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COMPARATAIVE PHARMACOGNOSTIC STANDARDS OF ERANDAMOOLA (*RICINUS COMMUNIS* LINN.) COLLECTED IN DIFFERERENT SEASONS

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ABSTRACT

Introduction: *Ricinus communis* Linn (*Euphorbiaceae*) commonly known as *Eranda* in Ayurveda is a soft-wooded small tree wide spread over tropics and warm temperate region of the world. Roots are said as Virshya, Vatahara and beneficial in various ailments. As per Dravyasamgrahanakaala roots are advised to collect in three seasons, Greeshma, Pravarut and Shishsira. With all these backgrounds, planned to conduct pharmacognostic study of roots collected in three seasons. **Materials and Methods:** Roots collected in above three seasons Greeshma, Pravarut and Shishsira are shade dried, labelled properly subjected for Macro- microscopy, Physico chemical standards, Phytochemical study and HPTLC as per standard guidelines. Results and Discussion: Macro-microscopic features have not shown much difference among their histological features. Physico chemical standards and HPTLC have shown standard values. The Phytoconstituents like Alkaloid, Steroid, Carbohydrates, Tannins, Coumarins shown thier presence in majority of all seasons. Similarly, the constituents like Resin, Amino acids, Carboxylic acids, Phenol, Tetrapenoids, Saponins, Flavanoids were absent in the all three seasons. Quinone as secondary metabolite found in two seasons. **Conclusion:** Dravyasamgrahana kala (instruction for collection) is a textual guideline documentary mentioned in Samhitaas till Nighantu period, wherein they have specified the specific kaala (season) for collection of different parts of plant. Pharmacognostical study conducted on these sample of Ernadamoola proved the ancient fact that there is a role of season on metabolites of drugs.

KEYWORDS: Dravyasamgrahana, Eranda, Ricinus communis, Pharmacognosy.

INTRODUCTION

Eranda (*Ricinis communis* Linn) a popularly used herbal drug in *Ayurveda* since centuries. It is a glabrous shrub or almost small tree 2-4 m high, belonging to family *Euphorbiaceae*, found throughout India, mostly growing wild on waste land and also cultivated for its oil seeds.[1] Different parts of the plant are found to be used in various therapeutic condition; like leaves are best *swedopaga*, seeds and seed oil are said as *rechaka*(purgative).[2] Apart from this roots of *Eranda* (*Ricinis communis* Linn) are mentioned as best *Vrishya* and *Vatahara* by *Acharya Charaka* and *Vagbhata*. The roots of this drug are used in many *Vathahara basti yogas, Udararoga, vatavyadhi, vatarakta and Amavata.*[3]

Ayurveda, science of life always revolves around its guidelines starting from drug collection, preservation, processing, fixing a dose, administration, till fallow-up. *Dravyasamgrahana* (instruction for collection) is a textual guideline documentary mentioned in *Samhitaas* till *Nighantu* period, wherein they have specified the specific *kaala* (season) for collection of different parts of plant.[4] As per these references roots of a plant are to be collected in two seasons, ie *Greeshma* (April-May) and *Shishira* (December –January). Whereas, *Acharya Sushrut* mentions, *Pravrut* (May-June) as the ideal time to collect root.

Globally the prospects of traditional herbal medicine have begun to look brighter and people are particular towards preventive as well as therapeutic approach of *Ayurveda*. The concepts of *Ayurveda* are the principles what our ancient sages, have practically observed with evident results, which are to be reestablished through scientific facts.

Hence with all these background, the present study has been formed to analyze the difference in Phyto-pharmacological values when roots of *Eranda(Ricinis communis* Linn) collected at different seasons as per classical guidelines.

MATERIALS AND METHODS

Collection of the drug sample

Eranda moola (*Ricinus communis. Linn)* root belonging to the family *Euphorbiaceae* were collected from their natural habitat in Sisira Ruthu (December and January), Greeshma Ruthu (April - May), Pravut Ruthu (May-June) authenticated by botanist's opinion and sample

deposited at SDM centre for Research in Ayurveda and Allied sciences, Udupi. (voucher No: 19011402).[5]

PHARMACOGNOSTIC STUDY

Pharmacognostic analysis of drugs conducted, collected in all the three Ruthus ie, Sisira Ruthu (December and January), Greeshma Ruthu (April - May), Pravut Ruthu (May-June) were planned as per standard methodology.

