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Quercetin Quantification in Some Important Medicinal Plants Using High Pressure Liquid Chromatography

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ABSTRACT:

The phytochemical, quercetin is well known for its anti-inflammatory property. The aim of the study is to estimate the impact of its presence in the anti-inflammatory medicinal property of *Baliospermummontanum, Drypetesroxburghii* and *Codiaeumvariegatum.* The quantification study was conducted using HPLC technique.The obtained result was compared with standard quercetin retention time and its peak area. Quercetin quantification by HPLC showed that significant amount of quercetin is present in *B. montanum, D. roxburghii* and *C. variegatum.* Its presence might be enhancing the medicinal properties of these plants. This work calls for the need of further research of isolation and characterization of quercetin and related compound from selected medicinal plants for exploiting them as a source of anti-inflammatory drugs.

KEYWORDS: Medicinal plants, *B. montanum, D. roxburghii* and *C. variegatum,* HPLC, quercetin

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1. INTRODUCTION:

The use of plants for treating diseases is as old as the human civilization. The low cost and safe quality makes herbal medicine superior than synthetic drugs. In the process of evolution, plants and humans are co-evolved and therefore the photochemical have significant positive effect on human systems. Since ancient times, people have been exploring the nature and more particularly plants in search of new drugs. This has resulted in the use of large number of medicinal plants to treat various diseases. Many of these plants have been shown curative properties and resulted in discovering few new drugs of western medicines. Edeoga reported that medicinal value of plants lies in some chemical substances that produce a definite physiological action on the human body[1]. Hill, opined that most of the important bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolics compounds[2].

Flavonoids (the term is derived from the Latin word “flavus,” meaning yellow) are phenolic substances which exhibit biological activities including antiallergenic, antiviral, anti-inflammatory, and vasodilating actions. Approximately, more than 3000 varieties of flavonoids have been identified, and it has aroused particular interest recently because of their potential beneficial effect on human health reported to have antiviral, anti-allergic, antiplatelet, anti-inflammatory, antitumor, antioxidant, and treatment of neurodegenerative disorders[3].Quercetin is one of the important bioflavonoids present in more than twenty plants material and which is known for its anti-inflammatory, antihypertensive, vasodilator effects, antiobesity, anti hypercholesterolemia and anti a therosclerotic activities[4,5].

Understanding the medicinal importance of quercetin, the current study is focused on its quantification from some members of Euphorbiaceaeviz *B. montanum*, *D. roxburghii* and *C. variegatum*.

2. EXPERIMENTAL SECTION

2.1 Sample preparation

The dried sample was mixed with 1% of extract was prepared in HPLC grade methanol. Then the sample was sonicated using ultrasonicator for 10 min. 1 ml of this solution was injected into the HPLC column using mobile phase of 3664 (acetonitrile and 0.1 %phosphoric acid). Quercetin in the samples was identified by comparison of their retention times (tR) with the standard Quercetin.

2.2 Standard preparation

Standard preparation for quercetin Standard (100 mg) were transferred to 100 ml volumetric flask and dissolved in mobile phase. The flask was shaken for 10 minute and the volume was made

up to the mark with methanol to obtain stock solution of Quercetin (1000 µg/mL), stock solution was filtered through a 0.2 µm membrane filter. The working standard solution of quercetin was prepared from suitable aliquots of stock solution were pipetted out and volumes were made up to the mark with mobile phase as diluents.

2.3 HPLC analysis

The quercetin quantification was done by HPLC Shimadzu LC-20A. The Column Phenomenox Luna C18 column, 250mm x 4.6 mm Particle size 5 micro meter was used with Mobile Phase Acetonitrile Water (7030). The Flow rate was maintained at 1ml/min 5. Sample Volume injected 20 ul sample volume was injected and it was run for 45min. The The HPLC equipment comprised Hewlett-Packard (HP) 1050 Chem Station Software, an HP model 35900 interface unit, an HP 9000 Series 300 computer, and an HP DeskJet 500 Printer. A Waters 486 tuna-ble absorbance detector was operated at 254 nm; detector sensitivity was 0.05 AUFS and the column oven temperature was 30°C.

