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# RESEARCH STUDYIES ON BIOCHEMICAL ESTIMATION OF MEDICINAL PLANT

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## ABSTRACT
Over centuries, cultures around the world have learned how to use medicinal plants to fight illness and maintain health. The importance of natural product in the treatment of disease has been increased because of its natural source and comparatively lesser side effects as compared to the complexity in formulating chemical based drugs as well as uprising cost has led worldwide researchers to focus on the medicinal plant research. Natural Products are the rich source of biologically active compounds and today's many medicines are either obtained directly from natural source. Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids. These compounds are synthesized by primary or rather secondary metabolism of living Organisms. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. The plant of Ricinus communis is a type of blooming plant of the family Euphorbiaceae. This plant has special place with subtribe Ricininae and monotypic genus Ricinus. The development of plant and its connection to different plant species are at present considered utilizing current hereditary tools. This project aims to detect primary metabolites in Ricinus Communis plant. We followed standard protocol to detect different primary metabolites using two aqueous solutions. It was found that some are present with extraction of ethanol and some are present with extraction of ethyl acetate.

**KEYWORDS:** Plant extraction, primary metabolites, secondary metabolites, ethanol, Ethyl acetate.

## INTRODUCTION
The plant kingdom holds many species of plants containing substances of medicinal interest which are yet to be investigated. Large numbers of plant are constantly being screened for their chemical and pharmacological properties. By the application of modern techniques of isolation and pharmacological evaluation, many new plant drugs find their way to medicine as purified substances 13. A recent aspect of interest in plant drug research is the new concept of a nonspecifically increased resistance of an animal to diseases attributable to other substances, besides the active principles responsible for specific biological activity(Sindhu.S.Nair et al., 2012)

The importance of natural product in the treatment of disease has been increased because of its natural source and comparatively lesser side effects as compared to the complexity in formulating chemical based drugs as well as uprising cost has led worldwide researchers to focus on the medicinal plant research. These are readily available and culturally important traditional medicines form the basis of an accessible and affordable healthcare regime and are an important source of livelihood for indigenous and rural populations. Worldwide, between 50,000 to 80,000 flowering plants are used medicinally. Of course, the use of wild plant species to cure and resist disease is nothing new. More than eighty percent of South Asia's people have no access to modern health care; they rely instead on traditional medicine using native species. In fact, many indigenous and local communities are immense reservoirs of traditional knowledge that can benefit biotechnology, agriculture, pharmaceutical development, and health care. Plants contain many biologically active compounds which have potential for the development as medicinal agents. Herbal medicines have already formed the basis of therapeutic use in the developing countries, but of recent, there has been an increase in the use of herbal medicines in the developed world too . Use of plants as a source of medicine has been inherited and is an important component of the health care system in India. In the Indian systems of medicine, most practitioners formulate and dispense their own recipes; hence this requires proper documentation and research. In western world also, the use of herbal medicines is steadily growing with approximately 40 percent of the population reporting use of herb to treat medical illnesses within the past year. Public, academic and government interest in traditional medicines is growing exponentially due to the increased

incidence of the adverse drug reactions and economic burden of the modern system of medicine. India has a rich diversity of medicinal as well as aromatic plants and holds a unique place in the world in the traditional system of medicine. Socioeconomic uses of plants, i.e. medicinal and, other than medicines have been reported in many studies. Plant based traditional knowledge has become a recognized tool in search of drugs and neutraceuticals. Today, according to World Health Organization as many as 80% of the world's people depend on traditional medicine for primary health care needs. The herbal medicines are comparatively safer than synthetic drugs.

