

Comprehensive Evaluation of Analytical Parameter of Erandamoola (Ricinus Communis L. Root)

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ABSTRACT:

Background: Eranda (*Ricinus communis* L.) is one of the most important plant for its medicinal use in Ayurveda. This present study has been carried out to establish the root of plant for its physicochemical characters with different phytochemical qualitative tests as per Ayurvedic Pharmacopoeia of India and High-Performance Thin Layer Chromatographic analysis. Physicochemical parameters showed pH (5.83), Loss on drying (8.50 %w/w), Total Ash value (3.20 %w/w), Acid insoluble ash (0.41 %w/w), water soluble extractive (28.6 %w/v) and alcohol soluble extractive (12.6 %w/w). Preliminary phytochemical analysis for the presence of various functional groups such as Alkaloids, Flavonoids, Tannin, Saponins, and Steroids were also studied. These observations can be helpful for identification and standardization of Erandamoola (*Ricinus communis* L. root)

KEY WORDS: Eranda, *Ricinus communis* L., Root, Physicochemical, Phytochemical, HPTLC.

I. INTRODUCTION

Eranda, botanically identified as *Ricinus communis* L. which belong to Euphorbiaceae family. Eranda (*Ricinus communis* L.) is a perennial bushy plant growing all over the tropical places of world.

The castor oil plant is a fast-growing, suckering perennial shrub or occasionally a soft wooded small tree up to 6 meter or more, but it is not hardy in nature. This plant was cultivated for leaf and flower colours and for oil production. Leaves are green or reddish in colour and about 30-60 cm in diameter. The leaves contain 5-12 deep lobes with coarsely toothed segments which are

alternate and palmate. The stems are varying in pigmentation. The flowers are monoecious and about 30-60 cm. long. Fruit: The fruit is a three-celled thorny capsule. The capsule of fruit covered with soft spines like processes and dehiscing into three 2-valved cocci. The seeds are considerable differences in size and colour. They are oval, somewhat compressed, 8-18 mm long and 4-12 mm broad. The testa is very smooth, thin and brittle. Castor seeds have a warty appendage called the caruncle, which present usually at one end from which runs the raphe to terminate in a slightly raised chalazal at the opposite end of the seed.

In the Indian system of medicine, the leaf, root, and seed oil of this plant have been used for the treatment of inflammation and liver disorders. This plant is also explored for various activities like anti-oxidant, anti-microbial, anti-histaminic, anti-asthmatic, anti-diabetic, hepatoprotective, anti-inflammatory etc. In Ayurveda Classics medicinal properties of Eranda in various conditions like Jwara, Atisara, Gulma, Kasa, Udararoga, Vatavyadhi, etc.

Adulteration of medicinal plants often occurs when non-authentic parts such as stems or branches are substituted in place of the pharmacologically active roots. Such practices compromise the therapeutic efficacy and safety of herbal formulations. To ensure authenticity and quality, analytical standardization is essential.

AIM

To perform Physicochemical, Phytochemical and HPTLC study of Erandamoola (*Ricinus communis* L. root).

OBJECTIVE

1. To determine physicochemical parameter of Erandamoola(Ricinus communis L.root).
2. To determine preliminary phytochemical parameters of Erandamoola(Ricinus communis L.root).
3. To determine High Performance of Thin Layer Chromatography (HPTLC) of Erandamoola(Ricinus communis L.root).

MATERIAL AND METHODS

Erandamoola(Ricinus communis L.root) was collected from Navsari, Gujarat, from a place positioned at a latitude of 20.95° N 72.93° E and an altitude of approximately 9 meters above sea level, after proper identification. Roots were subjected to powder form of 80 mesh size in controlled environment at Pharmacognosy Laboratory of Upgraded Department of Dravyaguna, GAC, and Vadodara.

1. Physicochemical Parameters

Assessment of the parameters such as pH, loss on drying, ash value, acid insoluble ash, water soluble extractive and alcohol soluble extractive was carried out by following the standard procedure recommended by Ayurvedic Pharmacopoeia of India. Detailed outcome of physicochemical parameters are given in table no. 3.

2. Preliminary Phytochemical analysis of Erandamoola(Ricinus communis L.root):

By performing various qualitative tests, one can get idea about the type of Phyto constituents present in the sample. Hence the powder of sample was subjected to the following tests. Preparation of plant extracts is as per shown in below table no.4.

Table No.4: Steps for preparation of Plant extracts

Step 1	Samples of powder taken 5 gm and was extracted with methanol (100ml).
Step 2	Kept it for overnight. Initially occasional shaking up to 6 hours was performed and then kept aside for settle down.
Step 3	After 24 hours, it was filtered and alcoholic extract was collected
Step 4	Similarly, water extracts of sample were prepared and collected
Step 5	After that, qualitative tests were done by using appropriate extracts

Phytochemical analysis was performed with following the standard protocol given in API. As like - Alkaloid - Dragendorff's reagent, Saponin - Foam test, Flavonoids, Tannin, Steroids. Observations are mentioned in table no. 5.

