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HPLC Analysis of Ethnomedicinal important Plant Capparis grandis L.f. from Western Melghat Region (MS) India

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Abstract

The history of plant medicine clearly demonstrated the use of plants as an exemplary source of medicine. India is abundant in biodiversity. India's flora includes approximately 45.000 plant species, the majority of which are medicinally important. The use of medicinal plants dates back to ancient times. The knowledge of medicinal uses of plants from the local region is essential because the majorities of these plants are unknown and are not used in any practice. So, in terms of ethnobotany and ethnomedicine, the botany and medicinal uses of these plants are important.

The Present paper is focus on Ethnomedicinal importance and Phytochemical analysis of Capparis grandis from Western Melghat region of Amravati district Maharashtra. The plant has tremendous ethnomedicinal value. Phytochemical analysis of Capparis grandis was done by using HPLC. It showed the presence of maximum phytoconstituents. The present paper is also focus on the traditional uses of Capparis grandis L.f. among the Korku triable community which are located in Western Melghat region of Amravati disrict, India. The Melghat forest has great diversity in medicinal plants. Local people are aware of medical cures produced from different plant species belonging to various families to treat a wide range of ailments.

Keywords: Capparis grandis Linn, Ethnomedicine, HPLC.

Introduction:

The world's plant biodiversity is the most abundant source of herbal medicine, and approximately 60-80% of the world's population still relies on plant-based medicine, which has been used since antiquity [1]. As a traditional health-care system, it is now clear that the medicinal value of this plant is found in the bioactive phytochemical constituents, which have a distinct physiological effect on the human body. These natural compounds serve as the foundation for modern drugs [2,3].

Natural bioactive compounds found in plants are known as phytoconstituents. These phytoconstituents collaborate with nutrients and fibers to form an integrated part of the human defense system against disease and stress [4,5]. Phytochemicals are classified into two groups based on their function in plant metabolism: primary and secondary constituents. Common sugars, amino acids, proteins, and chlorophyll are the primary constituents. Secondary constituents include alkaloids, flavonoids, saponin, phenolics, and other compounds [6-8].

Capparis grandis L.f. contains a high concentration of active ingredients; knowledge of an area's plant diversity, as well as knowledge of medicinal uses of Capparis grandis L.f. by local people, is essential for the development of effective treatments for a variety of ailments. [9,10].

The study area i.e. Western Melghat forest is an excellent source of biodiversity. Western Melghat forest is located in the Satpuda hills range. Melghat is a dry deciduous type forest.

MATERIALS AND METHODS

Material Collection and sample processing:

The Capparis grandis L.f. plant material was collected from the Wesrern Melghat area and identified taxonomically in the Department of Botany Shri Vasantrao Naik Mahavidyalaya Dharni, District Amravati Maharashtra. The voucher specimen wasdeposited in the departmental herbarium.

The lateral branches of Capparis grandis L.f. plant are properly washed in tap water and then rinsed in distilled water. The rinsed branches are dried under shade for 8-10 days and powdered for further experimentation (fig. 1).

Fig. 1: Capparis grandis L.f.

Phytochemical analysis:

The HPLC analysis of Capparis grandis L.f. leaves powdered sample was done on Brucker Daltonic GMBH, Bremen, Germany make HPLC unit equipped with C18 Column and Diode Array Detector. The analysis was done at 254nm and chromatogram was analysed on HyStar version software of HPLC. The result obtained for the HPLC analysis are presented below in the form of chromatograms and their tables containing peaks numbers, Retention time and Peak area. The chromatograms were correlated with the available standard data to identify the phytocontituents present in the plant sample.

RESULT AND DISCUSSION

The current study on Capparis Grandis L.f.was carried out to investigate the presence of medicinally active phytochemicals in the leaves of Capparis Grandis L.f. The ethnomedicinal data was gathered from the study area's locals Korku tribals.

Ethnomedicinal uses of Capparis grandis L.f.:

1. The Korku tribals of this area use the stem bark to cure asthma. They use to take stem bark decoction with black pepper and garlic orally.
2. The leaves are being used as antiseptic to heal wounds and burns.
3. The tribal healers also administered the leaves and stem decoctions and berries to cure anemia, as blood tonic.
4. The viscous substance obtained from the berries are use to mix with milk and taken as refreshment.

