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Research Article

DETECTION OF AMINO ACIDS FROM *AGLAIA LAWII* (WIGHT) LEAVES

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ABSTRACT

The present study was undertaken to evaluate amino acids from *Aglaia lawii* leaves. *Aglaia lawii* (Wight) Saldanha ex Ramamoorty is a traditional medicinal plant from family Meliaceae, indigenous to Vietnam having been used for the treatment of bacterial infection, liver, tumour diseases and headaches. The amino acids are basic units of protein. They have important role in the metabolic pathways for synthesis of secondary metabolites and therefore their presence was detected. Leaves of *Aglaia lawii* were found to be a rich source of various amino acids. Detection of amino acids from saline and water extracts of *Aglaia lawii* leaves was carried out in different mobile phases using paper chromatographic technique. The results obtained were compared with the standard amino acids in all respective mobile phases. Three mobile phases showed promising results. L- Cysteine, L- Glutamic acid, L- Histadine Monohydrochloride, DL-nor-Leucine, L-Leucine, DL- Methionine, L- Proline and L- Hydroxy Proline were common in all three phases. Total eighteen amino acids from three phases were detected from aqueous and saline extracts of the plant. This type of work is reported for first time.

Keywords: *Aglaia lawii*, Amino acids, Paper Chromatography, Proline, Valine, Mobile phase.

INTRODUCTION

The Indian region is well known for its native medicine. More than 80% of the developing world continues to rely on traditional medicines predominantly plants, for its primary health care.[1] Plant derived drugs serve as most effective and less toxic medicines for many of the diseases [2]. Aglaia is a genus of more than 100 species belonging to the Mahogany family (Meliaceae). These trees occur in the tropical and subtropical forests of Southeast Asia, Northern Australia and the Pacific [3]. Some are important trees, others have edible fruits, scented flowers or medicinal properties. Many have complex biological relationships with their dispersal agents. Some show insecticidal bioactivity [4].More than fifty species are available in India. Certain species of Aglaia have traditionally been used for their medicinal and healing properties such as the treatment of fever, diarrhea, inflammation and wounds. Extracts have also been used as bactericides, insecticides and in perfumery [5].

Aglaia lawii is distributed from India, through Burma (Myanmar), Thailand, Indo-China and throughout Malaysia towards the Solomon Islands [6, 7, 8]. *A. Lawii* is a traditional medicinal plant having been used for the treatment of bacterial infection, liver, tumour diseases and headaches [9]. Its medicinal properties have yet to be studied systematically and scientifically. However there is no information available about the amino acids of *A. Lawii* leaves. The present study deals with the leaves *of A. lawii*, is a traditional medicinal plant used in Ayurveda for therapeutic purposes. All parts of the plants are reported to be medicinally important for the treatment of various diseases in Ayurveda [10]. The pharmacological studies have shown that Aglaia species possesses various notable biological activities such as anthelmintic, antimicrobial, analgesic, anti-inflammatory, immunimodulatory, antifungal etc. [11]. The presence of amino acids from leaves has not been reported. Thus *Aglaia lawii* a medicinally important plant with wide biological activities considered for the further analysis of amino acids. The present work includes detection of amino acids from leaves of the plant using paper chromatographic technique [12]. In this study eighteen amino acids have been detected and they were compared with the standard.

MATERIAL AND METHODS

Sample collection and Identification of plant materials:-

The plant material was collected from Mulshi district of Pune, Maharashtra, India. It was authenticated at Botanical survey of India, Pune, Maharashtra, India. Its Authentication No. is BSI/WRC/Tech/2010/1028, Pune, India.

Whatmann filter paper no.1 was used for paper chromatography. Dried leaves powder extracts of definite concentrations were prepared by using water, saline and ethanol. These extracts were repeatedly treated with chloroform for the removal of chlorophyll. The chloroform layer was separated and the remaining part was used for amino acid analysis. The following three mobile phases were used in paper chromatographic technique for the detection of amino acids.