3. RESULTSAND DISCUSSION

In the present studies, it was found that crude extracts of all three medicinal plants was analyzed for HPLC spectra and compared with standard quercetin at the retention time 2.700, 2.964 and 3.211 (Fig.1).

In the present study, peak area was used for quantification of flavonoids present in the plant sample at 3 peak measured at 254 nm with peak area 5.704 %, 77.600 % and 16.696 %.

In the present investigation, *B. montanum* leaf, showed 9 peaks. These 9 peaks were notice at retention time 1.760, 1.925, 2.597, 2.796, 2.930, 3.292, 3.343, 4.499 and 8.975 with peak area 40.721, 34.576, 11.081, 3.949, 7.897, 0.505, 0.492, 0.667 and 0.111 (Fig. 2).

In the current study, through HPLC analysis of *D. roxburghii* leaf showed 5 peaks. The peaks were marked at retention time 1.886, 2.016, 3.036, 3.240 and 3.483 with peaks area 46.508, 52.940, 0.170, 0.203 and 0.180 (Fig. 3).

In the present investigation, the HPLC analysis of *C. variegatum* leaf exhibited 7 peaks. The 7 peaks were recorded at retention time 1.793, 2.598, 2.845, 4.560, 5.716, 6.619 and 8.448 with peak area 41.041, 34.347, 11.163, 3.980, 7.959, 0.509 and 0.495 (Fig. 4).

