EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 7
Issue: 5
758-762
Year: 2020

ESTIMATION AND IDENTIFICATION OF BIOMOLECULES IN "RICINUS COMMUNIS"

Kusuma Medara*

Student Department of Genetic Engineering Bharath University, Chennai.

***Corresponding Author: Kusuma Medara**
Student Department of Genetic Engineering Bharath University, Chennai.

Article Received on 21/03/2020 **Article Revised on 11/04/2020** **Article Accepted on 01/05/2020**

ABSTRACT
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. In this reiew states that this plant extract has different metabolites like proteins, flavonoids, and other metabolites.

KEYWORDS: Medicinal plants – extract-proteins-steroids-ethyl acetate.

INTRODUCTION

Even today, plants are not only indispensable in health care, but form the best hope of source for safe future medicines. In spite of the fact that now we have at our command a number of modern drugs, it is still genuinely urgent to discover and develop new therapeutic agents. It has been estimated that the acceptable therapy is available only for one third of the known human ailments. Therefore, the fight against diseases must be carried on relentlessly. Traditional plant medicines still enjoy significant position in the modern-day drug industries due to the minor side effects as well as the synergistic action of the combination of compounds.

The plants which have been selected for medicinal use over thousands of years constitute the most obvious choice of examining the current search for therapeutically effective new drugs such as anticancer drugs, antimicrobial drugs, antihepatotoxic compounds. According to World Health Organization (WHO), medicinal plants would be the best source to obtain variety of drugs. About 80% of individuals from developed countries use traditional medicines, which has compounds derived from medicinal plants. However, such plants should be investigated to better understand their properties, safety, and efficiency. 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.

C*Ricinus communis* L. (Euphorbiaceae), commonly known as castor oil plant, is a soft wooden small tree developed throughout tropics and warm temperature regions. This plant is indigenous to the southeastern Mediterranean Basin, Eastern Africa, and India but is widespread throughout tropical regions and is widely used as an ornamental plant. The plant is known to display antimicrobial activity and has been used to treat several ailments. Its leaf, root, and seed oil are used in inflammation treatment, liver disorders, hypoglycemic, and as a laxative. In Tunisia, the plant is used as a contraceptive. The plant is also used in African folk medicine in the treatment of warts, cold tumors, and indurations of mammary glands, corns, and moles. The anti-inflammatory, antioxidant, antimicrobial, and cytotoxic activities of the plant was demonstrated. However, *Ricinus communis* is classified as the most poisonous plant on earth for humans. The toxicity of raw castor beans is due to the presence of ricin, a naturally occurring lectin (a carbohydrate-binding protein). Ricin is a globular, glycosylated heterodimer of approximately 60–65 kDa. Ricin toxin A chain (RTA) and ricin toxin B chain (RTB) are of similar molecular weights, approximately 32 and 34 kDa, respectively. RTA is an *N*-glycoside hydrolase composed of 267 amino acids. It has three structural domains with approximately 50% of the polypeptide arranged into alpha-helices and beta-sheets. RTB is a lectin composed of 262 amino acids that is able to bind terminal galactose residues on cell

surfaces. Ricin is so toxic that the amount contained in a single bean would kill a human in just a few minutes, and there is no antidote. The median lethal dose (LD_{50}) of ricin is around 22 µg/kg in humans if exposure is from injection or inhalation while oral exposure to this lectin is less toxic (though still toxic) and a lethal dose can be up to 20–30 mg/kg. However, ingestion of seeds of the castor oil plant is rare. The 2007 edition of Guinness World Records also ranks *Ricinus communis* as the most poisonous plant in the world. *Ricinus communis* acute poisoning episodes in humans are the result of oral ingestion of castor beans, five to twenty of which could prove fatal to an adult. Physical symptoms include nausea, diarrhea, tachycardia, hypotension, and seizures persisting for up to a week with blood, plasma, or urine concentration of ricin been detectable and measured to confirm diagnosis.

Astor beans (*Ricinus communis*) and ricin have been identified as potential terror agents of terrorism (Coppock, 2009). Castor beans do not give unique clinical signs of intoxication and in waterfowl can be confused with other acute causes of death (Jensen and Allen, 1981). There are inconclusive reports of Canada geese being killed due to castor bean. In Texas, castor bean intoxication could have been the cause of deaths of 10,000 ducks in 1967, and 2,000 ducks in 1969 to 1970 (Jensen and Allen, 1981). The death of 1,673 ducks occurred again in Texas in 1971. A castor bean was found in the examination of one duck. Castor beans were known to have been grown in the area. Although inconclusive, this report does incriminate castor bean ingestion as the cause of death in ducks and geese.

