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Research Article

HPTLC Fingerprints of Various Secondary Metabolites in the Traditional Medicinal Herb *Hypochaeris radicata* L.

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The aim of this work was to elucidate the various secondary metabolites such as alkaloids, flavonoids, glycosides, saponins, and terpenoids in the methanolic leaf and root extracts of *Hypochaeris radicata*, a most important traditional medicinal plant species in Nilgiris, the Western Ghats, India, using high performance thin layer chromatography (HPTLC). This study was carried out using CAMAG HPTLC system equipped with LINOMAT 5 applicator, TLC scanner 3, Reprostar 3, and winCATS 1.3.4 software. A comprehensive assortment of phytoconstituents in methanolic extracts through HPTLC fingerprinting profiles displayed the existence of alkaloids (3 in leaf and 1 in root extract), flavonoids (4 in leaf extract and 5 in root extract), glycosides (1 in leaf extract and 3 in root extract), saponins (1 in root extract), and terpenoids (1 in leaf and root extracts, resp.). The current study overlays boulevard for *H. radicata* to provide a direction for further exploration in precluding communicable and noncommunicable ailments.

1. Introduction

Natural products of plant origin are widely recognized in the pharmaceutical industry for their broad structural diversity as well as their wide range of pharmacological activities [1, 2]. The subject of phytochemistry is concerned with the enormous variety of organic substances that are elaborated and accumulated by plants and deals with structures of these substances, biosynthesis, turnover, and metabolism, their natural distribution, and their biological function [3, 4]. HPTLC is rational for expansion of chromatographic fingerprints to determine major active constituents of medicinal plants. The separation and resolution are much better, and the results are much more reliable and reproducible than TLC. Combined with digital scanning profiling, it has the main advantage of *in situ* qualitative and quantitative measurements by scanning densitometry. Besides, the colourful pictorial HPTLC image provides extra, intuitive visible colour and/or fluorescence parameters for parallel assessment on the same plate. It also revealed a better separation of individual secondary metabolites.

As a megabiodiversity nation, India is endowed with high species richness of medicinal plants. Despite this status, a huge number of traditional medicinal plants are still not explored phytochemically with particular reference to secondary metabolites of medicinal importance. *Hypochaeris radicata*, a member of the family Asteraceae is an edible perennial herb, distributed in the high hills of Nilgiris, the Western Ghats, Tamil Nadu, India. It is an important traditional medicinal species in the Nilgiris both by tribal and nontribal healers for various ailments. The tender leaves and roots of this species are prescribed by the Thoda tribal community of Nilgiris, a major tribal group in this mountain, for various medical ailments, mainly for the treatment of inflammation [5, 6]. It is being prescribed by the local healers of Nilgiris for the treatment of jaundice, rheumatism, dyspepsia, constipation, hypoglycemia, and kidney related problems also [7]. Our previous reports exhibited more pronounced antimicrobial [8–10], antioxidant [11], and anti-inflammatory [12] activities also for *H. radicata*. A literature survey on the chemical constituents of the family members revealed the presence of alkaloids [13], flavonoids [14], terpenoids [15],