In traditional medicine, there are many natural crude drugs that have the potential to treat various diseases and disorders, one of them is Ricinus communis L. [Family: Euphorbiaceae, popularly known as 'castor plant' and commonly known as 'Palm of Christ', Verenda (Bengali), Arand, Erand, Andi (Hindi), Errandi (Marathi), Diveli (Guajarati), Urdu (Be danjir, Arand) and Punjabi (Arind)] (Figure 1). This plant is widespread throughout the tropical regions. Castor bean is an evergreen herbaceous or semi-woody, large shrub or small tree that reaches 5 meters tall. This is a fast growing plant that tends to grow straight up at first, and then develops branches later. The leaves are palmate, with 5-11 deeply incised lobes. They are glossy, green to purplish or reddish-green and 30 to 75 cm across, with long petioles. Stem is green to reddish-purple in color and have hollow internodes. The inflorescence (not particularly showy) has greenish yellow flowers that are borne in spikes up to 30 cm long near the tops of the stems. Female flowers are on the top half of the spike and have conspicuous red stigmas. The male flowers on the lower half of the spike have showy yellow anthers. Pollinated female flowers are followed by reddish brown, egg-shaped capsules, about 2.5 cm long, thickly covered with soft flexible spines. Each capsule contains three seeds that look like fat, swollen dog ticks and are deadly poisonous. This plant has numerous medicinal uses that are potential for the prevention of diseases, leaving no baleful effects on the health if the dose is maintained properly (below the toxic level).

The following are the materials, methods and procedures adopted for the present study.

**1. Foam test**

Take 1 ml of plant extract and dilute with distilled water to 5 ml and shake the content continuously for 5 minutes. Formation of foam indicates the formation of saponins.

**Detection of phytosterols**

**Salkowski's test**

To 1 ml of extract add 1ml of chloroform and add few drops of Conc. sulphuric acid.

Shake the content and allow it to stand for few minutes. Appearance of golden yellow colour indicates the presence of triterpenes.

**Liberman Burchard's test**

To 1 ml of leaf extract add equal volumes of chloroform and few drops of acetic anhydride. Boil he contents of 5 minutes and allow it to cool. Add few drops of conc. Sulphuric acid onto walls of test tube. Brown ring formation at the junction indicates the presence of phytosterols.

**Detection of phenols**

***Ferric chloride test***

Add 3-4 drops of ferric chloride solution to 1 ml of the extract. Observe for the formation of bluish black colour which then indicates the presence of phenols

***Detection of tannins***

To 2ml of the extract add few drops of ferric chloride solution appearance of blue colour indicate the presence of hydrolysable tannins and green colour indicates the presence of condensed tannins.

**Detection of flavonoids**

***Alkaline Reagent Test***

To 2ml of the extract add 2ml of sodium hydroxide solution. Intense yellow colour formation indicates the presence of flavonoids.

***Lead acetate test***

To 2ml of the extract add 2ml of the acetate solution. Intense yellow colour formation indicates the presence of flavonoids.

**Detection of proteins and aminoacids**

***Xanthoproteic test***

To 1ml of the extract add few drops of concentrated nitric acid. Formation of yellow colour
Indicates the presence of proteins

***Ninhydrin test***

Add 0.25% w/v of ninhydrin reagent to the extract and boil for few minutes. Appearance of blue colour indicates the presence of amino acids.

**Detection of diterpenes**

***Copper acetate test***

To 2ml of the plant extract add 3-4 drops of copper acetate solution. Formation of emerald green colour indicates the presence of diterpenes.

**Preliminary Phytochemical screening**

***Detection of alkaloids***

***Mayer's test***

Add few drops of Mayer's reagent to 1ml of the extract. Formation of a yellow coloured precipitate indicates the presence of alkaloids.

***Wagner's test***

Add 2 to 3 drops of Wagner's reagent to one ml of the filtrate. Formation of brown/reddish precipitate indicates the presence of alkaloids.

***Dragendroff's test***
Add 2 to 3 drops of Dragendroff's reagent to 1ml of the extract. Formation of red/white precipitate indicates the presence of alkaloids.

***Hager's test***
Add to 1 ml of the filrate a few drops of Hager's reagent (saturated picric acid solution). Presence of alkaloids is confirmed by the formation of yellow coloured precipitate.

**Detection of carbohydrates**
Extracts were dissolved individually in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

***Molisch's test***
To 2 ml of the extract mix few drops of Molisch's reagent. Add few drops of concentrated sulphuric acid onto the sides of the test tube. Appearance of violet coloured ring at the juncture indicates the presence of carbohydrate.

