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Research Article

PHYTOCHEMICAL EVALUATION OF *RICINUS COMMUNIS* LINN. ROOT (*ERANDA*) OF COLLECTED FROM THREE DIFFERENT REGIONS OF BELGAUM (KARNATAKA)

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ABSTRACT

In Ayurveda, the roots of *Eranda* plant (*Ricinus communis* Linn.) are used in the treatment of various disorders like *Amavata* (rheumatism), *Jwara* (fever) and various types of inflammation. It is important drug used in *Panchkarma Basti* procedure as *Niruha basti* drug. This drug is collected by various pharmaceutical companies from anywhere ignoring contaminations. Considering this, a preliminary study has been done to ensure basic phytochemical profile of mentioned regions varieties. Preliminary physicochemical parameters, phytochemical screening was carried out in the study. There was significant difference between all varieties of alcohol and water extracts of this plant. Though present study gives idea for pharmacological and clinical studies at larger scales.

KEYWORDS: *Erandmoola, Ricinus Communis* Linn. Chromatography, Extract.

INTRODUCTION

Ricinus communis Linn. (Euphorbiaceae) commonly known as *Eranda* in Ayurveda is a soft wooded small tree wide spread throughout tropics and warm temperate regions of the world. 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.[1,2] Its roots have also been highlighted for its *Vrishya* (aphrodisiac) and *Vatahara* actions by Acharya Charaka.[3] This plant also possesses hepatoprotective,[4,5] anti-diabetic,[6] laxative,[7] anti-fertility,[8] anti-inflammatory and free radical scavenging activities.[9] In Ayurveda, the roots of *Eranda* are used in the treatment of *Amavata* (rheumatism), *Sotha* (inflammation), *Katisula* (backache), *Udararoga* (diseases of abdomen), *Jwara* (fever), etc.[2]

Due to its high demand, roots of this plant collected from anywhere, that is why a comparative phytochemical study has been done. Verities of this plant root were taken from polluted, non polluted and domestic areas. Hence, to ensure quality of all varieties, phytochemical evaluations and heavy metal detection was undertaken.

Materials and Methods

Collection of drug

Table 1: Physicochemical analysis of *Eranda Mula* from different regions of Belgaum (Karnataka)

Loss on drying	Hanumannagar	Udyambagh	Sahapur
	42.3%	3.780%	14.128%
Total ash	4.4%	4.25%	4.35%
Acid insoluble ash	0.45%	0.84%	1.96%
Water insoluble ash	0.08%	0.076%	0.047%
Water soluble extractive	10.8%	11.68%	12.4%
Alcohol soluble extractive	5.2%	5.84%	8.32%
Foreign matter	Nil	nil	Nil
PH value	5.28	5.44	5.38

Fresh roots of *Ricinus communis* Linn. after proper identification were collected from the adjacent area of Belgaum from three regions Sahapur, Hanumananagar, Udyambagh. With the help of taxonomist, Specimen herbarium of all varieties were preserved in the KLE GMP verified Pharmacy, Belguam (Karnataka). The obtained roots were shade dried and made into coarse powder with the help of mechanical grinder and preserved in a glass container for future studies.

RESULTS

Physicochemical study

Moisture content, ash values (total ash, acid insoluble ash), and extractive values (alcohol soluble extractive, water soluble Extractive) were determined by following standard analytical procedures.[10,11]

Preliminary phytochemical profiles

Five grams coarse powder of the roots was subjected for extraction with methanol (100 ml), keeping it for overnight with initial occasional shaking up to 6 h.

and then set aside. After 24 h, it was filtered and alcoholic extract was collected. Similarly, water extract was prepared. Both the extracts were evaporated till dryness on water bath. The dried extracts were weighed, and percentage yield was calculated. The extracts were used for preliminary phyto-chemical screening with a set of various chemical tests viz., Dragendorff's Mayer's, Hager's, and Wagner's tests for alkaloids; ferric chloride, lead acetate, potassium dichromate, and dilute iodine tests for tannins and phenolics; and foam test for saponin glycosides.[12]