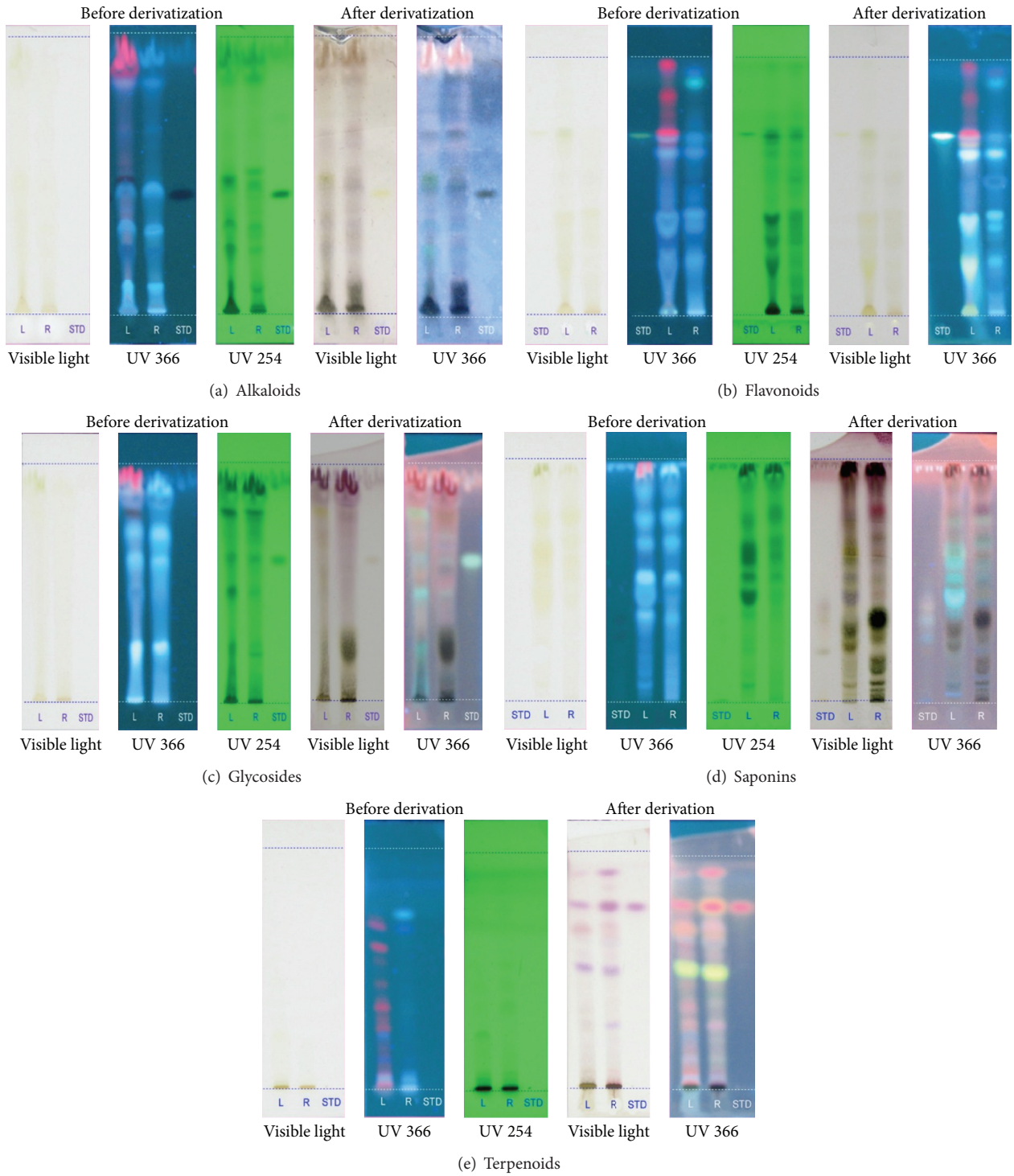


Figure 1: (a–e) HPTLC fingerprinting profile for various secondary metabolites present in *Hypochaeris radicata*. L: leaf, R: root, and STD: standard.

sesquiterpene lactones [16–18], and so forth. However, there have been no reports on phytochemical constituent profiles for *Hypochaeris radicata*. Thus in the light of knowledge that *H. radicata* is having folklore uses, we intend to investigate the assortment of phytochemical profiles using HPTLC task that exerted the observed biological activities of this species.

2. Materials and Methods

2.1. Collection and Authentication of Plant Material. The leaf and root parts of *H. radicata* were collected from Kattabettu, Nilgiris, the Western Ghats. The plant was authenticated in Botanical Survey of India, Southern Circle, Coimbatore, by