Macroscopy

Various parameters of the plant material, such as size, shape, colour, odour and taste of the roots were recorded.

Microscopy[6]

Sample was preserved in fixative solution. The fixative used was FAA (Formalin-5ml + Acetic acid-5ml + 70% Ethyl alcohol-90ml). The materials were left in FAA for more than 48 hours. The preserved specimens were cut into thin transverse section using a sharp blade and the sections were stained with saffranine. The slides were also stained with iodine in potassium iodide for detection of starch. Transverse sections were photographed using Zeiss AXIO trinocular microscope attached with Zeiss AxioCam camera under bright field light. Magnifications of the figures are indicated by the scale-bars.

Physicochemical standard

Loss on drying, Total Ash, Acid insoluble Ash, Water soluble ash, Alcohol soluble extractive, Water soluble extractive was measured as per standard protocol.[7]

Preliminary phytochemical tests

Test for the presence of alkaloids, carbohydrates, steroids, saponins, tannins, flavonoids Phenol, coumarins, triterpenoids, carboxylic acid, resin, quinone conducted using both alcoholic and aqueous extract.[8]

HPTLC

1g of *Ricinus communis* (Eranda moola) powder was suspended in 10 ml of alcohol. 4, 8 and 12µl of the above extract was applied on a pre-coated silica gel F254 on aluminum plates to a band width of 7 mm using Linomat 5 TLC applicator. The plate was developed in Toluene: Ethyl acetate: Formic acid: Methanol (2.0: 3.0: 1.0: 3.0). The developed plates were visualized under short UV, long UV and then derivatised with vanillin sulphuric acid and

scanned under UV 254nm, 366nm and 620nm (After derivatisation). R_f, colour of the spots and densitometric scan were recorded.[9]

RESULTS

Pharmacognostic study

Macroscopy

On naked eye examination root appears as, stout, twisted tap root, with many lateral rootlets. Outer layer yellowish in colour, around 10-12 cm long with 3-5cm thick, rounded, lateral roots, thin fibrous, tough. Roots collected in three seasons have not shown much difference among morphological characters.

Microscopy

TS of root is circular in outline with narrow cortex and wide wood, occupying maximum area of section. The cork layer is narrow 3 to 5 layered embedded with few calcium oxalate crystals. Phloem is wide next layer with tangentially arranged cells and interfering with bands of modularly rays. Phloem parenchymatous cells show the presence of cluster of calcium oxalate crystals, starch grains. Xylem is very wide, vessels and tracheid are found. Xylem may be isolated or in groups of 3-5, separated with medullary rays, which contain a lot of starch grains. Microscopic structures have also not shown much difference among histological features.

Figure 1: Macroscopy of Eranda moola(*Ricinus communis* Linn.).

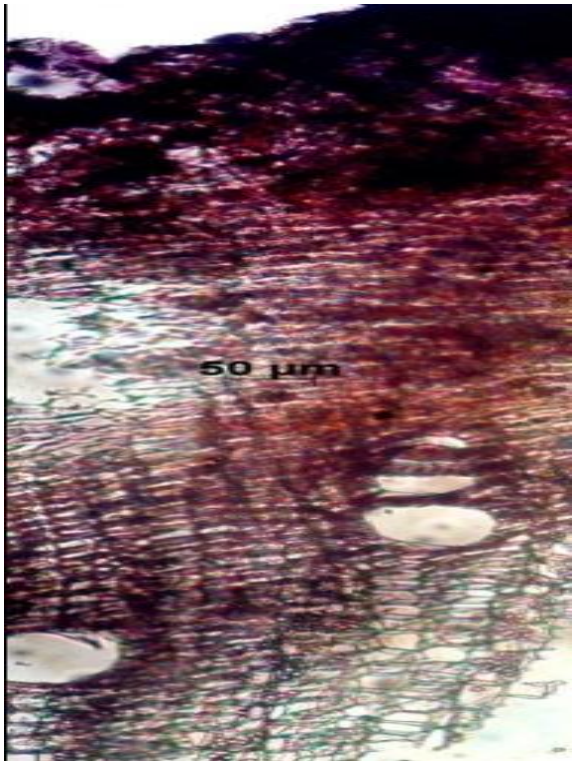


Figure 2: Microscopy of Erandamoola (*Ricinus communis* Linn.) collected in Pravrut Rutu(EMP).