Phase 1: n-butanol: ethanol: water (2: 2: 1).

Phase 2: n-butanol: ethanol: water: pyridine (2:0.5:0.5:1).

Phase 3: n-butanol: acetone: water (2: 2: 1).

The chromatographic paper was dried and the spots were developed using ninhydrin as a spraying reagent. The different extracts showed the presence of various amino acids in different mobile phases as reported in **Table 1, 2 and 3.**

RESULTS AND DISCUSSION

The amino acids are basic units of protein. They have important role in the metabolic pathways for synthesis of secondary metabolites and therefore their presence was detected. Leaves of *Aglaia lawii* were found to be a rich source of various amino acids. Detection of amino acids by paper chromatography showed the presence of DL-2- Amino -N- Butyric acid, L- Arginine Monohydrochloride, L-Cysteine Hydrochloride, L- Cysteine, L- Glutamic acid, L- Histadine Monohydrochloride, DL- Iso- leucine, DL-nor-Leucine, L-Leucine, DL-Methionine, DL-Threonine, DL-Valine, L-Hydroxy proline and L-Proline, were common in both **phases 1** and **2.** L- Cysteine, L-Glutamic acid, L- Histadine Monohydrochloride, DL-nor-Leucine, L-Leucine, DL- Methionine, L-Tyrosine, L- Proline, 3-(3, 4-dihydroxy phenyl) DL-Alanine and L- Hydroxy Proline were found to be present in **phase-2** and **3.** L- Cysteine, L- Glutamic acid, L- Histadine Monohydrochloride, DL-nor-Leucine, L-Leucine, DL- Methionine, L-Proline and L- Hydroxy Proline are common in **Phase -1, 2 and 3.**

Table 1: Amino acids detected in the phase 1

S. No.	Name of Amino Acids	Rf value for standard amino acid	Rf value for saline extract	Rf value for water extract
1	DL-2- Amino -N- Butyric acid	0.258	0.283	0.283
2	L- Arginine Monohydrochloride	0.150	-	0.170
3	L- Cysteine Hydrochloride	0.383	-	0.400
4	L- Cysteine	0.041	0.033	0.033
5	L- Glutamic acid	0.141	0.141	-
6	L- Histadine Monohydrochloride	0.100	-	0.092
7	DL- Iso- leucine	0.350	-	0.358
8	DL-nor-Leucine	0.441	-	0.425
9	L-Leucine	0.375	0.375	
10	L-Lysine Monohydrochloride	0.083	0.083	0.066
11	DL- Methionine	0.291	-	0.291
12	L-Ornithine monohydrochloride	0.116	-	0.116
13	DL-Threonine	0.200	-	0.200
14	DL-Valine	0.316	0.325	-
15	L-Proline	0.458	0.400	-
16	L- Hydroxy Proline	0.200	0.192	-

Phase: 1: n – Butanol: ethanol: water (2: 2: 1)

Table 2: Amino acids detected in phase 2

S. No.	Name of Amino Acids	Rf value for standard amino acid	Rf value for saline extract	Rf value for water extract
1	DL-2- Amino -N- Butyric acid	0.15	0.134	0.150
2	L- Arginine Monohydrochloride	0.06	-	0.069
3	L- Cysteine Hydrochloride	0.23	0.230	0.200
4	L- Cysteine	0.023	-	0.023
5	L- Glutamic acid	0.053	-	0.055
6	L- Histadine Monohydrochloride	0.046	0.039	-
7	DL- Iso- leucine	0.253	-	0.253
8	DL-Nor-Leucine	0.269	-	0.269
9	L-Leucine	0.261	0.261	-
10	DL- Methionine	0.214	0.230	-
11	DL-Threonine	0.103	-	0.103
12	L-Tyrosine	0.182	0.192	-
13	DL-Valine	0.198	-	0.198
14	L-Proline	0.174	0.182	-
15	3-(3,4-dihydroxy phenyl) DL-Alanine	0.158	-	0.153
16	L- Hydroxy Proline	0.095	0.095	-