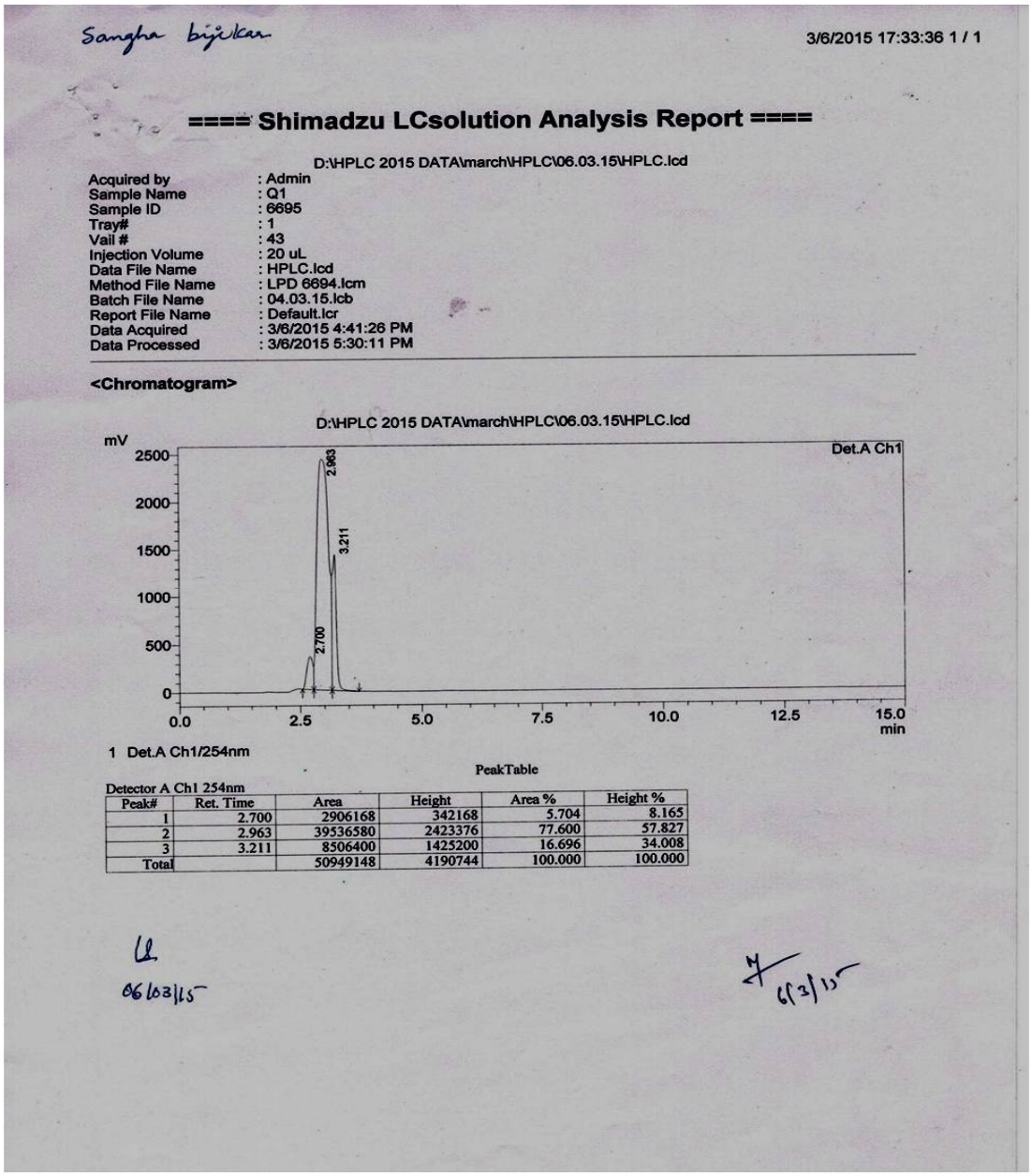
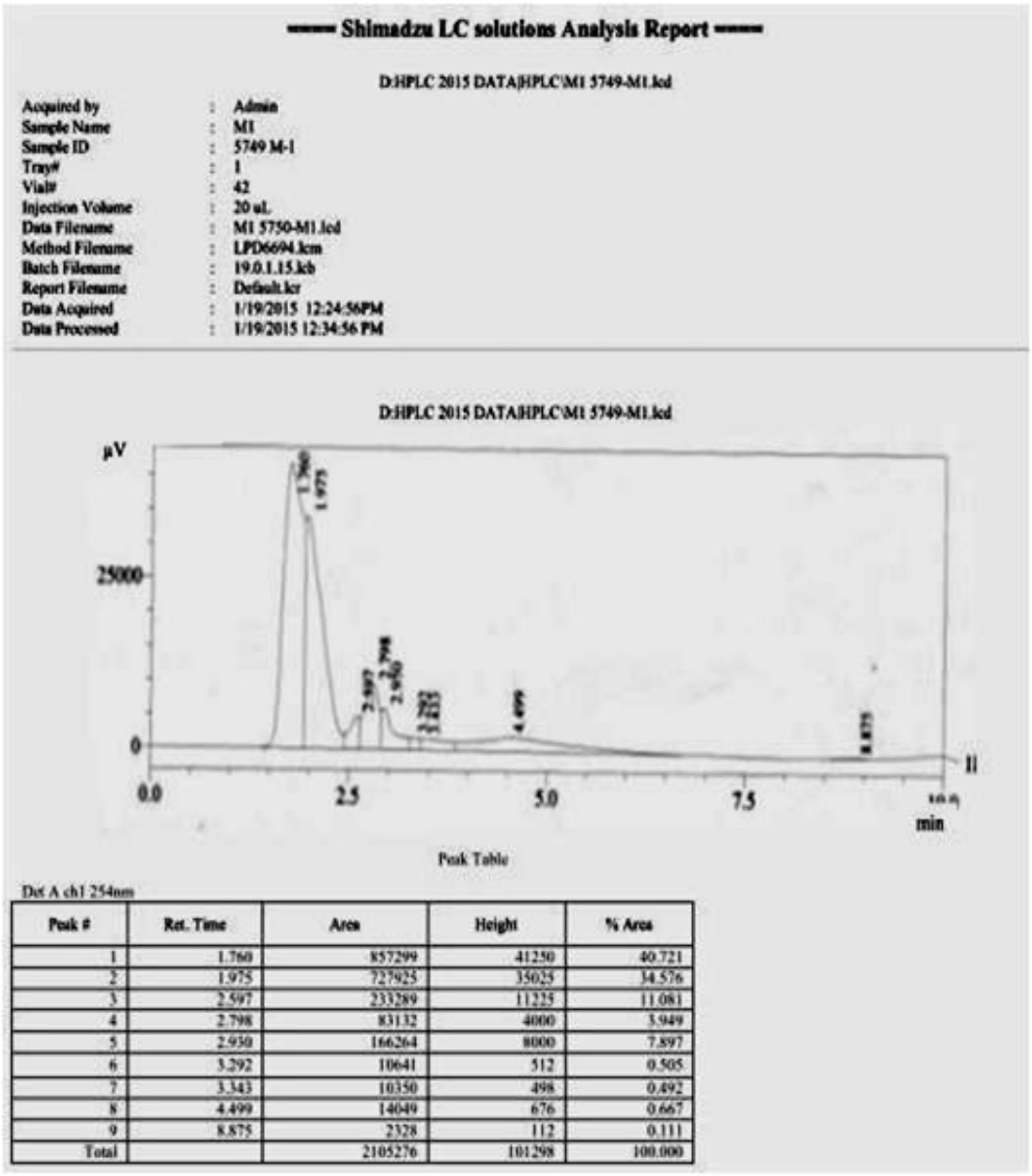