3. Sophisticated Analysis:

HPTLC is a sophisticated and automated technique, which is useful in separation of compounds. Precoated plates and auto sampler are used for precision and to achieve significant separation. UV, visible and fluorescence scanner are used for qualitative and quantitative estimation.

Preparation of Test Solution: Weight approximately 5g of sample in a conical flask. To it 100 ml of methanol was added and cold macerated for 24hrs. On completion of time, it was filtered with the help of whatmann No. 1. Filter paper and this test solution was used for HPTLC fingerprinting.

Preparation of Spray reagent [Vanillin – Sulphuric acid reagent]: 1 g of vanillin added with 2ml of sulfuric acid was dissolved in 100ml of 95% ethanol

HPTLC of Eranda(Ricinus communis L.) was scanned under 254nm, 366 nm and 540nm. Observation of Rf value and number of spots at different visualization tabulated in table no. 6.

II. RESULTS AND DISCUSSION

In the present study, standardization of Erandamoola(Ricinus communis L.root) was done which included physicochemical and phytochemical analysis. This provides the easy, speedy and economical means to establish the identity and purity of drug and it also provides a reliable method for identification of adulteration.

Physicochemical evaluation of the plant material was carried out to assess its purity, quality, and identity. The total ash value was found to be 3.20%, indicating a normal level of inorganic content and minimal extraneous earthy matter. The acid-insoluble ash was 0.41%, reflecting low siliceous contamination such as sand or silica, which suggests proper post-harvesting handling. The loss on drying was recorded as 8.50%, signifying moderate moisture content; this value is within acceptable limits, reducing the likelihood of microbial proliferation such as bacteria or fungi

during storage. The water-soluble extractive value was 28.6%, suggesting the presence of a significant proportion of polar constituents, while the alcohol-soluble extractive value measured 12.6%, indicating a moderate level of alcohol-soluble phytochemicals. These extractive values demonstrate the presence of the expected

phytoconstituents and are useful indicators for detecting exhausted or adulterated samples. The pH of the aqueous extract was 5.83, which falls within the normal acidic range reported for many herbal drugs, supporting its stability and palatability. The obtained values comply with the standard ranges prescribed in the Ayurvedic Pharmacopoeia.

Table No. 3: Values of Physicochemical Parameters of Erandamoola(Ricinus communis L.root)

Physicochemical Parameter	Results	Limit as per Ayurvedic Pharmacopoeia of India
Loss on drying(% w/w)	8.50	Not Applicable
Total Ash value(% w/w)	3.20	Not more than 8.0%
Acid insoluble ash(% w/w)	0.41	Not more than 1.0%
Water soluble extractive value(% w/w)	28.6	Not less than 9.0%
Alcohol soluble extractive value(% w/w)	12.6	Not less than 3.0%
pH (1% Solution)	5.83	Not Applicable

The chemical constituents of plants/herbs contribute to their physiological properties and consist of primary metabolites, viz., sugars, amino acids, and proteins, along with secondary metabolites such as alkaloids, flavonoids, tannins, saponin, steroids etc. In the present study, different

qualitative tests were carried out with the methanol extracts of the Erandamoola(Ricinus communis L.root) powder. The results of the phytochemical screening revealed the presence of alkaloids, tannins and steroids but absence of flavonoids and steroids in the extracts of this the sample.

Table No. 5: Result of Preliminary Qualitative tests of Erandamoola(Ricinus communis L. root)

Plant Metabolites	Results
Alkaloid	+ve
Saponins	-ve
Flavonoids	-ve
Tannin	+ve
Steroids	+ve

In HPTLC profile, each and every metabolite has played specific role and function in harmony with other metabolites within the organization framework of the cells in the defence mechanism of the plants. Here in this HPTLC study different peaks are observed at different Rf. Total 8 peaks are observed at 254nm, 4 peaks are observed

at 366nm and 5 peaks are observed at 540nm of UV light. The number of observed peaks shows the presence of numerous active constituents in the given sample of the Erandamoola(Ricinus communis L. root).

Table No. 6: Observation of Rf value and number of spots at different visualization

Visualization	Rf Value	Number of Spots
254 nm	0.119, 0.163, 0.292, 0.394, 0.513, 0.627, 0.800, 0.903	8
366 nm	0.077, 0.160, 0.385, 0.797	4
540 nm	0.052, 0.111, 0.406, 0.708, 0.929	5

III. CONCLUSION

Erandamoola (Ricinus communis L. root) is an important plant which is used in many formulations and various diseases conditions

mentioned in Ayurvedic literature. This study shows the Phytochemical analysis Physicochemical and HPTLC parameters that can be used for the identification in further research study.