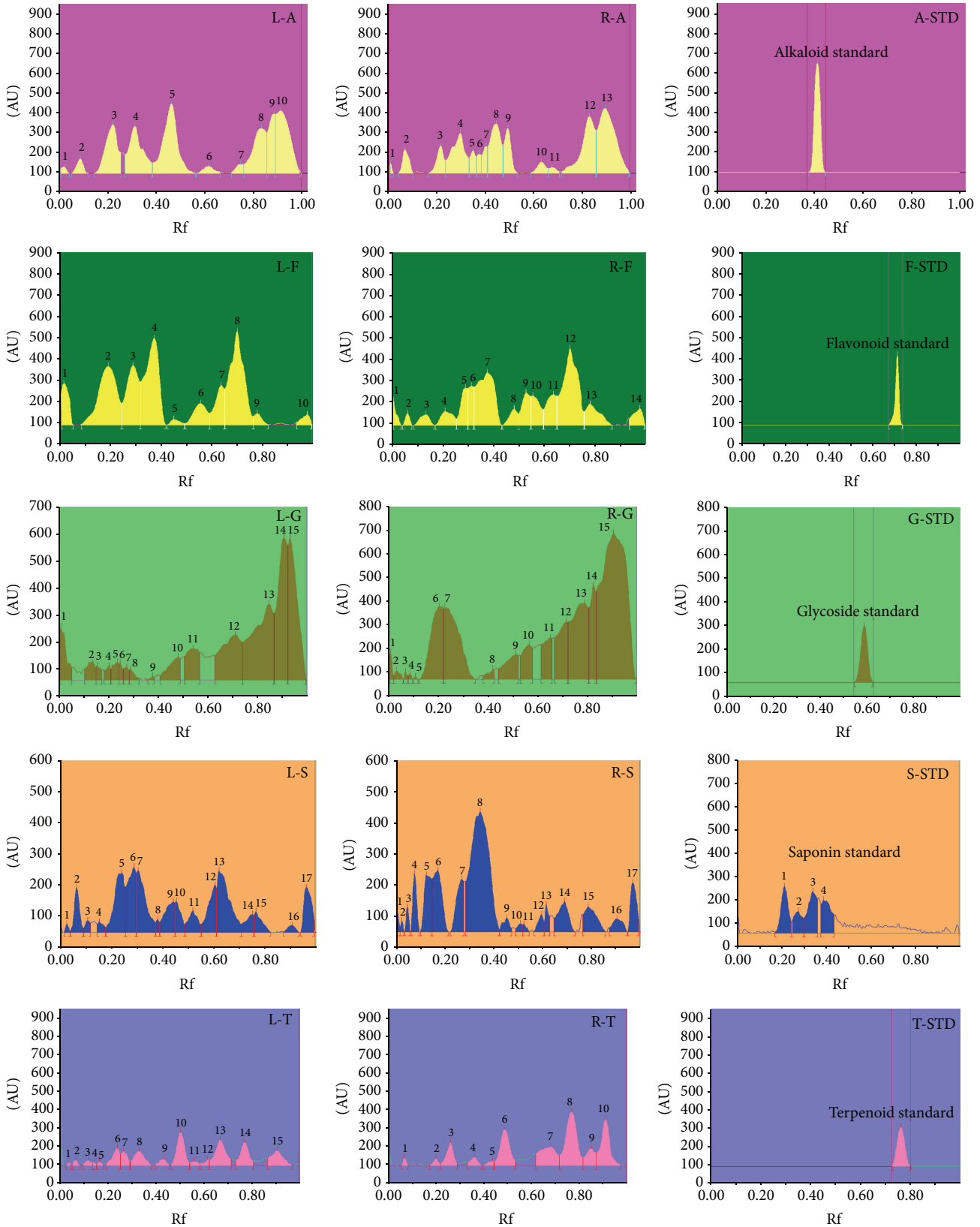


Figure 2: HPTLC densitogram for methanolic leaf and root extracts of *Hypochaeris radicata* with their respective standards. L: methanolic leaf extract; R: methanolic root extract; STD: standard; A: alkaloids; F: flavonoids; G: glycosides; S: saponins; T: terpenoids.