Fig. 1: Standard High Pressure Liquid Chromatography chromatogram of Quercetin



Shimadzu LC solutions Analysis Report

D:\HPLC 2015 DATA\HPLC\M1 5749-M1.lcd

Acquired by	:	Admin
Sample Name	:	M1
Sample ID	:	5749 M-1
Tray#	:	1
Vial#	:	42
Injection Volume	:	20 uL
Data Filename	:	M1 5750-M1.lcd
Method Filename	:	LPD6694.lcm
Batch Filename	:	19.0.1.15.lcb
Report Filename	:	Default.lcr
Data Acquired	:	1/19/2015 12:24:56PM
Data Processed	:	1/19/2015 12:34:56 PM

Peak Table

Det A ch1 254nm

Peak #	Ret. Time	Area	Height	% Area
1	1.760	857299	41250	40.721
2	1.975	727925	35025	34.576
3	2.597	233289	11225	11.081
4	2.798	83132	4000	3.949
5	2.930	166264	8000	7.897
6	3.292	10641	512	0.505
7	3.343	10350	498	0.492
8	4.499	14049	676	0.667
9	8.875	2328	112	0.111
Total		2105276	101298	100.000

Fig. 2: High Pressure Liquid Chromatography Chromatogram of methanol leaf of *Baliospermummontanum*