***Benedict's test***
Add a few drops of Benedict's reagent to the extract and heat it for 5 min. Appearance of orange red precipitate indicates the presence of reducing sugars.

***Fehling's test***
To 1ml of the plant extract add equal amount of Fehling's A & B solutions and heat it for few minutes. Formation of red precipitate indicates the presence of reducing sugars.

**Detection of glycosides**
Extracts were hydrolysed with dil. HCl, and then subjected to test for glycosides.

**Modified Borntrager's test**
To 1ml of the plant extract add 2ml of ferric chloride solution and immerse the content in boiling water bath for about 5 minutes. Cool the mixture and extracted with equal volumes of benzene. Separate the benzene layer and treat it with equal volume of ammonia solution. Formation of rose pink colour in the ammonical layer indicates the presence of anthranol glycosides.

***Legal's test***
Treat 1ml of the extract with equal volumes of sodium nitroprusside in pyridine and sodium hydroxide. Appearance of pink to blood colour indicates the presence of cardiac glycosides.

**Test for Saponins**
About 0.5 g of the elaf extract was vigorously shaken with water in a test tube and then heated to boil. Frothing was observed which was taken as evidence for the presence of the Saponins.

**Test for Tannins**
About 0.5 g of leaf extract was added in 10 ml of water in a test tube and filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or blue-black coloration.

**Table: Below table shows that different primary Phyto- chemicals using different solvents.**

| Test performed | Acetone | Ethyl acetate |
|---|---|---|
| saponin | - | - |
| flavenoids | + | + |
| phenols | - | - |
| tannins | - | - |
| phytosteriods | - | - |
| carbohydrates | + | + |
| Cardic glycoside | + | + |
| terpenoids | - | - |
| diterpenes | + | + |