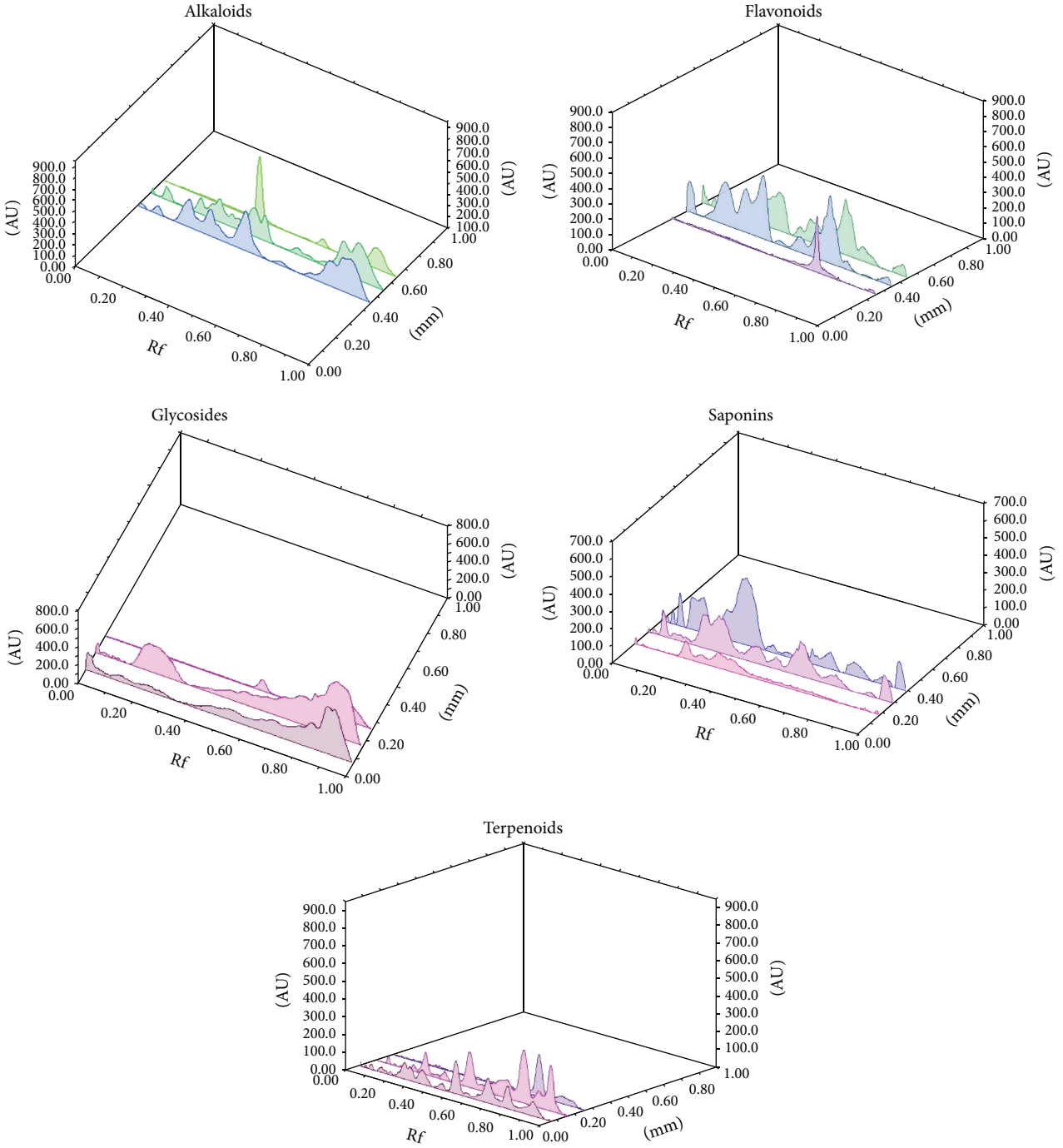


Figure 3: 3D diagram of HPTLC densitogram for methanolic leaf and root extracts of *Hypochaeris radicata* with respective standards.

referring the deposited specimen. The voucher number of the specimen is BSI/SRC/5/23/2010-11/Tech.153. The plant materials were washed with tap water, shade dried, and then homogenized to fine powder. It is stored in air tight containers for further study.

2.2. Extraction of Plant Samples. Fifty grams of shade dried leaf and root powders was extracted with methanol (250 mL) using soxhlet apparatus at 60–80°C separately. The extracts were filtered and concentrated to dryness under reduced pressure using rotary vacuum evaporator (RE 300; Yamato, Japan) and lyophilized (4KBTXL-75; Vir Tis Benchtop K, New York, USA) to remove traces of water molecules and the lyophilized powders were stored at −20°C for further analysis.

2.3. HPTLC Fingerprinting Analysis. HPTLC finger printing studies were carried out according to the method of Wagner and Baldt [19] and Harbone [20]. The methanolic extract of leaf and root samples of 100 mg each was dissolved in 1 mL of HPTLC grade methanol and centrifuged at 3000 rpm

Table 1: Mobile phase, spray reagent used, and the changed colour for various secondary metabolites by using HPTLC for methanolic leaf and root extracts of *Hypochaeris radicata.*

Name of the compound	Mobile phase	Spray reagent	Colour of the spot/band	
			Visible light	UV 366 nm
Alkaloids	Ethyl acetate-methanol-water (10 : 1.35 : 1)	Dragendorff's reagent followed by 10% ethanolic sulphuric acid reagent	Yellow, orange-yellow	—
Flavonoids	Toluene-acetone-formic acid (4.5 : 4.5 : 1)	1% ethanolic Aluminium chloride reagent	—	Yellow, yellowish blue
Glycosides	Ethyl acetate-ethanol-water (8 : 2 : 1.2)	Anisaldehyde sulphuric acid reagent	Pinkish violet	—
Saponins	Chloroform-glacial acetic acid-methanol-Water (6.4 : 3.2 : 1.2 : 0.8)	Anisaldehyde sulphuric acid reagent	Blue, yellow, green, and violet	—
Terpenoids	n-Hexane-ethyl acetate (7.2 : 2.9)	Anisaldehyde sulphuric acid reagent	Blue, bluish violet	—

Table 2: HPTLC-alkaloids profile of methanolic extract of leaf and root parts of *Hypochaeris radicata.*