Table 2: Preliminary phytochemical profiles of *Eranda Mula*

Tests	Procedure	Results		
		Shahapur sample	Udyambagh sample	Hanumannagar sample
Test for Calcium	With solution of ammonium carbonate gives white PPT. which is insoluble in ammonium chloride solution.	-	-	-
Test for Magnesium	Gives white ppt. with ammonium carbonate solution but not with ammonium chloride solution.	-	-	-
Test for Sodium	Flame test: Prepare thick paste of ash of drug with conc. HCl. Take paste on platinum wire loop, introduce in Bunsen flame. Golden yellow flame is observed.	+	+	+
Test for Potassium	Flame Test: Gives violet color to the flame.	-	-	-
Test for Iron	TO 5ml. test solution, add few drops 5% ammonium thiocyanate (or 5% potassium thiocyanate). solution turns blood red.	+	+	+
Test for Sulphate	With Lead Acetate reagent gives white ppt. soluble in NaOH	+	+	+
Test for Phosphate	To 5ml test solution prepared in HNO3, add few drops ammonium molybdate solution. Heat 10 min. coo, Yellow crystalline ppt of ammonium phosphomolybdate is observed.	-	-	-
Test for Chloride	To about 5 to7 ml. filtrate, add 3 to 5 ml lead acetate solution. White precipitate soluble in hot water is observed.	+	+	+
Test for Carbonate	With solution of magnesium sulphate, white ppt is formed.	-	-	-
Test for Nitrates	With solution of ferrous sulphate yield no brown color but if sulphuric acid is added (slow from the side of the test tube,) a brown color is produced at the junction of two liquids.	-	-	-

+: Present, –: Absent

Table 3: Rf values of chloroform extracts varieties of *Eranda Mula*

S.No.	Areas	Extracts	Wavelengths	Rf Values
1.	Sahapur (Domestic Area)	Alcohol extract	Short wave	0.16, 0.26, 0.80
			Long wave	0.08,0.23
		Water extract	Short wave	0.76,0.85,0.92
			Long wave	-
2.	Udyambagh (Industrial area)	Alcohol extract	Short wave	0.19,0.26,0.35, 0.82
		Water extract	Long wave	0.24,0.30,0.45
3.	Hanumannagar (Agriculture area)	Alcohol extract	Short wave	0.05,0.08,0.15,0.18,0.44, 0.54
		Water extract	Long wave	0.30

Chromatographic conditions

Application mode: Camag Linomate V; Development chamber: Camag Twin trough chamber; Plates: Pre-coated silica gel GF254 plates; Chamber saturation: 30 min; Development time: 30 min; Development distance: 7 cm; Scanner: Camag scanner II; Detection: Deuterium lamp and mercury lamp; Photo-documentation: Camag reprostar; Data system: Win cats software; Drying device: Oven and was visualized under 254 nm (Short wave) and 366 nm(Long wave).

Heavy-metal analysis

Heavy metal analysis of the root powder for all varieties, for lead, cadmium and copper by following standard procedure,[15] was carried out at pollution control board, Belgaum (Karnataka), India.

Table 4: Heavy metal analysis of *Eranda Moola* from three different regions of Belgaum(Karnataka) Three metals (lead, cadmium and copper,) were detected using AAS (Atomic absorption spectrophotometer)

S.NO.	Region	Part Used	Lead	Cadmium	Copper
1.	Sahapur	Root	134.2	8	145
2.	Udyambagh	Root	ND	ND	124.5
3.	Hanumannagar	Root	109.1	ND	117.7

DISCUSSION

The whole study has discussed under the following points-

1. Physicochemical study
2. Preliminary analytical study
3. Analytical study

Physicochemical study

The aim of Ayurvedic pharmaceutics is preparation of suitable and best drug. Drug manufacturing is a multi-step process, its steps varies according to different formulations. Preparation of any medicine needs 1st and important step which is always mandatory is, collection of drug. Our Acharya's had beautifully described the method of collection of drug.