HPLC analysis of *Capparis grandis* L.f. leaf powder sample:

The HPLC chromatogram showed presence of 13 peaks in the methanolic extracts (fig. 2). The peak numbers, retention time (min) and peak height is presented in Table 1. For the same analysis, as no standard was taken, the results were compared with available data. On the basis of retention time and peak height, it was found that, the plant contain Rutin (RT – 5.83) (Fig. 3), Quercetin (RT – 9.72) (Fig. 4) and Caffeic acid (RT- 10.82) (Fig. 5) shows the chemical structure of compound identified on the basis of HPLC [11-13].

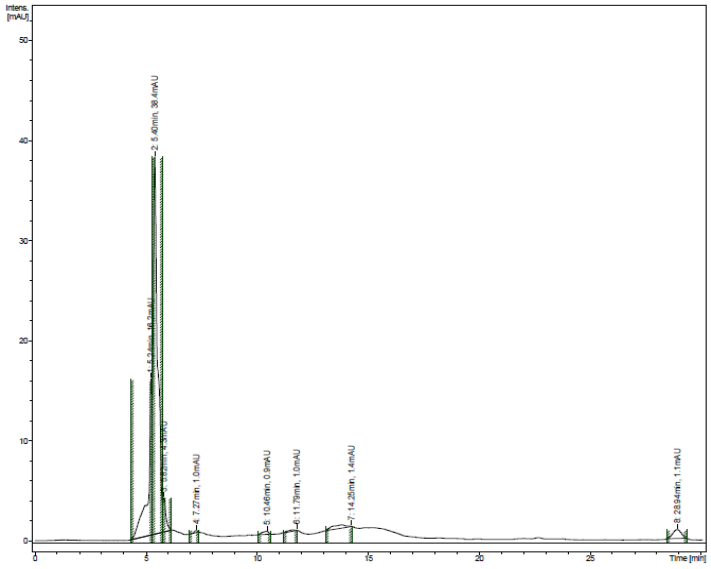

Fig. 2: HPLC chromatogram of *Capparis grandis* L.f. sample

Table 1: HPLC results for the *Capparis grandis* L.f.sample,

Peak No.	RT (Min)	Peak Height (mAU)	Identification
1	4.84	4.98	ND
2	5.25	10.61	ND
3	5.41	9.93	ND
4	5.56	5.04	ND
5	5.83	2.97	**Rutin**
6	7.69	1.08	ND
7	8.64	1.20	ND
8	9.72	1.05	**Quercetin**
9	10.82	0.99	**Caffeic acid**
10	12.97	1.91	ND