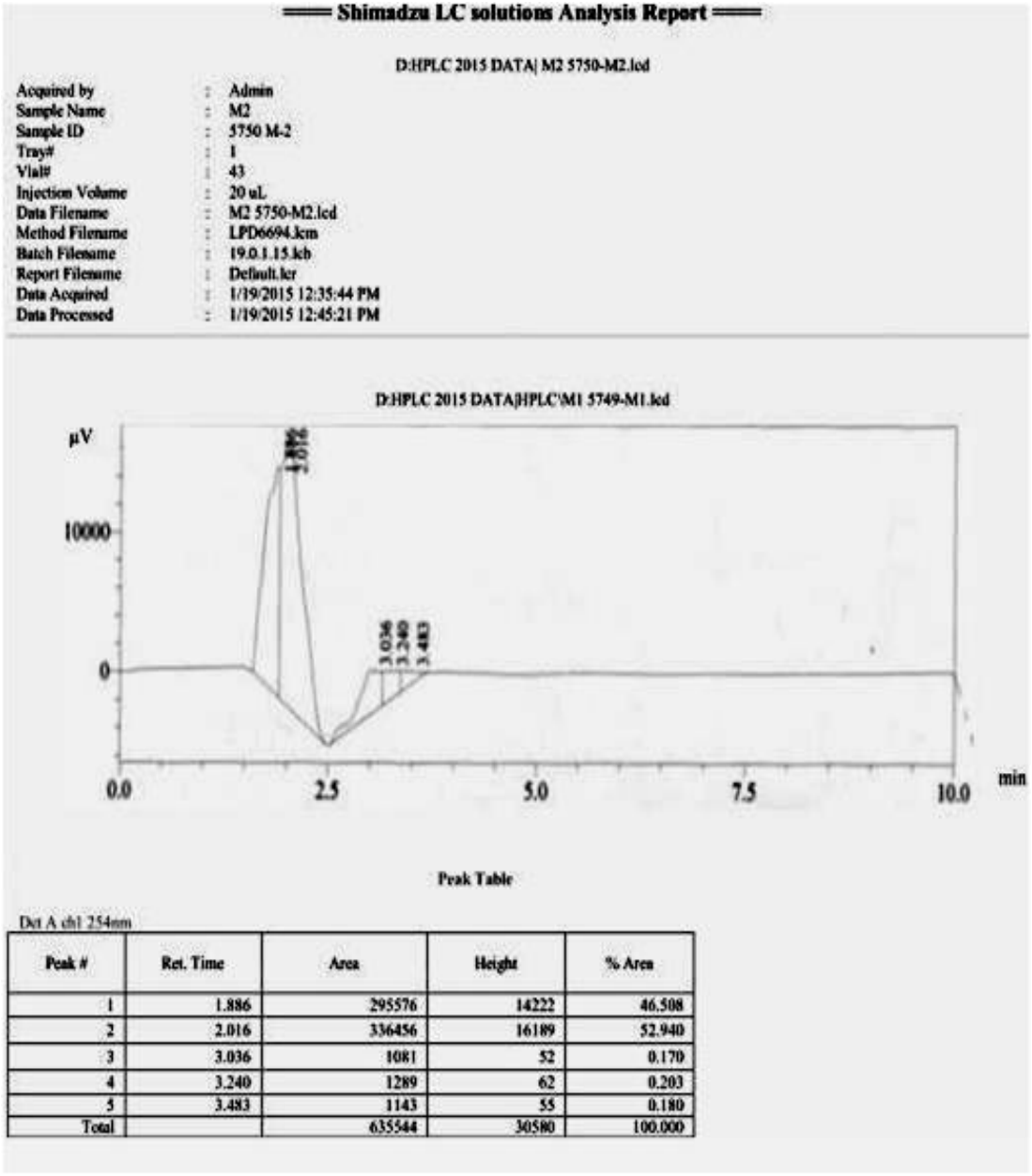
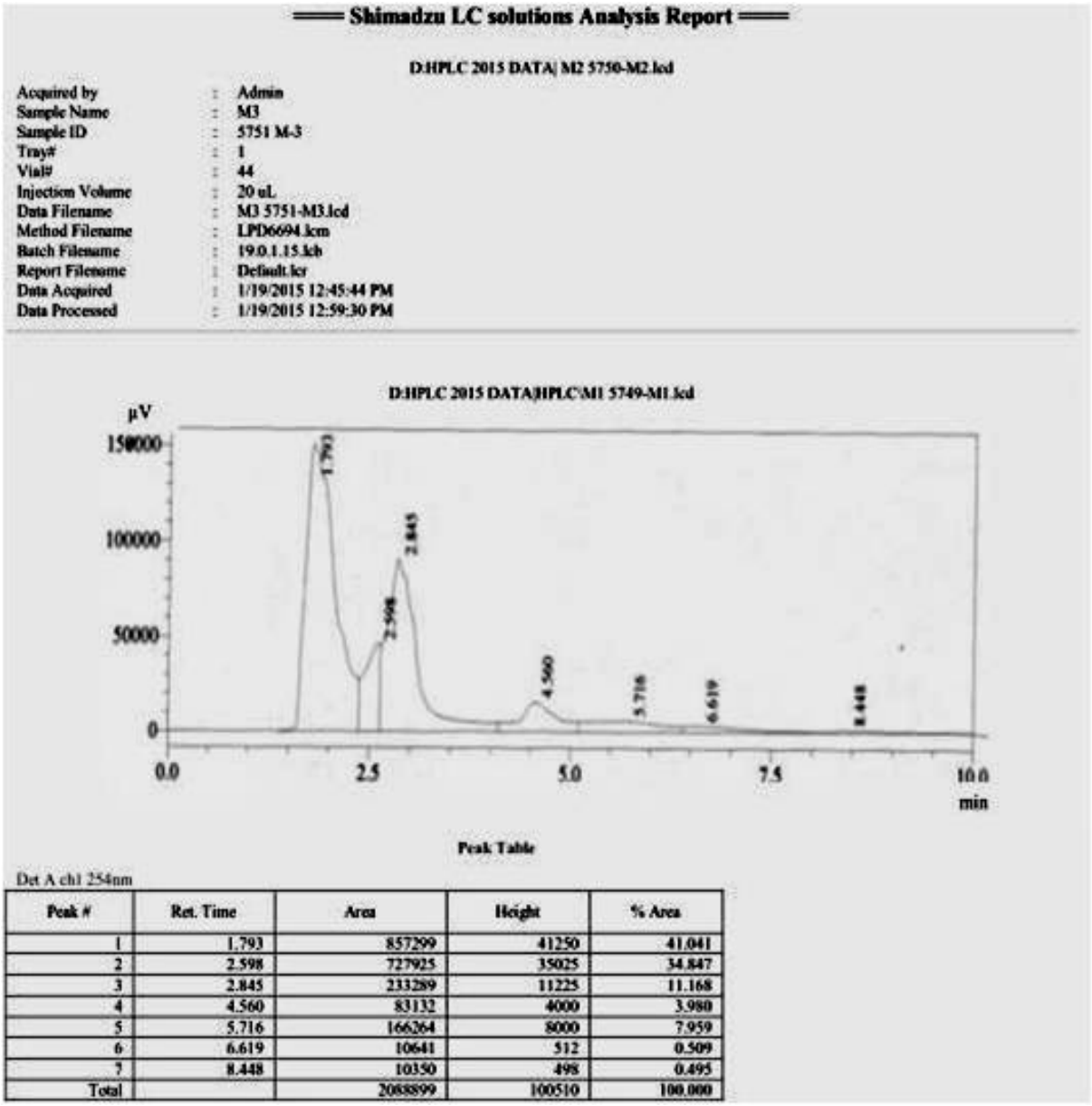


