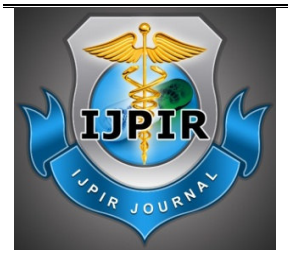
Research Article



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Determination of Gallic acid content from marketed monoherbal formulations containing *Emblica officinalis* by HPLC technique

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ABSTRACT

Standardization refers to the process of delivering a product with a specified minimum level of one or more plant constituents. In some cases this is accomplished by measuring the level of a chemical in a crude herbal extract and establishing a standard amount of that chemical for future production. The standardization of herbal formulations has become very essential as there is increase in the demand and frequent usage of the herbal formulations by the people. Monoherbal formulations containing *Emblica officinalis* extract were collected from the commercial market and standardized for their gallic acid content by High Performance Liquid Chromatographic Technique (HPLC). The Tablet and Capsule forms of different brands of marketed herbal formulations of Amla were selected and analysed by HPLC Technique. The total peak area of standard (gallic acid) and the corresponding peak area of samples were compared and the amount present in it was calculated. The results reveal that there are lot of variations between the samples and the percentage of gallic acid is not uniform. The present study indicates the necessity of development of analytical procedures for all herbal formulations available in the market to ensure the quality and efficacy of the products.

INTRODUCTION

The World Health Organization (WHO) estimates that about 80% of the population living in the developing countries relies exclusively on traditional system of medicine for their primary health care needs. Herbal drugs constitute a major part in all traditional systems of medicine and are a triumph of popular therapeutic diversity. Early in this century, the greater part of medical therapy in the industrialized countries was dependent on the medicinal plants but, with the growth of pharmaceutical industry, their use fell out of fewer. Even so, 25% of all prescription dispensed between 1959 and 1980 from community pharmacies in the United States contained plant extract or active

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principles prepared from higher plant [1]. Now the pendulum is swinging back and the value of medicinal plants in treatment is receiving increasing attention. There is a growing movement towards the consumption of dietary supplements and more natural therapies out of a desire by people to take more control over their health. These are not only used for primary health care in rural areas or in developing countries, but also in developed countries where modern medicines are predominantly used. While the traditional medicines are derived from medicinal plants, minerals, and organic matter, the herbal drugs are prepared from medicinal plants only.

The idea of standardization is to establish consistent potency and to control the full spectrum of bioactive chemical constituents naturally occurring in medicinal plants from batch to batch. This is complicated by the complex chemical group of plants and the difficulty in obtaining the pure materials needed to compare and measure the amounts of any one particular compound in a plant mixture[2].

The aim of the present study is to determine the content variations of monoherbal formulations containing *Emblica officinalis* available in the commercial market. For our study we have selected gallic acid as analytical marker present in the Amla for the HPLC analysis. The Tablet and Capsules forms of different brands of marketed monoherbal formulations of Amla were selected and standardized for their gallic acid content by HPLC Technique.

MATERIALS AND METHODS

Sample collection

The capsules and powder forms of different brands of five monoherbal formulations containing *Emblica officinalis* were collected from various community pharmacies and given name as A to E and used for the study.

Standard Preparation

Prepared 0.1mg/ml concentration of gallic acid in HPLC grade water and used as standard solution.

Sample Preparation

Accurately weighed quantity of uniformly mixed formulation equivalent to 0.1mg/ml of gallic acid into a 100ml volumetric flask and added 40ml of hot HPLC grade water and sonicated for 10 minutes. Cooled and made up the volume upto 100ml with HPLC grade water. Mixed well and filtered the solution through 0.2µ (or) 0.45µ membrane filter paper.

Chromatographic conditions

Solvent A - Dissolved 0.136gm of anhydrous potassium dihydrogen orthophosphate (KH2PO4) in900ml of HPLC grade water and added 0.5ml of ortho-phosphoric acid. Added water to the above to make up the volume upto 1000ml. The above solution was filtered through 0.45µ membrane and degasses it in a sonicater for 3 minutes[3-6].