Track	Peak	Rf	Height	Area	Assigned substance
Leaf	1	0.02	26.4	414.1	Unknown
	2	0.09	73.1	2008.4	Nicotine
	3	0.22	245.5	12317.2	Colchicine
	4	0.31	237.0	13364.9	Strychnine
	5	0.46	350.8	20474.3	Alkaloid 1
	6	0.62	35.5	1609.5	Unknown
	7	0.75	48.4	1226.0	Unknown
	8	0.83	233.0	13146.6	Unknown
	9	0.88	299.7	8239.3	Unknown
	10	0.91	315.0	18195.6	Unknown
Root	1	0.01	51.0	307.8	Unknown
	2	0.07	120.5	3219.2	Unknown
	3	0.22	138.4	4068.1	Unknown
	4	0.30	200.9	10777.9	Unknown
	5	0.35	114.0	2592.8	Unknown
	6	0.38	95.8	1666.7	Unknown
	7	0.41	135.9	2626.5	Chelidonine
	8	0.45	248.8	11159.1	Unknown
	9	0.49	225.6	6352.6	Alkaloid 1
	10	0.63	58.4	2099.0	Unknown
	11	0.67	33.2	1124.4	Unknown
	12	0.83	295.9	16509.4	Unknown
Standard	1	0.41	569.9	15416.8	Chelidonine

for 5 min. These solutions were used as test solution for HPTLC analysis. A CAMAG (Muttenz, Switzerland) HPTLC system, comprising a Linomat 5 automatic applicator with a 100 μL syringe, a twin trough plate development chamber, Camag TLC scanner 3, and winCATS software was used. Suitable volume of standard (2 μL) and sample solution (2 μL) were spotted in the form of bands having band width of 5 mm on precoated silica gel 60 F_{254} HPTLC plate (4 × 10 cm, 250 μm thickness) (E. Merck, Mumbai, India), 8 mm from the bottom, and 15 mm from the side edges. After the application, prederivatization was performed by exposing the plate to iodine vapour for 10 minutes. The prederivatized plate was developed vertically ascending in a twin trough glass chamber (Camag, Switzerland) saturated with respective mobile phase for alkaloids, flavonoids, glycosides, saponins, and terpenoids. The optimized chamber saturation time for the mobile phase was 20 minutes at room temperature (25 ± 2°C). The chromatographic run length was 90 mm from the bottom edge of the plate. Subsequent to the development, HPTLC plates were dried in an oven for

Table 3: HPTLC-flavonoids profile of methanolic extract of leaf and root parts of *Hypochaeris radicata*.

Track	Peak	Rf	Height	Area	Assigned substance
Leaf	1	0.02	160.2	3997.7	Unknown
	2	0.19	274.9	18558.0	Flavonoid 1
	3	0.29	278.4	12545.6	Unknown
	4	0.37	405.9	19975.5	Flavonoid 2
	5	0.45	26.9	887.3	Unknown
	6	0.56	100.3	4946.8	Isoquercetin
	7	0.64	186.0	6145.2	Chlorogenic acid
	8	0.70	438.4	22221.0	Kaempferol
	9	0.78	53.4	1526.1	Unknown
	10	0.97	39.9	1195.8	Quercetin
Root	1	0.01	81.8	726.8	Unknown
	2	0.06	54.1	843.7	Flavonoid 1
	3	0.13	48.2	1732.2	Unknown
	4	0.21	64.1	2863.6	Flavonoid 2
	5	0.29	172.0	4264.0	Unknown
	6	0.31	179.8	3361.3	Diosmin
	7	0.38	248.4	15542.0	Flavonoid 4
	8	0.48	75.0	2234.3	Rutin
	9	0.53	149.3	4645.0	Unknown
	10	0.56	135.6	4203.0	Isoquercetin
	11	0.64	141.7	5077.3	Chlorogenic acid
	12	0.70	359.2	19325.5	Flavonoid 6
	13	0.78	97.4	4806.7	Unknown
	14	0.97	64.8	2151.7	Quercetin
Standard	1	0.71	364.9	7420.2	Kaempferol

5 minutes at 60°C for complete removal of mobile phase. Densitometric scanning was performed with a TLC scanner equipped with winCATS 1.4.2 software (Camag, Switzerland) in reflectance absorbance. The slit dimensions were 6 mm × 0.45 mm, scanning speed was 20 mm s^{-1}, data resolution 100 μm/step, optical filter (second order), and filter factor (Savitzky-golay 7). Plates were scanned at 254 nm which was selected experimentally on the basis of distinctive absorption spectra of the compounds between 200 and 400 nm. The plate was kept in photo-documentation chamber (CAMAG REPROSTAR 3) and captured the images at visible light and UV 366 nm and 254 nm. The peak numbers with its height and area, peak display, and peak densitogram were identified.

3. Results

The present work attempts to optimize the simultaneous HPTLC fingerprint profiles of secondary metabolites in methanolic leaf and root extracts of *H. radicata*. It unveils the occurrence of the secondary metabolites, *namely*, alkaloids, flavonoids, glycosides, saponins, and terpenoids. Different compositions of the mobile phase and spraying reagents used and the colour change according to the phytoconstituents are presented in Table 1. HPTLC outline under UV 254 and 366 nm, the densitogram, and 3D display were illustrated in Figures 1, 2, and 3, respectively. The sample extracts were run along with the standards and it was perceived to validate the presence of phytochemical compounds from chromatogram after derivatization.