Plate No.1: Photo of Phytochemical analysis of Erandamoola(Ricinus communis L.root) powder



Fig.1 a: *Erandamoola* (*Ricinus communis* L. root) powder

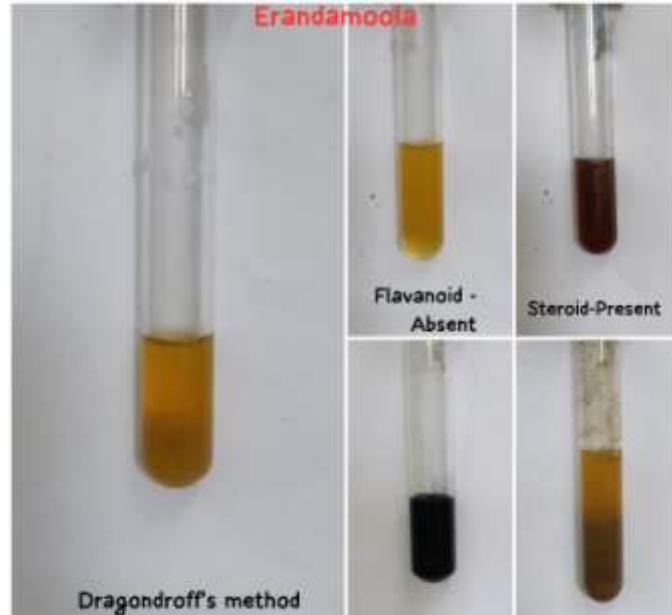
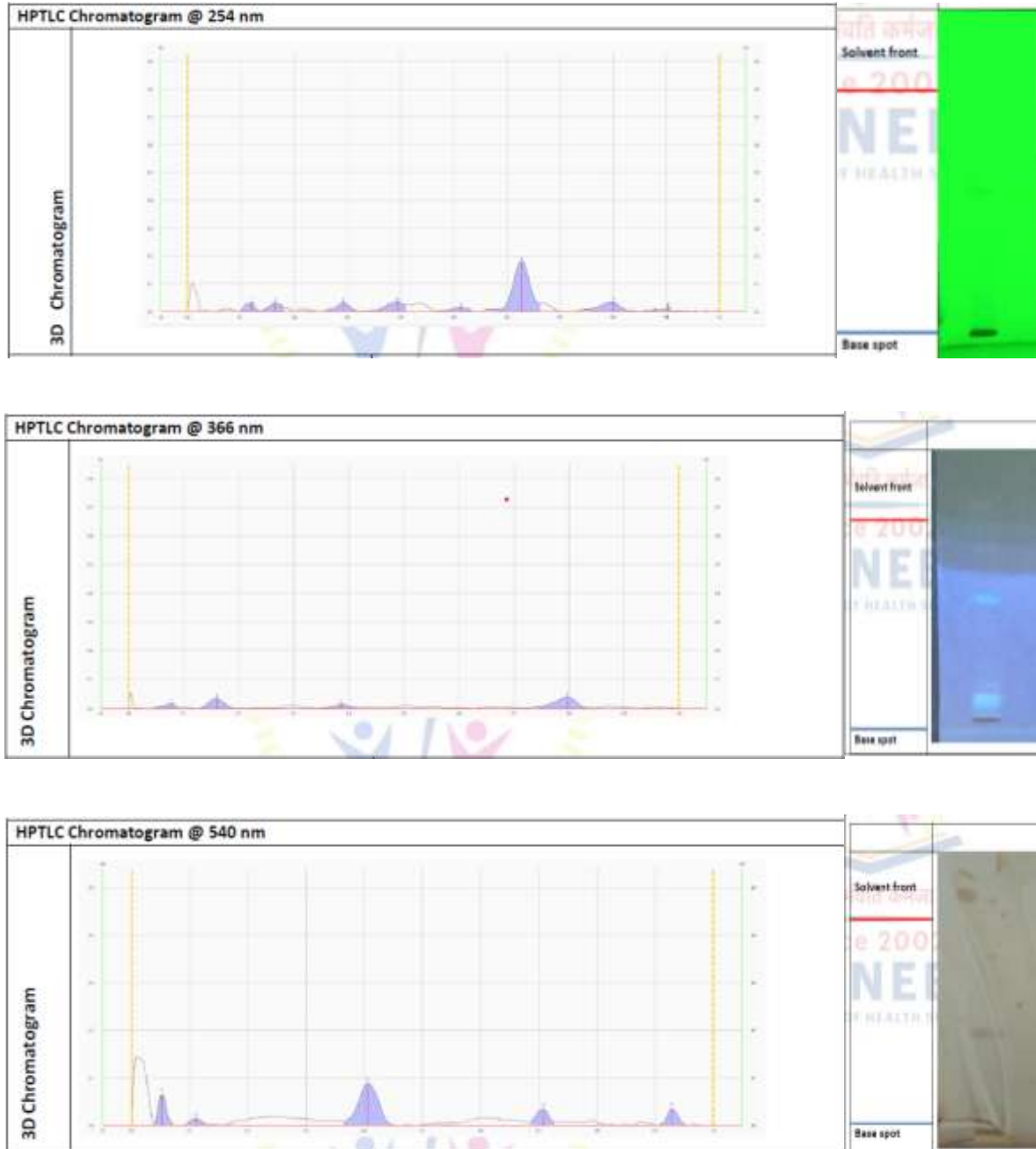


Fig.1 b: Phytochemical analysis of *Erandamoola* (*Ricinus communis* L. root) powder

PlateNo.2:PhotoofHPTLC analysis ofEradamoola(*Ricinus communis L.root*)powder



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