Solvent B - Acetonitrile solution

Table No. 1 Gradient conditions

TIME (min)	BUFFER CONCENTRATION (SOVENT A)	ACETONITRILE CONCENTRATION (SOLVENT B)
0.01	95.0	5.0
18.0	55.0	45.0
25.0	20.0	80.0
28.0	20.0	80.0
35.0	55.0	45.0
40.0	95.0	5.0
45.0	95.0	5.0

Column : Hibar, Prepacked column, LiChrosher 100, RP-18e (5µm) (Merck)
Phenomenex – Luna 5µ C-18(2) SIZE: 250×4.60mm
Detector : Photo diode array detector & UV Detector
Wave length : 270nm
Flow rate : 1.5ml/min

Injection volume : 20µl

RESULT AND DISCUSSION

The HPLC analyses of different monoherbal marketed formulations were carried out for the quantitative estimation of gallic acid, the active principle present in *Emblica officinalis*. In the present study the monoherbal formulations were selected in different dosage forms like tablets and capsules from various community pharmacies in the market. The results are tabulated in Table No: 2 and Fig No. 1-6.

Table No. 2 Results of HPLC Analysis of herbal formulations

Sl. No	Brand Name	Dosage Forms	% Content of Gallic acid
1	SAMPLE A	Capsule	69.68
2	SAMPLE B	Tablet	4.53
3	SAMPLE C	Capsule	60.03
4	SAMPLE D	Capsule	8.21
5	SAMPLE E	Capsule	14.92

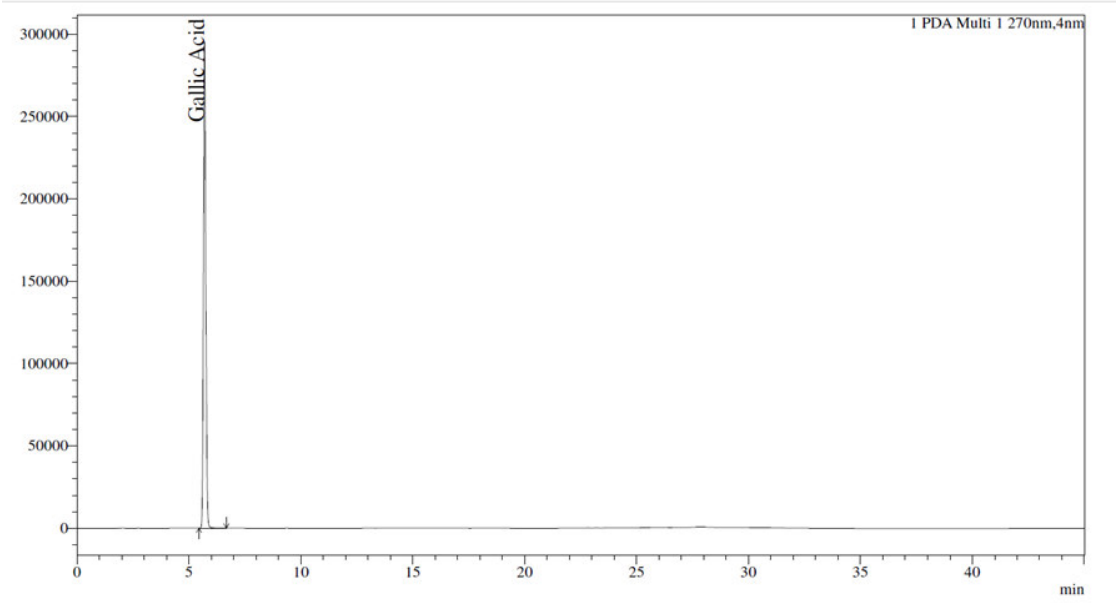

Fig.No. 1. HPLC Chromatogram of Standard Gallic Acid.