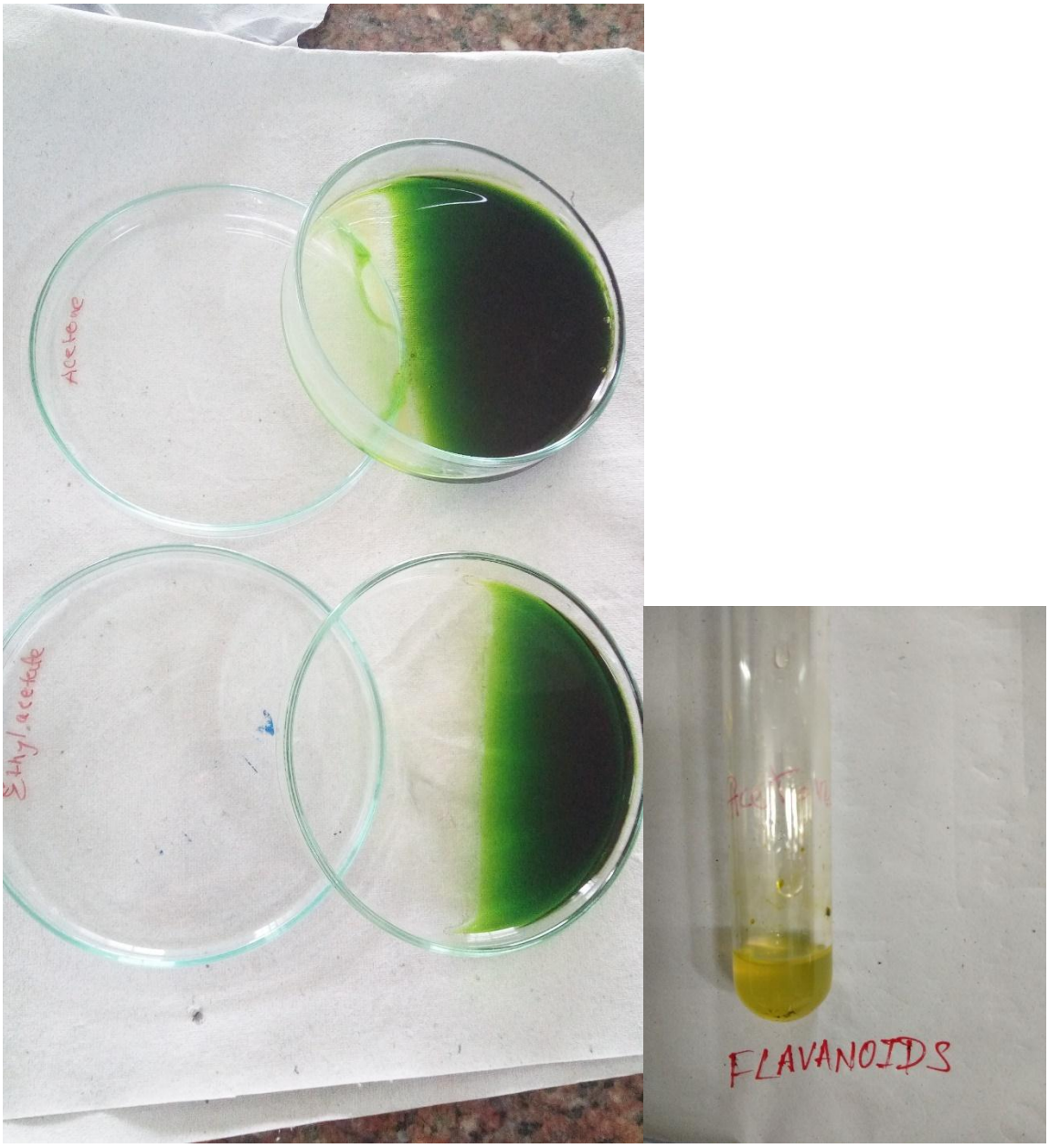


**Fig. Extraction of flavonoids using solvents.**

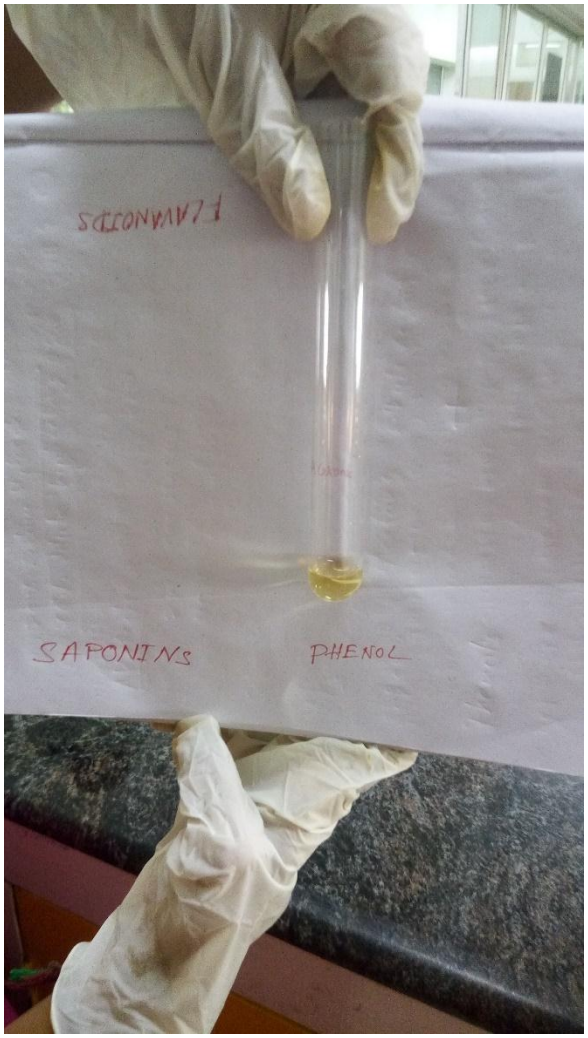


**Fig. Extraction of phenols using different solvent systems.**

## DISCUSSION

Plants are rich source of different metabolities. There are two types. Even both primary and secondary metabolities are highly useful to detect pharmaco activity also. These plant metabolites are very useful to show anti bacaterial, antifungal and anticancer activity. In our study we identified the carbohydates, proteins, flavonoids, phenols, glycosides, and diterpenes. R. communis or castor plant is a natural plant of India. Medicinal effect of R. communis plant occupied a distinct place in the life right from the primitive period to till date and provided information on the use of plants or plant products as medicine. It has various pharmacological actions, some of them are reviewed here, but still this plant has much novel potential which is yet to explore. Overall, all these phytochemical constituents and pharmacological activities exhibited by the R. communis have great potential and significance in the field of medicinal plant research. Hence, the industrial entrepreneurs also should come forward with new concepts and steps towards the best use of this potential medicinal plant.

