4] Begum SS, Gogoi R. (2007) Herbal recipe prepared during Bohag or Rongali Bihu in Assam. Indian Journal of Traditional. knowledge.2007;6:417-22 [google scholar]

[5] Duma mara et al., (2014.) Leafy vegetables as source of phytochemicals. Journal of food Balt 2014, page 262-265.

[6] Ghosh C, Bhowmik J, Ghosh. R, Das.M, Sandhu P, Kumari M, Acharjee. S, et.al (2020) The anti-biofilm potential of triterpenoids isolated from *Sarcochlamys pulcherrima* (Roxb.) Gaud. Journal of Microbial pathogenesis vol. 139. Feb 2020.

[7] Goswami MJ, Boruah Hati JL, Saikia R, Dutta U, Kakati D (2024) Synthesis, antimicrobial and antioxidant bio evaluation of silver nanoparticles using leaf extract of *Sarcochlamys pulcherrima.* Elsevier journal nanotechnology, vol.5, 2024

[8] Harborne, J.B.1973. Phytochemicals Methods. Chapman and Hall Ltd, London 49-278.

[9] Kavitha, R. (2021): Phytochemical screening and GC-MS analysis of bioactive compounds present in ethanolic extracts of leaf and fruits of *Trichosanthesis dioica* Roxb.IJPSR(2021), volume 12, issue 5, page 2755-2764.

[10] Kanjilal VN (1997): Flora of Assam, vol. II, reprinted Edition, 1997.

[11] Mazumder AH, Das J, Gogoi HK, Chattopadhyay P, Singh L, Paul SB. (2015) Pharmaceutical scope of a phytochemically unexplored medicinal plant, *Sarcochlamys pulcherrima* (Roxb.) Gaud.: A review. Pharmacognosy Review 2015 jan-jun;9(17): 81-83, vol 9, issue 17.

[12] Mazumder AH, Das J, Gogoi HK, Chattopadhyay P, Singh L, Paul SB. *In vitro* activity of some medicinal plants from Cacher district, Assam (India) against *Candida albicans.* Pharmacognosy journal. Volume 4, Issue 33, December 2012, Pages 35-39

[13] Mazumder AH, Das J, Chattopadhyay P, Paul SB (2014) Antimicrobial activity of methanol extract and fractions from *Sarcochlamys pulcherrima.* Bangladesh journal of pharmacology, volume No.1 (2014)

[14] National biodiversity Centre. Species Records Details: *Sarcochlamys pulcherrima* (National Biodiversity Centre- National Biodiversity centre Plinian core Resources) *Sarcochlamys pulcherrima* 2011.

[15] RHAC (2020): An illustrative Hand Book of Rabha Hasong Autonomous Council in connection with Rabha Hasong Cultural Festival,2020 & Celebration of 25 Glorious years of RHAC.: Publish by RHAC.

[16] Sharma UK, Pegu S, (2011). Ethnobotany of religious and supernatural beliefs of the missing tribes of Assam with special reference to the “Dobur Uie” J Ethonobiol 2011;7;16 (PMC free article)

[17] Sharma, S. (2021): *Bono oukhadhir leseri butoli.* Moinak publication, Bokakhat, Golaghat, Assam.pin-785612

[18] Sofowra, A (1993). Medicinal plants and traditional medicine in Africa. Spectrum Books Ltd, Ibadan, Nigeria, pp191-289.

[19] Yadav, RNS and Agarwala, Munin 2011. Phytochemical analysis of some medicinal plants. Journal of phytology2011, 3(12), page 10-14.