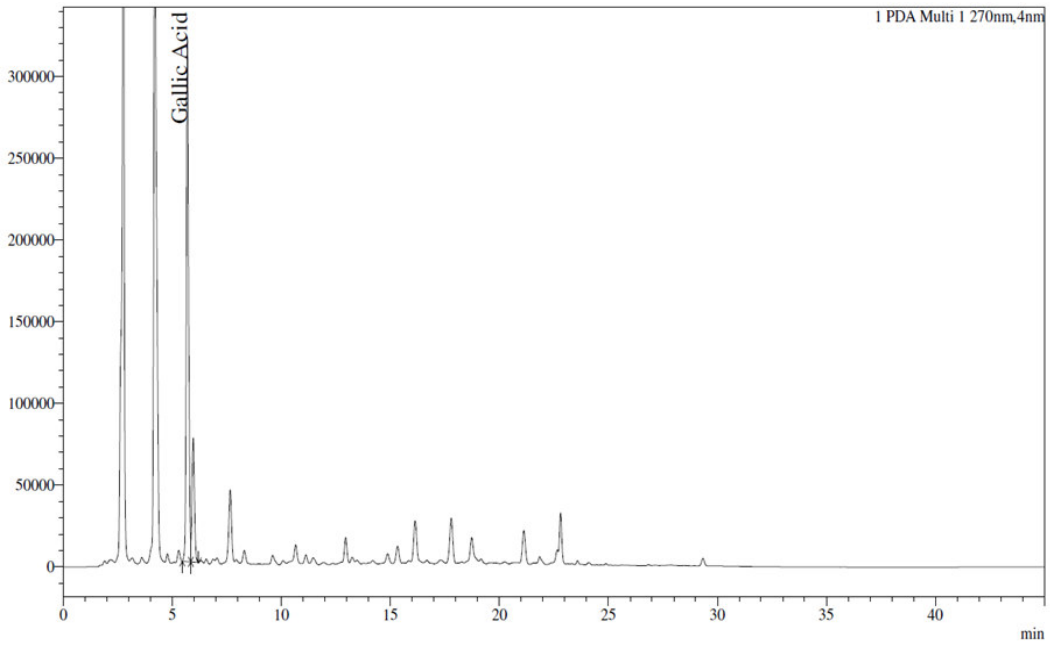

Fig.No. 2. HPLC Chromatogram of SAMPLE – A.

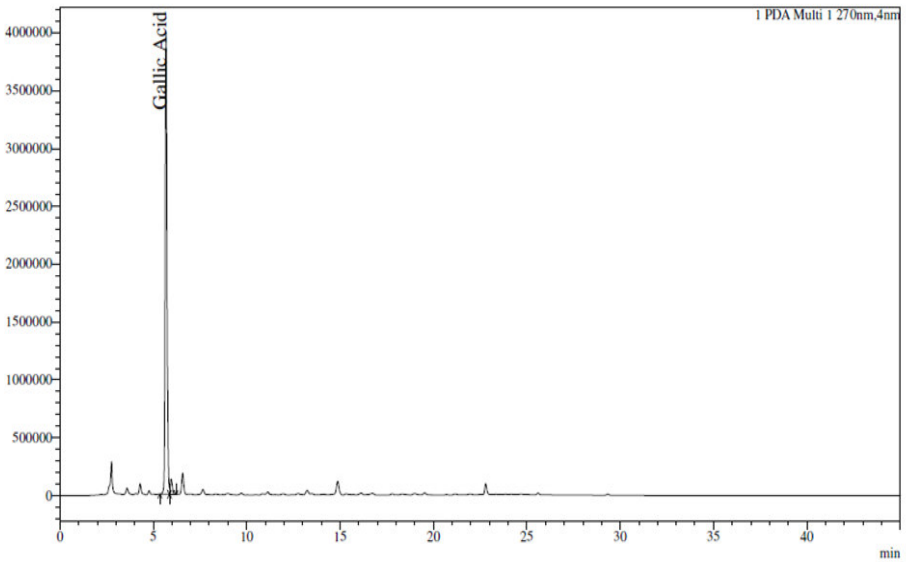

Fig.No. 3. HPLC Chromatogram of SAMPLE – B.

