

Detection of Free Amino Acids from *Embelia basal*

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Embelia basal, a shrub from family *Myrsinaceae* have various medicinal values. Detection of amino acids from various extracts of *Embelia basal* was carried out by using different mobile phases with paper chromatographic technique. The results obtained were compared with standard amino acids in respective mobile phases. Proline and serine were found to be present in all different phases examined for fruits of *Embelia basal*. Total 18 amino acids were detected from different extracts of the plant. The maximum separation and detection of amino acids was observed in two specific mobile phases.

Key Words: *Embelia basal*, Paper chromatography, Amino acids.

INTRODUCTION

Natural products are used as traditional medicines from ancient times. They are having a great importance in Ayurveda. The present study deals with the fruits of *Embelia basal* that is Vidanga, a well known Ayurvedic medicine. Various species of *Embelia* are used in Ayurveda for therapeutic purposes¹. In Ayurveda Vidanga is used to cure pyorrhea, diarrhea and flatulence, for the treatment of cough and as an antifertility drug. Fresh juice is cooling, diuretic and laxative. Fruits are acrid, light, astringent, carminative, anthelmintic, stimulant, alternative. Its reputation is due to the action of expelling tapeworms. Fruits cure dental, oral and throat troubles. A paste of seeds is applied locally against ringworm and seed powder is used as an errhine in cold and headache. A decoction of seeds is beneficial in fever, skin diseases and chest complaints².

Literature survey revealed wide biological activity of family *Myrsinaceae*. One of the species, *Embelia ribes* is used in dental caries³. It is also used in the process of formulating Anti-AIDS Ayurvedic pharmaceutical compositions⁴. The antibacterial activity of embelin isolated from berries of *Embelia ribes* has been reported⁵. The most of the work has been carried out on

Embelia ribes. This species shows an antispermatogenic⁶ effect. It also acts as a contraceptive⁷. This family is widely spread and has applications from antediluvian days. Taking into consideration such wide biological activity, the qualitative analysis of amino acids is performed.

Fruits of *Embelia basal* having similar botanical characters are always mixed with or replaced for *Embelia ribes*, even though the therapeutic property of the formulation does not change. This suggests equal importance of *Embelia basal* fruits. Therefore, *Embelia ribes* a medicinally important plant with wide biological activities attracted us to study the similar species, *Embelia basal*.

EXPERIMENTAL

The fruits of *Embelia basal* (R & S) A. Dc. family *Myrsinaceae* obtained as a market sample. The fruits were authenticated by Agharkar Research Institute, Pune, India.

Whatmann filter paper no. 1 was used for paper chromatography. Dried fruit powder extracts of definite concentrations were prepared by using chloroform, acetone, ethanol and water. 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 amino acid estimation.

Phase 1: Pyridine:Isopropyl alcohol:Acetic acid:Water (8:8:1:3)

Phase 2: *n*-Butanol:Acetic acid:Water (4:1:5)

Phase 3: *n*-Butanol:Pyridine:Acetic acid:Water (6:10:1:3)

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 Tables 1-3.

RESULTS AND DISCUSSION

The amino acids are basic units of proteins and therefore their presence was detected. Fruits of *Embelia basal* were found to be a rich source of various amino acids. Qualitative estimation of amino acids by paper chromatography showed the presence of proline and serine in all the phases. Amino acids like butyric acid, valine, glutamic acid and methionine are found to be present commonly in phases **1** and **2**; while lysine, ornithine, iso-leucine and phenyl alanine were detected in phases **2** and **3**. Alanine and arginine were detected in phase **1**, Glycine was detected in phase **2** and remaining amino acids like aspartic acid, histidine, hydroxy proline and L-dopa were detected in phase **3**.

TABLE-1
AMINO ACIDS DETECTED IN THE PHASE 1:
PYRIDINE:ISOPROPHYL ALCOHOL:ACETIC ACID:WATER (8:8:1:3)

Name of amino acids	R _f for standard amino acids	R _f for sample
Alanine	0.330	0.330
Arginine	0.150	0.140
Lysine	0.110	0.120
Ornithine	0.100	0.090
Proline	0.410	0.410
Butyric acid	0.460	0.450
Valine	0.530	0.540
Glutamic acid	0.220	0.220
Iso-Leucine	0.640	0.640
Leucine	0.440	0.440
Methionine	0.550	0.550
Phenyl alanine	0.600	0.620
Serine	0.210	0.210

TABLE-2
AMINO ACIDS DETECTED IN THE PHASE 2:
n-BUTANOL:ACETIC ACID:WATER (4:1:5)

Name of amino acids	R _f for standard amino acids	R _f for sample
Glycine	0.230	0.230
Proline	0.370	0.370
Threonine	0.300	0.280
Butyric acid	0.430	0.430
Valine	0.530	0.530
Glutamic acid	0.310	0.330
Methionine	0.550	0.570
Serine	0.250	0.260
Tryptophan	0.590	0.610

TABLE-3
AMINO ACIDS DETECTED IN THE PHASE 3:
n-BUTANOL:PYRIDINE:ACETIC ACID:WATER (6:10:1:3)

Name of amino acids	R _f for standard amino acids	R _f for sample
Cysteine	0.440	0.440
Lysine	0.100	0.110
Ornithine	0.080	0.070
Proline	0.330	0.320
Threonine	0.280	0.300
Aspartic acid	0.500	0.500
Histidine	0.130	0.120
Iso-Leucine	0.580	0.590
Phenyl alanine	0.580	0.590
Serine	0.190	0.210
Tryptophan	0.530	0.530
Hydroxyproline	0.230	0.230
L-Dopa	0.430	0.430

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REFERENCES

1. V.S. Agarwal, Drug Plant of India, Kalyani Publishers, Ludhiana, Vol. 1, p. 353 (1997).
2. S.G. Joshi, Medicinal Plants, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, p. 289 (2000).
3. T. Namba, M. Tsunozuka, K. Saito and U. Pilapitiya, Studies on Dental Caries Prevention by Traditional Medicines (Part-VII), Vol. 39(2), pp. 146-153 (1985).
4. S. Khanna, A Process of Preparing Anti-AIDS, GB Patent, GB2314270 (1998).
5. M. Chitra, C.S.S. Devi and E. Sukumar, *Fitoterapia*, **74**, 401 (2003).
6. S.D. Seth, N. Johri and K.R. Sundaram, *Indian J. Pharmacol.*, **14**, 207 (1982).
7. T.K. Chatterjee, Herbal Options, Books and Allied (P) Ltd., Kolkata, pp. 98-99 (2000).

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