11	20.27	6.51	ND
12	22.28	0.86	ND
13	29.26	0.59	ND

ND: Not Detected

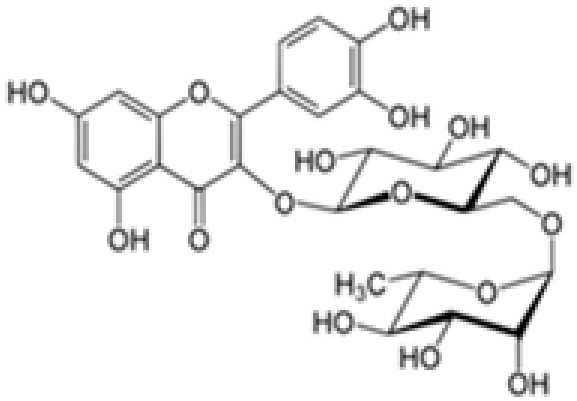

Fig. 3: structure of Rutin identified on the basis of HPLC analysis

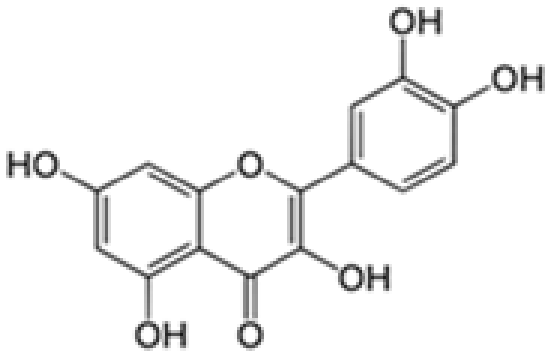

Fig. 4: structure of Quercetin identified on the basis of HPLC analysis

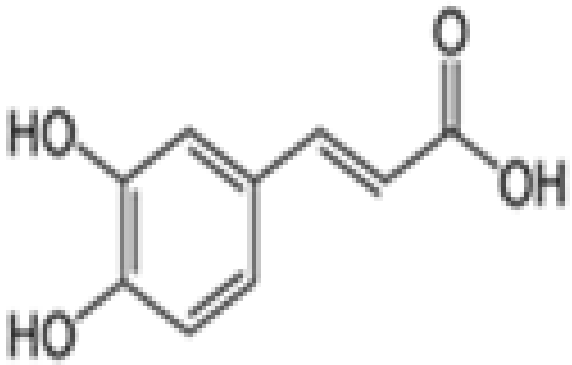

Fig. 5: structure of Caffeic acid identified on the basis of HPLC analysis

Conclusion:

The HPLC chromatogram of *Capparis grandis* L.f. methanolic extracts showed presence of 13 peaks. The result were compare with available data, on the basis of retention time and peak height, it

was found that, the plant contain Rutin (RT – 5.83), Quercetin (RT – 9.72) and Caffeic acid (RT- 10.82). Based on the findings of this study, it is possible to conclude that *Capparis grandis* L.f. has ethnomedicinal potential and is used by Korku tribal and local communities to treat a variety of ailments.

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References

1. Ebert, A. W., & Engels, J. M. M. Plant Biodiversity and Genetic Resources Matter! Plants 2020;9(12), 1706.
2. Morsy, N. Phytochemical analysis of biologically active constituents of medicinal plants. Main Group Chemistry 2014;13(1), 7-21.
3. Ingle, K. P., Deshmukh, A. G., Padole, D. A., Dudhare, M. S., Moharil, M. P., & Khelurkar, V. C. Phytochemicals: Extraction methods, identification and detection of bioactive compounds from plant extracts. Journal of Pharmacognosy and Phytochemistry 2017;6(1), 32-36.
4. Altemimi, A., Lakhssassi, N., Baharlouei, A., Watson, D. G., & Lightfoot, D. A. Phytochemicals: Extraction, isolation, and identification of bioactive compounds from plant extracts. Plants 2017;6(4), 42.
5. Bandaranayake, W. M. Bioactivities, bioactive compounds and chemical constituents of mangrove plants. Wetlands ecology and management 2002;10, 421-452.
6. Tugizimana, F., Piater, L., & Dubery, I. Plant metabolomics: A new frontier in phytochemical analysis. South African Journal of Science 2013;109(5-6), 01-11.
7. Koche, D., Shirsat, R., & Kawale, M. A. H. E. S. H. An overerview of major classes of phytochemicals: their types and role in disease prevention. Hislopia J 2016;9(1/2), 1-11.
8. Velu, G., Palanichamy, V., & Rajan, A. P. Phytochemical and pharmacological importance of plant secondary metabolites in modern medicine. Bioorganic phase in natural food: an overview 2018;135-156.
9. Mishra, S. N., Tomar, P. C., & Lakra, N. 2007;Medicinal and food value of Capparis a harsh terrain plant.
10. Tlili, N., Elfalleh, W., Saadaoui, E., Khaldi, A., Triki, S., & Nasri, N. The caper (Capparis L.): Ethnopharmacology, phytochemical and pharmacological properties. Fitoterapia 2011;82(2), 93-101.
11. Ashok, P. K., & Saini, B. HPLC analysis and isolation of rutin from stem bark of Ginkgo biloba L. Journal of Pharmacognosy and Phytochemistry 2013;2(4), 68-71.
12. Al-Rifai, A. A., Aqel, A., Awaad, A., & Alothman, Z. A. Analysis of Quercetin and Kaempferol in an Alcoholic Extract of Convolvulus pilosellifolius using HPLC. Communications in Soil Science and Plant Analysis 2015;46(11), 1411-1418.
13. Fulcrand, H., Cheminat, A., Brouillard, R., & Cheynier, V. Characterization of compounds obtained by chemical oxidation of caffeic acid in acidic conditions. Phytochemistry 1994;35(2), 499-505.