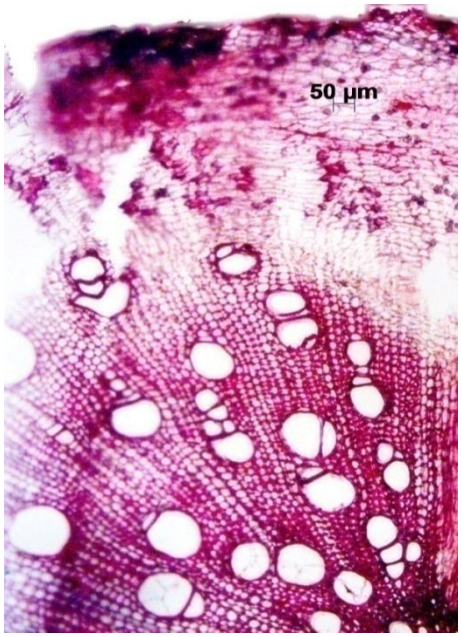


Figure 3: Microscopy of Erandamoola (*Ricinus communis* Linn.) collected in Greeshma Rutu (EMG).

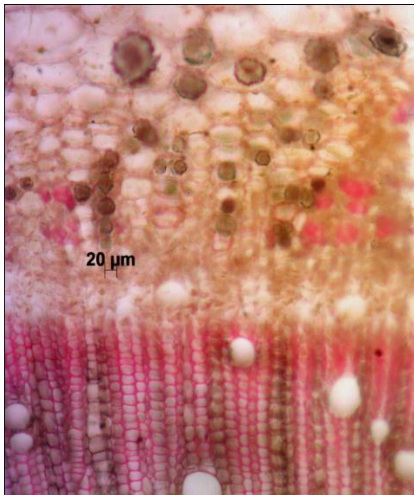


Figure 4: Microscopy of Erandamoola(*Ricinus communis* Linn.) collected in Shishira Rutu (EMS).

Table 1: Phytochemical study.

Phytochemical study of Root (*Ricinus communis* Linn.) collected in three seasons			
Test	**Sample 1(EMS)**	**Sample 2(EMP)**	**Sample 3(EMG)**
Alkaloid	+	+	+
Steroid	+	+	+
Carbohydrates	+	+	+
Tannins	+	+	+
Flavanoids	-	-	-
Saponins	-	-	-
Tetrapenoids	-	-	-
Coumarins	+	+	+
Phenols	-	-	-
Carboxylic acid	-	-	-
Amino acid	-	-	-
Resin	-	-	-
Quinone	+	-	+

(Note: EMP- Pravrat Ritu sample EMS- Shishsira ritu sample EMG- Greeshma ritu sample)

The Phytoconstituents like Alkaloid, Steroid, Carbohydrates, Tannins, Coumarins shown thier presence in majority of all seasons. Similarly the constituents like Resin, Amino acids, Carboxylic acids, Phenol, Tetrapenoids, Saponins, Flavanoids were absent in the all three seasons. Quinone as secondary metabolite found in two seasons.

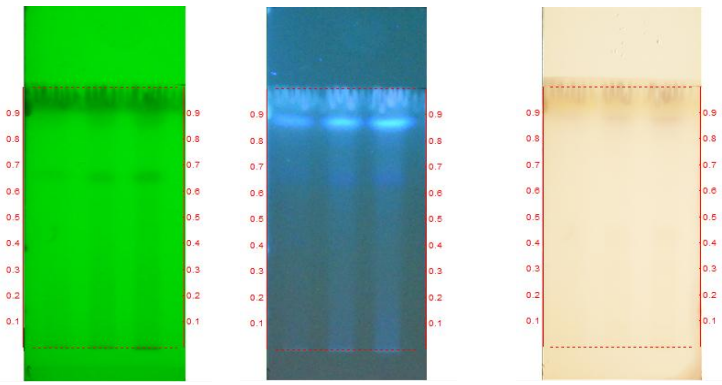
Table 2: Physicochemical standards.