3.1. Alkaloids. The results from HPTLC chromatogram for alkaloids can be distinguished at UV 254 nm before derivatization. The methanolic leaf extract evidenced 10 spots with their corresponding ascending order of Rf values, 0.02, 0.09, 0.22, 0.31, 0.46, 0.62, 0.75, 0.83, 0.88, and 0.91. The spots 2, 3, and 4 are identified as nicotine, colchicines, and strychnine, respectively, in the leaf extract (Figure 2 L-A). The methanolic root extract exhibited the presence of 12 spots with the Rf values in the ascending order of 0.01, 0.07, 0.22, 0.30, 0.35, 0.38, 0.41, 0.45, 0.49, 0.63, 0.67, and 0.83. The 7th spot in HPTLC densitogram was determined as the alkaloid, chelidonine (Rf = 0.41) (Figure 2 R-A). Apparently, the desired profile was achieved in the mobile phase of ethyl acetate : methanol : water [10 : 1.35 : 1] (Table 2).

3.2. Flavonoids. HPTLC finger prints of *H. radicata* were done by using selected solvent system toluene : acetone : formic acid [4.5 : 4.5 : 1] for both leaf and root extracts, visualized under UV 254 nm before derivatization. The leaf extract exerted 10 prominent bands, of which 4 peaks, *namely*, 6th, 7th, 8th, and 10th, were identified as isoquercetin, chlorogenic acid, kaempferol, and quercetin, respectively (Figure 2 L-F). The Rf values 0.31, 0.48, 0.56, 0.64, and 0.97 for the spots of root methanolic extract of *H. radicata* were detected as

Table 4: HPTLC-glycosides profile of methanolic extract of leaf and root parts of *Hypochaeris radicata*.

Track	Peak	Rf	Height	Area	Assigned substance
Leaf	1	0.01	199.0	4552.3	Unknown
	2	0.14	68.3	2111.4	Unknown
	3	0.15	52.9	833.2	Unknown
	4	0.20	52.4	998.2	Unknown
	5	0.23	64.7	1492.6	Unknown
	6	0.25	65.3	866.8	Unknown
	7	0.27	48.7	793.5	Unknown
	8	0.29	41.9	754.0	Unknown
	9	0.38	14.9	188.8	Unknown
	10	0.48	84.6	3533.6	Unknown
	11	0.54	115.7	5401.2	Pervoside-1
	12	0.71	166.6	12055.8	Glycoside 1
	13	0.85	281.0	21140.8	Unknown
	14	0.91	525.6	18495.7	Unknown
	15	0.93	523.0	17414.1	Unknown
Root	1	0.01	112.6	923.5	Unknown
	2	0.03	37.3	729.6	Unknown
	3	0.07	31.8	298.0	Unknown
	4	0.09	23.0	244.9	Unknown
	5	0.11	12.3	97.9	Unknown
	6	0.20	308.7	13852.0	Unknown
	7	0.23	304.3	17425.7	Unknown
	8	0.42	45.0	1081.0	Unknown
	9	0.51	105.2	5135.1	Glycoside 1
	10	0.56	146.5	5326.6	Pervoside-1
	11	0.65	175.7	5851.4	Swertiamarin
	12	0.71	242.8	9361.0	Unknown
	13	0.79	320.9	19206.5	Glycoside 3
	14	0.82	396.3	8550.2	Unknown
	15	0.90	615.8	57404.3	Unknown
Standard	1	0.59	122.0	3589.4	Pervoside

diosmin, rutin, isoquercetin, chlorogenic acid, and quercetin, respectively (Figure 2 R-F). The flavonoids (chlorogenic acid) with Rf value 0.64 were present commonly in leaf and root extracts (Table 3). Nevertheless, higher number of flavonoids (7 peaks) has been detected in root than the leaf (3 peaks).

3.3. Glycosides. The HPTLC fingerprinting for methanolic leaf and root extracts of *H. radicata* exposed the existence of 15 peaks. Pinkish violet zones at day light mode are present in the given standard and sample tracks noticed in the chromatogram after derivatization, which affirmed the presence of glycosides in the given standard and in the samples. The mobile phase ethyl acetate : ethanol : water [8 : 2 : 1.2] gave good resolution with Rf value. The segregated bands were seen at the Rf 0.01 to 0.93 in the methanolic leaf extract of which single Rf 0.54 displayed the presence of glycoside, pervoside (Figure 2 L-G). The root extract also revealed the occurrence of 2 peaks as glycosides, pervoside, and swertiamarin, which were seen at Rf 0.56 to 0.65 (Table 4) (Figure 2 R-G). Moreover, lesser number of compounds was noticed in the leaf (1 peak) than the root (3 peaks).