Phase: 2: n – Butanol: Ethanol: Water: pyridine (2:0.5:0.5:1)

Table 2: Amino acids detected in the phase -3

S. No.	Name of Amino Acids	Rf value for standard amino acid	Rf value for saline extract	Rf value for water extract
1	L- Cysteine	0.033	-	0.033
2	L- Glutamic acid	0.125	-	0.133
3	L- Histadine Monohydrochloride	0.083	-	0.083
4	DL-nor-Leucine	0.330	-	0.358
5	L-Leucine	0.320	-	0.316
6	L-Lysine Monohydrochloride	0.092	0.075	-
7	DL- Methionine	0.250	0.233	0.250
8	L-Ornithine monohydrochloride	0.092	0.075	-
9	L-Tyrosine	0.258	0.253	-
10	L-Proline	0.183	-	0.175
11	3-(3,4-dihydroxy phenyl) DL-Alanine	0.200	-	0.208
12	L- Hydroxy Proline	0.170	0.183	-

Phase: 3: n-Butanol: acetone: water (2: 2: 1)

CONCLUSION

This study indicates that saline and water extracts showed presence of eighteen amino acids from leaves of the medicinally important plant- *A. lawii* (Wight). They are basic units of protein and have important role in the metabolic pathways for synthesis of secondary metabolites. However, the isolation of the active constituents responsible for the activity is under progress in our laboratory.

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REFERENCES

1. Shanthi G, Saridha D, Mariappan V., Pharmacognostical studies on morinda Tinctoria. Roxb, International journal of pharmacy and pharmaceutical science, Vol.4, Issue 2, 2012.
2. Prabhu K, Lakshmipathy R *In vitro* anthelminthic activity of *Eclipta alba* leaf extracts. Int. J Pharm Pharm Sci, 2012; 4: 488- 489.
3. Pannell, C.M., 1992. A Taxonomic Monograph of the genus *Aglaia* Lour. (Meliaceae). Kew Bulletin Additional Series XVI, HMSO, Royal Botanic Gardens, Kew, London, UK.
4. King, M. Lu, Chiang, C. C., Ling, H. C., Fujita, E., Ochiai, M., McPhail, A. T, X-ray crystal structure of rocaglamide, a novel antileukemic 1H-cyclopenta[b]benzofuran from *Aglaia elliptifolia*. J. Chem. Soc., Chem. Commun. 1982, 20, 1150-1151.

5. Satasook C., Isman .M B., et al. Insecticide bioactivity of crude extracts of Aglaia species, Biochemical Systematics and Ecology, 1994, 22 (2), 121-127.
6. S. Moorthy in N. P. Singh and S. karthikayan, flora of Maharashtra: dicotyledones 1:499, page-500, 2000.
7. Pannel C.M. 1998. Aglaia lawii 2006 ICUN Red List of threatened species, Karnataka (India).Aglaia. In F.S .P. Ng (editor), Tree Flora of Malaya, 4: 207-230, 1989.
8. Muellner A. N, pannell C. N., Coleman, Chase M.W Journal of biogeography, 35 (10): 1769-1789, 2008.
9. C.J. Saldhana & D. H. Nicolson, Flora Hassan Distribution, 392, 1976.
10. Asolkar L. V., Kakkar K. K. and Thakre O. J. Second supplement to Glossary of Indian Medicinal Plants with Active Principles, PID, CSIR, New Delhi, (1992), pp 215.
11. Nanda, A., Iyengar, M. A., Narayan, C. S., Kulkarni, D. R. (1987): Investigations on the root bark of *Aglaia odoratissima*. Fitoterapia, 58, 189-91.
12. J.Gasparic and J.Churacek, Laboratory Handbook of paper and thin layer chromatography, Elise – Horwood Ltd., Sussey, England, P.16, 1978.