Results of Physicochemical standard parameters of Root of *R.Communis* (Eranda moola) collected in three different seasons			
Parameter	**(EMS-1) Results n = 3 %w/w**	**(EMP-2) Results n = 3 %w/w**	**(EMG-3) Results n = 3 %w/w**
Loss on drying	5.28±0.01	9.01 ± 0.00	9.27±0.01
Total Ash	5.67±0.31	9.53 ± 0.07	2.95±0.67
Acid Insoluble Ash	0.00±0.00	1.47 ± 0.01	0.29±0.01
Water soluble Ash	3.48±0.00	3.46 ± 0.01	2.74±0.01
Alcohol soluble extractive value	1.23±0.01	0.15 ± 0.00	2.83±0.01
Water soluble extractive value	6.78±0.00	9.89 ± 0.00	12.78±0.01

(Note: EMP- Pravrat ritu sample, EMS- Shishsira ritu sample, EMG- Greeshma ritu sample)

HPTLC

Alcoholic extract of Eranda moola used for HPTCL with Toluene; Ethyl acetate; Formic acid; Methanol (2.0; 3.0; 1.0; 3.0) as mobile phase. Different seasons have shown their characteristic HPTLC standards.



Short UV **Long UV** **After derivatisation**

Fiure 5: HPTLC Photodocumentation of *Eranda moola*(*Ricinus communis* Linn.) *collected in Pravrat Rutu* (EMP).

Track 1: *Eranda moola*- 4µl

Track 2: *Eranda moola*- 8µl

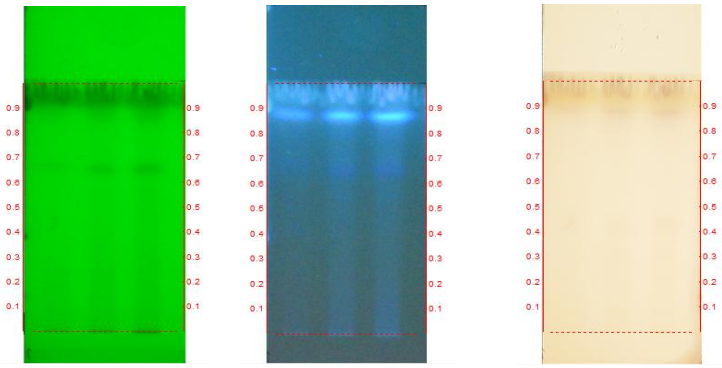
Track 3: *Eranda moola*- 12µl

Solvent system- Toluene: Ethyl acetate: Formic acid: Methanol (2.0: 3.0: 1.0: 3.0)

Table 3: Rf values of sample

Short UV	**Long UV**	**After derivatisation**
0.66 (Green)	**0.66 (F. blue)**	**-**
-	**0.69 (F. blue)**	**-**
-	**0.87 (F aqua. blue)**	**-**
-	**-**	**0.89 (Purple)**

***F – fluorescent**



Short UV **Long UV** **After derivatisation**

Track 1: *Eranda moola*- 4µl

Track 2: *Eranda moola*- 8µl

Track 3: *Eranda moola*- 12µl

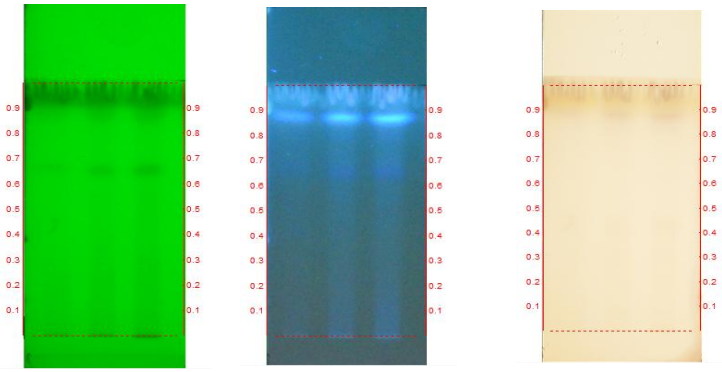
Solvent system- Toluene: Ethyl acetate: Formic acid: Methanol (2.0: 3.0: 1.0: 3.0)

Figure 6: HPTLC Photodocumentation of sample of *Eranda moola*(*Ricinus communis* Linn.), collected in Greeshma Rutu(EMG).