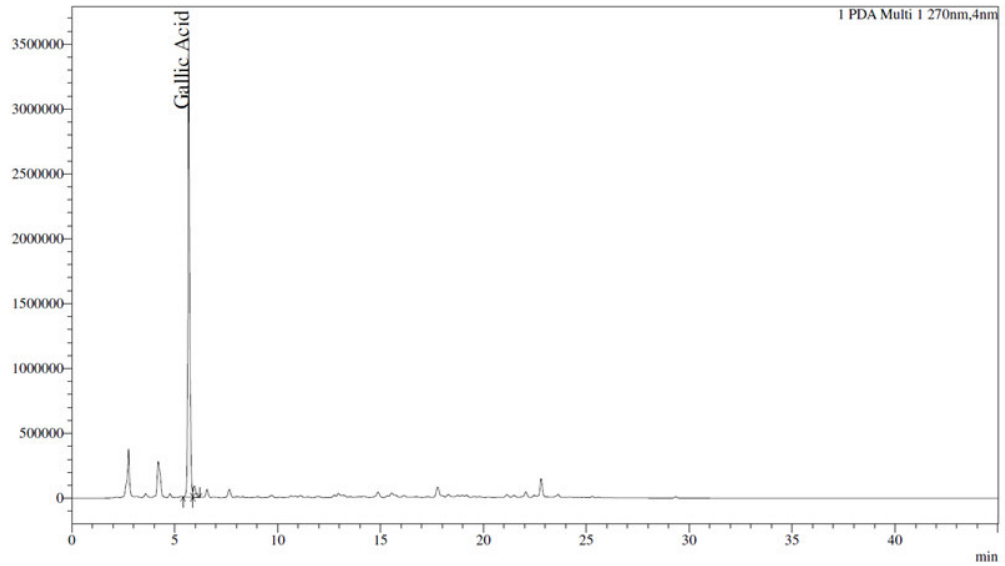

Fig.No. 4. HPLC Chromatogram of SAMPLE – C.

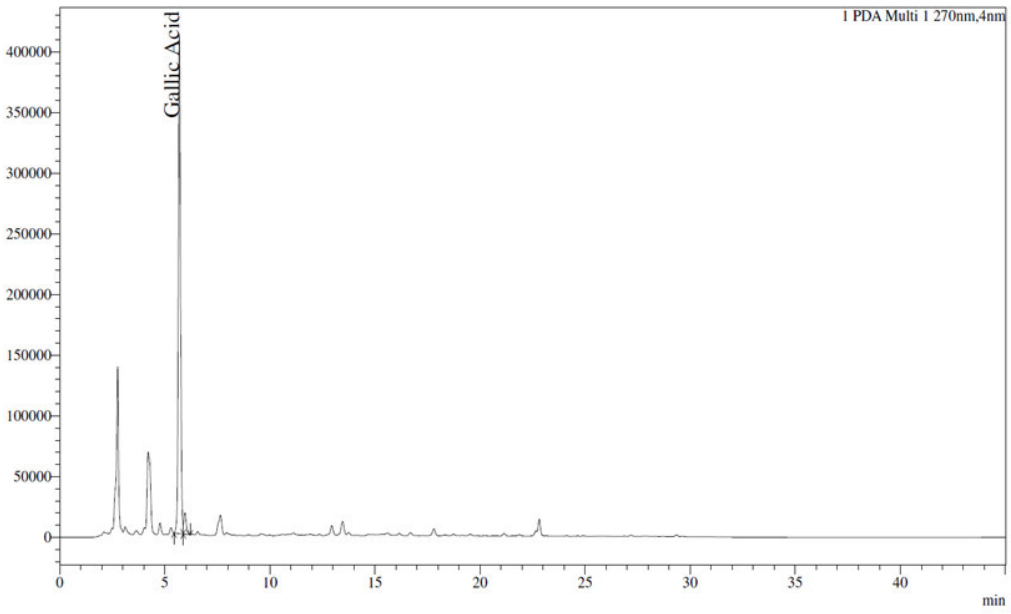

Fig.No. 5. HPLC Chromatogram of SAMPLE – D.