Fig. 3 High Pressure Liquid Chromatography Chromatogram of methanol leaf of *Drypetesroxburghii*



Peak #	Ret. Time	Area	Height	% Area
1	1.793	857299	41250	41.041
2	2.598	727925	35025	34.847
3	2.845	233289	11225	11.168
4	4.560	83132	4000	3.980
5	5.716	166264	8000	7.959
6	6.619	10641	512	0.509
7	8.448	10350	498	0.495
Total		2088899	100510	100.000

Fig. 4: High Pressure Liquid Chromatography Chromatogram of methanol leaf of *Codiaeumvariegatum*

Quercetin quantification by HPLC showed that significant amount of quercetin is present in *B. montanum, D. roxburghii* and *C. variegatum.* Its presence might be enhancing the medicinal properties of these plants.

In the present investigation quercetin quantification was performed through HPLC and found 9 peaks in methanol leaf extracts of *B. montanum* and 5 peaks of quercetin each in *D. roxburghii* and *C. variegatum* and these peaks were compared with the standard peak 3.2 at 254 nm, this indicates that significant amount of quercetin is present in methanol leaf extract of *B. montanum, D. roxburghii* and *C. variegatum.* This finding coincides with Neelam Verma and Nitu Trehan (2013)[6]; Garima and Baghel (2012), and they have also quantified quercetin in medicinal plants[7].

4. CONCLUSION:

This work demands forfurtherstudy of isolation and characterization of quercet in and related compound from *B. montanum, D. roxburghii* and *C. variegatum* for exploiting them as a source of anti-inflammatory drugs.

5. REFERENCES

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