3.4. Saponins. Blue, yellow, green, and violet colours after derivatization at visible light confirmed the presence of saponins. They were best resolved at the wavelength UV 366 nm after derivatization. Mobile phase consisting of chloroform : glacial acetic acid : methanol : water [6.4 : 3.2 : 1.2 : 0.8] gave sharp and well defined peaks. The methanolic leaf and root extracts displayed 17 peaks which were seen at the Rf 0.03 to 0.96 and Rf 0.01 to 0.97, respectively. Furthermore, the root extract attained the greater number of saponins (15 peaks) than that of the leaf extracts (12 peaks) (Figure 2 L-S). The Rf value of standard bacopaside was found to be 0.34 and the peak area was 3126.9 AU. In root extract, the Rf (0.34) value of 8th peak was coinciding with the Rf value of standard and its area calculated was 26992.7 AU at 100 μg/mL of standard and sample concentration (Table 5) (Figure 2 R-S).

Table 5: HPTLC-saponins profile of methanolic extract of leaf and root parts of *Hypochaeris radicata*.

Track	Peak	Rf	Height	Area	Assigned substance
Leaf	1	0.03	26.4	286.7	Saponin 1
	2	0.06	141.7	2618.5	Saponin 2
	3	0.11	37.5	657.9	Unknown
	4	0.15	33.4	710.7	Unknown
	5	0.24	190.8	7669.4	Saponin 3
	6	0.29	209.9	5982.5	Saponin 4
	7	0.30	197.9	6397.8	Saponin 5
	8	0.38	40.9	475.4	Unknown
	9	0.44	97.7	3455.2	Saponin 6
	10	0.45	98.9	1954.9	Saponin 7
	11	0.52	69.2	2458.6	Saponin 8
	12	0.60	150.9	4168.8	Saponin 9
	13	0.62	198.8	8535.9	Saponin 10
	14	0.75	58.2	1735.4	Saponin 11
	15	0.76	66.9	1788.3	Unknown
	16	0.91	22.7	637.3	Saponin 12
	17	0.96	144.3	3934.9	Unknown
Root	1	0.01	61.8	338.5	Saponin 1
	2	0.02	34.8	287.8	Saponin 2
	3	0.05	79.4	765.3	Saponin 3
	4	0.08	186.8	2671.8	Saponin 4
	5	0.12	182.4	4905.7	Saponin 5
	6	0.17	197.5	6731.2	Saponin 6
	7	0.27	168.8	4485.9	Saponin 7
	8	0.34	385.0	26992.7	Bacopaside
	9	0.45	45.1	1143.5	Saponin 9
	10	0.51	25.9	483.9	Saponin 10
	11	0.52	25.2	328.6	Unknown
	12	0.59	55.8	1098.3	Saponin 11
	13	0.61	87.3	1178.8	Saponin 12
	14	0.69	98.3	3931.8	Saponin 13
	15	0.78	80.5	3786.9	Saponin 14
	16	0.90	41.6	1659.0	Saponin 15
	17	0.97	158.1	3613.6	Unknown
Standard	1	0.21	99.5	2903.6	Saponin standard 1
	2	0.28	46.4	1586.2	Saponin standard 2
	3	0.34	88.5	3126.9	Bacopaside
	4	0.39	70.8	2801.2	Saponin standard 4

3.5. Terpenoids. The chromatographic fingerprinting for terpenoids was well resolved at UV 366 nm after derivatization. The plates were sprayed with anisaldehyde sulphuric acid reagent followed by heating and then visualized in day light which showed 15 and 10 prominent peaks in methanolic leaf and root extracts, respectively. The 11th and 9th peaks detected in methanolic leaf and root extracts were identified as coumarin and lupeol, respectively (Figure 2 L-T and R-T). Best solvent system to scrutinize the above partition is *n*-hexane : ethylacetate [7.2 : 2.9] (Table 6).

4. Discussion

The evaluation of crude extract is an integral part of correct identity. HPTLC is useful as a phytochemical marker [21, 22] and more effective in the field of plant taxonomy also for the identification of plants through secondary metabolites [23]. HPTLC fingerprinting is proved to be a linear, precise, and accurate method for herbal identification [24]. Such finger printing is useful in quality control of herbal products and checking for the adulterants [25]. Therefore, it can be useful

Table 6: HPTLC-terpenoids profile of methanolic extract of leaf and root parts of *Hypochaeris radicata*.