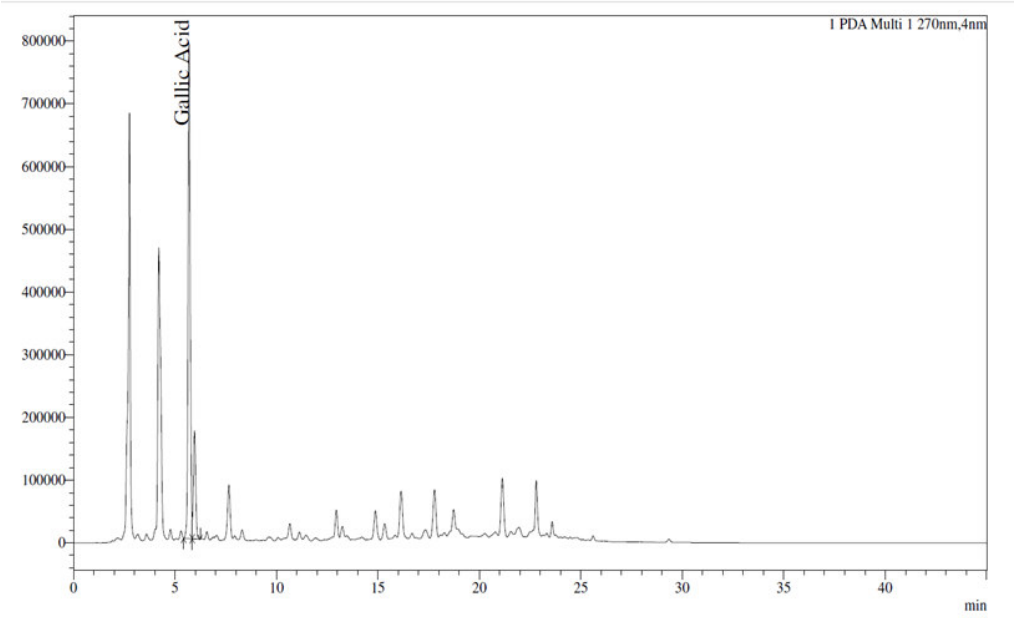

Fig.No. 6. HPLC Chromatogram of SAMPLE – E.

The monoherbal formulations of Amla containing the label claim 250mg, 250mg, 425mg, 250mg, 500mg of *Emblica officinalis* were taken for analysis. The retention time of the standard Gallic acid was found to be 5.703 and the retention time of various collected formulations of A, B, C, D, E, were found to be 5.692, 5.699, 5.687, 5.698 and 5.698 respectively and confirmed the presence of gallic acid in all the marketed formulations. The content of gallic acid was estimated by comparing the peak area of standard and the respective samples. The amount of gallic acid was found to be 69.68%w/w, 4.53%w/w, 60.03%w/w, 8.21%w/w and 14.92%w/w from the sample A, B, C, D and E respectively.

From the results it was reveals that the content of gallic acid is High in SAMPLE A with 69.68% followed by SAMPLE C with 60.03% and Less in SAMPLE E with 14.92% followed by SAMPLE D with 8.21% and SAMPLE B with 4.53%.

SUMMARY AND CONCLUSION

Today market is flooded with herbal medicines. A number of companies are entering into the arena of herbal medicines are available for each and every disorder ranging from diabetes to rejuvenators. Many of herbal therapies fall under one single title, Complementary and Alternative Medicine (CAM). Billions of dollars are spent on Herbal remedies per year. In the past situation regarding the quality of the numerous herbal drugs used by manufactures or sold directly to the public was by no means so well established [7]. Some of the pharmacopoeias which are only dedicated to herbal, while in some herbal and their extracts are mentioned in a view to provide their standards by giving their standard test method [8]. Now the requirement of current herbal market is need to improve and increase the analytical methods to test all commercially available herbal products in the market. Hence we selected the standardization of herbal products containing amla by HPLC technique. From the results it was concluded that a lot of variations in the gallic acid content in the selected five products containing amla and it indicates that the need of analytical procedure to test all herbal formulations available in the commercial market as like allopathic medicines.

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