Collected samples of *Erandamoola* from all regions were found similar in surface that was smooth or in some root it was wrinkled straight in shape, yellowish brown in colour, sweet bitter in taste and odourless. pH of collected soil samples from mentioned regions were almost same and slightly acidic in nature. Alcoholic and water extract were extracted from each samples of Erandmoola. From Udyambagh sample we got 5.84% alcohol extractives value, from Sahapur sample we got 8.32%, and from Hanumannagar sample we got 5.2% of alcohol extractives value. Water extractive was higher in Sahapur sample which was 12.4%, from Udyambagh sample it was 11.68% and from Hanumanagar sample it was 10.8%. Acid insoluble ash of Hanumannagar sample was 0.45%, Sahapur sample value was 0.96% and Udyambagh was 0.84%. From Hanumannagar *Erandamoola* sample there was higher percentage of moisture. We got 42.3% of loss in weight of sample. From Udyambagh sample there was 3.780% of loss in weight of sample, from Shahapur sample and there was 14.128% of loss in weight of sample.

Preliminary phytochemical study

Carbohydrates, Reducing sugars, Pentose sugar, Fats and oils, Non reducing sugars, tyrosine Amino acids, alkaloids and starch were absent in all samples of alcohol and water extractives of *Erandamoola*. Proteins were present in Shahapur and Hanumannagar water extractives samples of *Erandmoola* and absent in rest other samples. Gums and saponins were present in water extracts of samples in all mentioned areas and were absent in alcohol extracts samples in all three samples. Cardiac glycosides were absent in water extract of Shahapur, Udyambagh and Hanumannagar *Erandmoola* samples and were present in all three samples of alcoholic extracts of above mentioned samples. Flavonoids were present in all samples except alcoholic extract sample of Hanumannagar. Tannic acid and phosphates absent in all samples except Sahapur and Hanumannagar water extracts. Monosaccharides were present in all samples except in Alcoholic extract of Hanumannagar sample. Rf value were found in alcoholic extract of *Erandamoola* in sahapur region in short wave with 3 spots on 0.16, 0.26 and 0.80 and in long wave sample two spots were seen on 0.08, 0.23. In water extract spots were seen only in short wave with 3 spots that are on distance 0.76, 0.85 and 0.92. In Udyambagh alcoholic extract there were four spots seen on distance of 0.19, 0.26, 0.35 and 0.82 and in water extract under long wave three spots were seen on 0.24, 0.30 and 0.45 distance. In Hanumannagar alcoholic extract of *Erandmoola* under short wave 6 spots were seen at distance of 0.05, 0.08, 0.15, 0.18, 0.44 and 0.54 and under short wave only one spot seen at distance of 0.30. These spots were approximately at equal distance as per API standards. Three elements were found in different regions sample of *Erandamoola*, those were lead, cadmium and copper. In shahapur and Hanumannagar samples it was above the permissible limit i.e. 10 mg/kg. it was not detected in Udyambagh sample. Cadmium were only found in Shahapur region sample but it was below permissible limit i.e. 5-10mg/kg but nutritional limit of cadmium for human is 0.057mg/kg that may be harmful for humans if taken as medicine for longer days. In all samples Copper were found above permissible limit. Copper is said to be essential micronutrient. Its nutritional limit in humans is 2-3 mg/kg. Ayurvedic medicines are said to be safe drug for longer time. it is only when the drug is collected from uncontaminated land and in proper manner.

CONCLUSION

Hanumannagar (Agricultural area) sample was found to be more contaminated, but having lesser moisture content and lesser alcohol and extractive value than Sahapur (Domestic area) and least contamination in (Hanumannagar) industrial area.

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