Track	Peak	Rf	Height	Area	Assigned substance
Leaf	1	0.04	16.8	128.3	Unknown
	2	0.07	30.4	412.1	Unknown
	3	0.12	28.1	582.5	Unknown
	4	0.14	17.9	157.7	Unknown
	5	0.17	18.6	268.1	Unknown
	6	0.24	93.8	2547.3	Unknown
	7	0.27	76.9	1862.3	Terpenoid 1
	8	0.33	77.5	3120.3	Terpenoid 2
	9	0.43	34.6	952.6	Unknown
	10	0.50	180.0	5461.3	Terpenoid 3
	11	0.56	23.2	599.3	Coumarin
	12	0.62	34.0	595.2	Terpenoid 5
	13	0.67	139.7	5599.1	Terpenoid 6
	14	0.77	125.6	4151.0	Terpenoid 7
	15	0.90	80.4	3743.7	Terpenoid 8
Root	1	0.07	40.5	476.1	Terpenoid 1
	2	0.20	35.7	676.9	Terpenoid 2
	3	0.26	125.6	3321.5	Terpenoid 3
	4	0.36	45.7	1201.2	Terpenoid 4
	5	0.44	25.2	558.6	Unknown
	6	0.49	195.0	7255.5	Unknown
	7	0.68	102.5	6575.1	Terpenoid 5
	8	0.77	291.8	12594.8	Terpenoid 6
	9	0.85	90.9	3144.8	Lupeol
	10	0.91	251.7	8389.0	Terpenoid 8
Standard	1	0.71	143.0	4328.0	Solanesol

for the evaluation of different marketed pharmaceutical preparations [26–28].

The qualitative analysis of methanolic leaf and root extracts of *H. radicata* through HPTLC confirmed the presence of many secondary metabolites like alkaloids, flavonoids, glycosides, saponins, and terpenoids. The well resolved HPTLC profiles also showed the occurrence of these metabolites of medicinal importance which support the traditional therapeutic uses of this species.

Alkaloids are the N-sources found in plants that are the amino acids such as lysine, ornithine, phenyl alanine, tyrosine, tryptophan, and histidine. They have been a particularly rich source of medicinal uses as analgesic, anti-inflammatory, and adaptogenic activities which help to alleviate pains, developed resistance against diseases, and endurance against stress and also to cure many diseases [29]. In the present study, methanolic leaf and root extracts of *H. radicata* determined to have four distinct types of alkaloids with different Rf values.

Out of 24 spots, 9 were identified as flavonoids (4 in leaf extract and 5 in root extract) in the methanolic extract of *H. radicata*. Flavonoids, the most widespread group of natural compounds, basically consist of a fused aromatic ring (A-ring) and a heterocyclic ring (C-ring) connected through a carbon-carbon bridge to an aromatic B-ring [30]. Flavonoids are becoming the subject of medical research as they have been reported to possess many useful characters, like anti-inflammatory, enzyme inhibition, antimicrobial, anticancer, antiallergy, and antioxidant properties [31]. Three different types of glycosides were prominent in methanolic extract of *H. radicata* (1 in leaf and 3 in root) which confirm the therapeutic values of this species in terms of antimicrobial activity as they would release phenolics on hydrolysis that are toxic to microbial pathogens [32, 33].

Separation of saponins has also been observed in methanolic root extracts of *H. radicata* (1 spot). Saponins are diverse group of glycosidic triterpenoids widely found in plant kingdom and are characterized by structures containing triterpene or steroidal aglycones and one or more sugar chains. Despite their fairly large structural diversity, saponins share some unique biological properties including the ability to foam and lyse erythrocytes. Saponins exhibit a wide range of pharmacological activities which include expectorant, anti-inflammatory, vasoprotective, hypocholesterolemic, immunomodulatory, hypoglycaemic, molluscicidal, antifungal, antiparasitic, anticonvulsant, and other central nervous activities [34].

Terpenoids are secondary metabolites with molecular structures containing carbon backbones made up of isoprene units and they constitute one of the largest families of natural products accounting for more than 55,000 individual compounds of both primary and secondary metabolisms

[35]. Besides the wide range of biological properties, these natural compounds have significant commercial value as pharmaceuticals, flavours and fragrances, commodity chemicals, and more recently as potential biofuels. They have the properties like being antimicrobial, anti-inflammatory, gastroprotective, and hepatoprotective [36–38]. Terpenoids were detected by HPTLC technique in methanolic leaf and root extracts of *H. radicata* (1 peak in each part) in the present study and thus add additional value of medicinal importance for this species.

5. Conclusion

The study suggests that the methanolic extracts of leaf and root parts of *Hypochaeris radicata* have several secondary metabolites of medicinal importance and thus justifies medicinal usage. This may be a reason for its better healing property.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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