R. communis is herbaceous when young but in frost-free areas it can be an evergreen tree that gets up to 12m in height and become woody with age. The wood is soft and light with a thick central pith. Occasionally, irregular brown heartwood develops. The bark is light brown, smooth, and exhibits rings at the nodes and raised lenticels. There are a moderate number of large, star-shaped leaves with 7 to 9 long pointed lobes (Flordiata, 2005; and Francis, UNDATED).

Antitumour activity: Ricin A, a lectin isolated from R. communis possess antitumor activity, it was more toxic to tumor cells than to nontransformed cells, judged from the ED50 of the lectin towards tumor cells and non-transformed cells.

Bone Regeneration Activity: Ricinus communis polyurethane (RCP) has been studied for its biocompatibility and its ability to stimulate bone regeneration. Results showed that RCP blended with calcium carbonate or calcium phosphate could promote matrix mineralization and are biocompatible materials. Incorporating alkaline phosphatase to RCP with subsequent incubation in Synthetic body fluid could improve the biological properties of RCP. The advantage seen in RCP as compared to demineralized bone is that the former has a slower reabsorption process.

Anti-Implantation activity: The ether soluble portion of the methanol extract of Ricinuscommunis var. minor possesses anti-implantation, anticonceptive and estrogenic activity in adult female rats and rabbits when administere subcutaneously at a dose upto 1.2g/kg and600mg/kg respectively in divided doses.

Antiasthmatic activity: The ethanol extract of R.communis roots possess antiasthmatic activity, it significantly decreases milk induced leucocytosis and eosinophilia and protect degranulations of mast cells in mice.

Antinociceptive activity: The methanol extract of R. communis leaves possesses antinociceptive activity in writhing test, formalin induced paw licking and tail immersion method in mice.

Test for Steroids
2ml of acetic anhydride was added to 2ml of leaf extract along with 2ml conc. Sulphuric acid. The colour change from violet to blue or green is observed for the presence of steroids.

Test for Proteins
To 2 ml of the extract solution, 1 ml of 40% NaOH solution and 1 to 2 drops of 1% CuSO4 solution was added. A violet colour indicated the presence of peptide linkage of the molecule.

Test for Tri-Terpenoids
5ml of each extract was added to 2 ml of chloroform and 3ml of con. H2SO4 to form a monolayer of reddish brown coloration of the interface indicated positive result for the tri-terpenoids.

Test for Triple sugar
To 2ml of extract 2 drops of Molischs reagent was added and shaken well. 2ml of con. H2SO4 was added on the side of the test tube. A reddish violet ring appeared at the junction of two layers **immedi**ately, indicated the presence of triple sugar.

RESULTS
Sample preparation, different solvents used to prepare the sample.

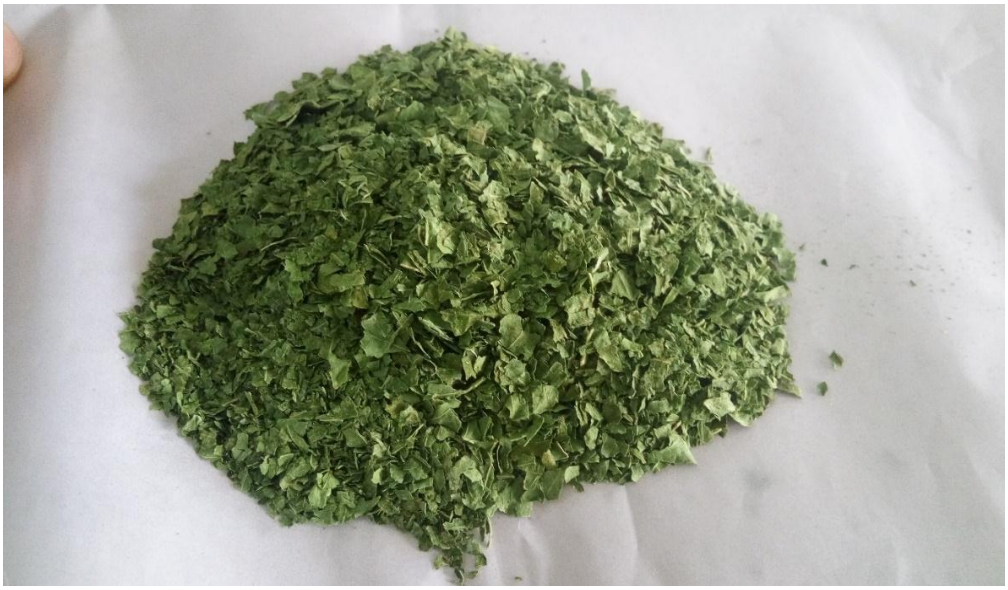

Fig: drying of the sample and preparation of sample using solvents.

