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Detection of Amino Acids from an edible *Cleome viscosa* seeds

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Abstract: *Cleome viscosa*, a common weed from family Capparidaceae is medicinally important in Ayurveda and it is used as food material. Detection of amino acids from various extracts of *Cleome viscosa* seeds were 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. Two mobile phases showed promising results. DL- Aspartic acid, L-Hydroxy proline, L- Proline, DL-Serine, 3- DL- Alanine, DL-2- Amino -N- Butyric acid and L- Tyrosine were common in both phases. Total fifteen amino acids were detected from aqueous and saline extracts of the plant.
Keywords: *Cleome viscosa*, Amino acids, Paper Chromatography.

Introduction

Herbal medicines are used from ancient times. They have a great importance in Ayurveda. The genus Cleome belongs to the family Cleomaceae (Syn-Capparaceae). Cleome comprises of 150-200 species, about 50 of these occur in Africa[1]. Investigations into micro morphological characters of the vegetative and floral organs are reported in eastern Nigeria[1]. The present study deals with the seeds of *Cleome viscosa* is a common weed, 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[2].

Leaves are used as an external application to wounds and ulcers[3]. It also acts as rubefacient and vesicant[3]. The pharmacological studies have shown that C. *viscosa* possesses various notable biological activities such as anthelnentic, antimicrobial, analgesic, anti-inflammatory, immunimodulatory, antipyretic, psychopharmacological, antidiarrheal and hepatoprotective activities[4]. A wide variety of phytoprinciples have been isolated from the plant[4]. The paste of the root is applied externally in the treatment of earaches[5]. Leaves and young shoots are cooked as a vegetable[5]. It has sharp mustard like flavour[6]. The pungent seed can be pickled or used as a mustard substitute in curries[5-6]. The juice of the plant is used as a condiment[6]. Oil obtained from the seeds is used for cooking[5]. All parts of the plant are used in liver diseases, chronic painful joints and mental disorders[7]. The presence of amino acids from roots and seeds of *Cleome viscose* have been reported[8]. The report indicates the presence of only nine amino acids from seeds. Thus *Cleome viscosa* a medicinally important plant with wide biological activities consider for the further analysis of amino acids. The present work includes detection of amino acids from seeds of the plant using paper chromatographic technique[9]. In this study fifteen amino acids have been detected and they were compared with the standard.

Material and Methods

The seeds of *Cleome viscosa* belonging to family Capparidaceae obtained as a market sample. The seeds were authenticated from Botanical survey of

India, Pune, Maharashtra. Its Authentication No. is BSI/WRC/Tech/2010/1028.Pune, India.
Whatmann filter paper no.1 was used for paper chromatography. Dried seed 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 two 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 (2:0.5:1:1.5)
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 and 2.**

Table 1: Amino acids detected in the phase 1
Phase: 1: n – Butanol: ethanol: water (2: 2: 1)

Sr. No.	Name of Amino Acids	Rf value for standard amino acid	Rf value for water extract	Seed extract Saline Extract
1	L – Lysine monohydrochloride	0.081	0.073	-
2	DL – Methionine	0.065	-	-
3	L – Ornithine monohydrochloride	0.155	-	0.147
4	DL-B-phenylalanine	0.655	-	0.631
5	DL-serine	0.139	0.139	-
6	DL-Tryptophan	0.508	0.5	-
7	L-Tyrosine	0.352	-	0.377
8	L-Proline	0.483	0.475	-
9	3-DL-Alanine	0.221	-	0.237
10	L-Hydroxy proline	0.147	0.139	-
11	DL-2 Amino N-Butyric acid	0.311	0.311	-
12	DL – Aspartic acid	0.073	0.073	-
13	L-Cysteine Hydrochloride	0.336	-	0.336
14	L-Cysteine	0.024	0.024	-
15	L-Histadine monohydrochloride	0.057	-	-
16	DL-Nor Leucine	0.606	0.606	-
17	L-Leucine	0.581	-	0.581

Table 2: – Amino acids detected in phase 2
Phase: 2: n – Butanol: Ethanol: Water: pyridine (2:0.5:1:1.5)

Sr. No.	Name of Amino Acids	Rf value for standard amino acid	Rf value for water extract	Seed extract Saline Extract
1	DL – Aspartic acid	0.073	-	0.073
2	L - Hydroxy proline	0.147	-	0.147
3	3-DL-Alanine	0.221	-	0.221
4	DL-2 Amino N-Butyric acid	0.311	-	0.286
5	L-Tyrosine	0.352	-	0.352
6	L-Proline	0.483	0.0491	-
7	DL-serine	0.139	0.139	-

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. Seeds of *Cleome viscosa* were found to be a rich source of various amino acids.

Detection of amino acids by paper chromatography showed the presence of L- Lysine monohydrochloride, L- Ornithine monohydrochloride, DL-B-Phenylalanine, DL-tryptophan, L-Proline, L-Cysteine Hydrochloride, L-Cysteine, DL-nor leucine and Leucine are found to be present in **Phase 1**.

DL- Aspartic acid, L-Hydroxy proline, 3-DL-Alanine, DL-2 Amino N- Butyric acid, L-Tyrocine, L-Proline and DL-Serine are common in **Phases 1** and **2**.

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