## REFERENCES

1. Warrier PK, Nambiar VPK, Ramankulty C. Bioactive Food as Dietary Interventions for Diabetes. Journal of Ethanopharmacology, 1996; 104: 129-131. 7. McGuire N. Taming the Bean. The American Chemical Society. 2007, 122-124.
2. HS Waizel and B.J. Waizel, Algunas plantas utilizadas en México para el tratamiento del asma. Anales de Otorrinolaringología, 2009; 54(4): 145-171.
3. M Krishna, T. Khemchandani and R. Balaji, Extraction of a novel biopesticide obtained from agricultural weeds useful for medicinal plants, Journal of Medicinal Plants Research, 2013; 7(30): 2236-2242.
4. LP Iaxmikant and K.R. Bhimashankar. Ricinus communis (Castor): An Overview. International Journal of Research in Pharmacology & Pharmacotherapeutics, 2014; 3(2): 136-5.
5. R Pita, A. Anadón and L.M.R Martínez, Ricina: una fitotoxina de uso potencial como arma. Revista de Toxicología, 2004; 21(2): 51-63.
6. Y Lezcano, M. Soca, L.M. Sánchez, F. Ojeda, Y. Olivera, D. Fontes, I.L. Montejo and H. Santana, Caracterización cualitativa del contenido de metabolitos secundarios en la fracción comestible de Tithonia diversifolia (Hemsl.) A. Gray, Pastos y Forrajes, 2012; 35(3): 283-291.

7. A Osho and T. Adetunji, Antimicrobial activity of the essential oil of Argemone mexicana Linn. Journal of Medicinal Plants Research, 2010; 4(1): 19-22.
8. G Brahmachari, D. Gorai and R. Roy, Argemone mexicana: chemical and pharmacological aspects. Brazilian Journal of Pharmacognosy, 2013; 23(3): 559-575.
9. S Singh, T.D. Singh, V.P. Singh, V.B. Pandey. A new benzylisoquinoline alkaloid from Argemone mexicana, Natural Product Research, 2010; 24(1): 63-67.
10. Bentley R and Trimen H. A Textbook of Medicinal Plants, 2nd Edition, Asiatic Publishing House, New Delhi, 2007; 237.
11. Kang SS, Cordell A, Soejarto DD and Fong HHS. Alkaloids and flavonoids from Ricinus communis. Journal of Natural Products, 1985; 48(1): 155-156.
12. Darmanin S, Wismaver PS, Camillerri Podesta MT, Micallef MJ and Buhagiar JA. An extract from Ricinus communis L. leaves possesses cytotoxic properties and induces apoptosis in SKMEL-28 human melanoma cells. Natural Product Research, 2009; 23(6): 561-571.
13. Singh PP and Ambika Chauhan SMS. Activity guided isolation of antioxidants from the leaves of Ricinus communis L. Food Chemistry, 2009; 114(3): 10691072.
14. Sani UM and Sule MI. Antifertility activity of methanol extracts of three different seed varieties of Ricinus communis Linn. Journal of Pharmaceutical Sciences, 2007; 6: 78-83. 24. Sandhyakumary K, Bobby RG and Indira M. Antifertility effects of Ricinus communis Linn. on rats. Phytotherapy Research, 2003; 17: 508-511.
15. Okwuasaba FK, Osunkwo UA, Ekwenchi MM, Ekpenyong KI, Onwukeme KE, Olayinka AO, Uguru MO and Das SC. Anticonceptive and estrogenic effects of a seed extract of Ricinus communis var. minor. Journal of Ethnopharmacology, 1991; 34: 141-145.