Table 4: Rf values of sample (EMG).

Short UV	Long UV	After derivatisation
0.66 (Green)	0.66 (F. blue)	-
-	0.69 (F. blue)	-
-	0.87 (F aqua. blue)	-
-	-	0.89 (Purple)

***F - fluorescent**



Short UV **Long UV** **After derivatisation**

Track 1: *Erandamoola*- 4µl,

Track 2: *Erandamoola*- 8µl,

Track 3: *Erandamoola*- 12µl

Solvent system- Toluene: Ethyl acetate: Formic acid: Methanol (2.0: 3.0: 1.0: 3.0)

Figure 7: HPTLC Photo documentation of sample of *Erandamoola*(*Ricinus communis* Linn.) *collected in (Shishira) Rutu (EMS).*

Table 13: Rf values of sample (EMS).

Short UV	Long UV	After derivatisation
0.66 (Green)	0.66 (F. blue)	-
-	0.69 (F. blue)	-
-	0.87 (F aqua. blue)	-
-	-	0.89 (Purple)

***F – fluorescent**

DISCUSSION

The integral part of Indian culture Ayurveda contributes the uses of thousands of plants, for the well-being of living beings, one among the precious contribution to the world is Eranda. It is used for both economical and medicinal purposes. *Ricinus communis* Linn (*Euphorbiaceae*) commonly known as *Eranda* in Ayurveda is a soft-wooded small tree wide spread over tropics and warm temperate region of the world.[10] 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. The palmate lobed leaf gives its special appearance and got the name gandarvahasta in Sanskrit and Palma Christi in English. Eranda has a considerable export market and is a source of foreign exchange. The castor oil is widely used as a cathartic and is official in Indian pharmacopoeia and other pharmacopoeias.

Its roots have also been highlighted for its Vrishya(aphrodisiac) and Vata hara actions by Acharya Charaka. This plant also possesses hepatoprotective, anti- diabetic, laxative, anti-inflammatory and free radical scavenging activities. Castor seeds are one among Bhedaniya dravya in classics. The leaves are used in the treatment various vatika disorders.

Hence with all these points as study has been planned to conduct a comparative study of Erandamoola collected in three different seasons. Authentication of raw material is an important step in quality control, involves taxonomical identification, macro-microscopic recording of the sample collected. Macroscopy helps in quick identification of plant material whereas microscopy of the drug reveal about its histological arrangement. Physico chemical standards further add about their purity and chemical nature. HPTLC reveal about chemical constituents of the drug.[11] Pharmacognostical study conducted on the sample of Ernadamoola collected in Greeshma rutu, Pravarat rutu and Shishsira ritu. Macro-microscopic features have not shown much difference among their histological features. Physico chemical standards and HPTLC have shown standard values. The Phytoconstituents like Alkaloid, Steroid, Carbohydrates, Tannins, Coumarins shown thier presence in majority

of all seasons. Similarly, the constituents like Resin, Amino acids, Carboxylic acids, Phenol, Tetrapenoids, Saponins, Flavanoids were absent in the all three seasons. Quinone as secondary metabolite found in two seasons.

CONCLUSION

Eranda (*Ricinus communis* Linn.) is an important medicinal plant where all parts of this drug area used in different pathological condition. The seeds are said to be purgative, leaves used as analgesic, anti-inflammatory. The roots are particularly indicated as Vrishya and Vatahara ie analgesic and aphrodisiac.

Dravyasamgrahana (instruction for collection) is a textual guideline documentary mentioned in Samhitaas till Nighantu period, wherein they have specified the specific kaala (season) for collection of different parts of plant. Pharmacognostical study conducted on the sample of Ernadamoola collected in Greeshma rutu, Pravarat rutu and Shishsira ritu. Macro-microscopic features have not shown much difference among their histological features. Physicochemical standards and HPTLC have shown standard values. The Phytoconstituents like Alkaloid, Steroid, Carbohydrates, Tannins, Coumarins shown thier presence in majority of all seasons. Similarly, the constituents like Resin, Amino acids, Carboxylic acids, Phenol, Tetrapenoids, Saponins, Flavonoids were absent in the all three seasons. Quinone as secondary metabolite found in two seasons.

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