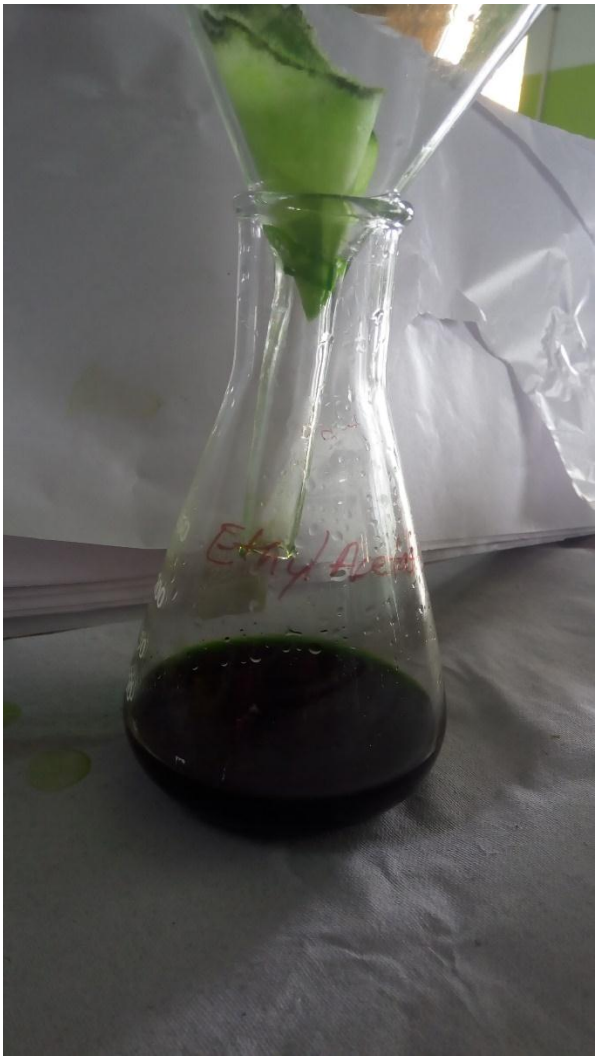

Fig. Sample extraction for analysis of primary phytochemicals.

Test performed	Acetone	Ethyl acetate
proteins	-	-
steriods	+	+
Tri-Terpenoids	-	-
Triple sugar	-	-

This table represent presence of different important metabolites in these leaf extraction

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 different metabolites.

CONCLUSION

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.

we collected leaves and dried for the estimation of different primary metabolities. Total ten parameters, we got different metabolities only. So these leaves are more potential of these primary metabolities. we got proteins, steroids, Tri-Terpenoids and triple sugars.

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. Rizzardo RA, Milfont MO, Silva EM, Freitas BM. Apis mellifera pollination improves agronomic

productivity of anemophilous castor bean (Ricinus communis). Anais da Academia Brasileira de Ciencias, 2012; 84(4): 1137-1145.
2. Sabina EP, Rasool MK, Mathew L, Parameswari. Studies on the protective effect of Ricinus communis leaves extract on carbon tetrachloride hepatotoxicity in albino rats. Pharmacologyonline, 2009; 2: 905-916.
3. Joshi M, Waghmare S, Chougule P, Kanase A. Extract of Ricinus communis leaves mediated alterations in liver and kidney functions against single dose of CCl4 induced liver necrosis in albino rats. Journal of Ecophysiology and Occupational Health, 2004; 4: 169-173.
4. Kalaiselvi P, Anuradha B, Parameswari CS. Protective effect of Ricinus communis leaf extract against paracetamol-induced hepatotoxicity. Biomedicine, 2003; 23(2): 97-105.
5. Aplin PJ, Eliseo T. Ingestion of castor oil plant seeds. The Medicinal Journal of Australia, 1997; 167: 260-261.
6. 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.
8. HS Waizel and B.J. Waizel, Algunas plantas utilizadas en México para el tratamiento del asma. Anales de Otorrinolaringología, 2009; 54(4): 145-171.
9. 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.
10. LP Iaxmikant and K.R. Bhimashankar. Ricinus communis (Castor): An Overview. International Journal of Research in Pharmacology & Pharmacotherapeutics, 2014; 3(2): 136-144.
11. 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.
12. 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.
13. 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.
14. G Brahmachari, D. Gorai and R. Roy, Argemone mexicana: chemical and pharmacological aspects. Brazilian Journal of Pharmacognosy, 2013; 23(3): 559-575.
15. 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.
16. Bentley R and Trimen H. A Textbook of Medicinal Plants, 2nd Edition, Asiatic Publishing House, New Delhi, 2007; 237.
17. Kang SS, Cordell A, Soejarto DD and Fong HHS. Alkaloids and flavonoids from Ricinus communis. Journal of Natural Products, 1985; 48(1): 155-156.