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Screening of Phytochemical constituents of Hydro-ethanolic extracts of Aerial parts of *Pithecellobium dulce* and *Ricinus communis*

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Abstract

The plants Ricinus communis belongs to the family Euphorbiaceae and Pithecellobium dulce from Fabaceae family are assessed and compared for the distribution of phytochemical constituents of medicinal importance like alkaloids, flavonoids, tannins, saponins, terpenoids, fatty acids, resins, phenols, steroids and glycosides in their various aerial parts. The individual hydroethanolic extracts of leaves, flower, pod and bark of both the plants are found to contain all these phytoconstituents qualitatively either in high (+++), moderate (++) and low (+) concentrations in all the part of both the plants. These results indicate that these plant parts have most of the compounds of medicinal values.

Keywords: Medicinal plants, natural products, phytochemical constituents..

Introduction

In all facet of life, plants provide a valuable starting material for the development of drug. Plant products have been ingredient of phyto-medicines can be resulting from bark, pod, leaves, flowers, roots, and seeds[1]. Medicinal plants have some bioactive constituents including alkaloids, fatty acids, Saponins, resins, phenols, steroids, terpenoids, glycosides, tannins, flavanoids provide various physiological action on human body. These phyto-constituents have been proven to exhibit antidiabetic, anticancerous, anti-inflammatiory antibacterial, anti-fungal, antiviral and many other properties[2,3].

The present study has been focused to analyse the phyto-chemicals of *Pithecellobium dulce* and *Ricinus communis*. .*P.dulce,* "Jungle Jalebi," belongs to the family fabaceae is a small to medium sized evergreen plant found throughout India, Pakistan and tropical America. This plant is hardly tested for its scientific utility. However, few *invivo* studies of its bark and seed extracts reveal its antimicrobial, astringent, dysentery, dermatitis[4], anti-inflammation[5], emollient, abortifiacient and antidiabetic[6] and antioxidant properties[7] but screening of its phytochemical constituents of medicinal value of all aerial parts is not available in the literature. The other plant has to be focused to analyse the phytochemical constituents is *R. communis* commonly known as"Castor Oil Plant" from the Euphobiaceae family is a small soft wooden tree, available throughout tropics and warm temperature of the world[8]. It has been reported for its antiasthamatic[9], antidiabetic[10], and antioxidative[11], antibacterial and anti-inflammatory attributes[12].

Material and Methods

Collection of Plants: Taxonomically identified experimental plants *P. dulce* was collected from khejari nursary, Jaipur, Rajasthan and *R. communis* was collected from Agricultural Research Institute, Jodhpur, Rajasthan.

Preparation of Powder: Experimental plants were shade dried plant parts via leaves, bark, pod and flowers by washing with distilled water and cabinet dried were subjected to size reduction to a coarse powder using grinder and passed through sieve no. 80 to get a powder of uniform particle size.

Preparation of Hydro-ethanolic Extracts: The hydro-ethanolic extracts were prepared by taking 25grams of powdered sample, were soaked in 250ml of 50% hydro-ethanol and it was kept in soxhlet apparatus at 80 degree celcius for 48 hours. This extraction was taken and allowed for evapouration and it was concentrated to dryness under reduced pressure at 60±1°C in vacuum rotatory evaporator[13].

Phytochemical Screennig: Chemical test were carried out on hydroethanolic extracts of aerial parts of *P. dulce* and *R. communis* using standard procedures to identify the constituents [14, 15, 16].

Test for Alkaloids: 2.5gms alcoholic extract were evaporated to dryness. 5ml of 2N HCL was added to the above residue and was heated on boiling water bath. After cooling, mixture were filtered, the filtrate were divided equally in 2 portions. First filterate was treated with mayer's reagent and other filterate with wagner's reagent. Turbidity formed indicated the presence of Alkaloids.

Test for Fatty Acids: The plant extracts were mixed with 5ml of ether. These extracts were allowed evapourated on filter paper and then dried the filter paper. The transparency appeared on filter paper was indicated the presence of fatty acids.

Flavonoids: 0.5 g of plant extract was shaken vigorously with diluted NaOH and to it HCl was added. A yellow colour solution was formed and turns to colourless was indicated the presence of flavonoids.

Tests for glycosides: 2 ml plant extract was added to 2 ml of chloroform. Carefully added 2 ml of sulphuric acid and shaken gently. A reddish brown colouration was indicated the presence of a steroidal ring (that is, a glycone portion of glycoside).

Test for Phenols: Each extract was treated with few drops of ferric chloride solution. Bluish black color formed was indicating the presence of phenols.

Test for Resins: 0.5g plant extract was diluted with 10ml with water and shaken for 5 minutes. Turbidity formed indicated the presence of Resins.

Test for saponins: 5 ml aqueous extract was stirred vigorously with equal amount of distilled water and then warmed in a test tube. Stable foam formation was taken as indicating the presence of saponins.

Test for steroids: 2 ml of organic extracts were stirred with 2 ml of chloroform and 2 ml of concentrated sulphuric acid. Red colour produced in the lower chloroform layer indicates the presence of steroids

Test for tannins: 2 ml aqueous extract was dissolved in 2 ml distilled water and 2 or 3 drops of $FeCl_3$ solution were added to the mixture. Green precipitate formed was indicating the presence of tannins.

Terpenoids (Salkowski method): 0.5 g plant extracts were added to 2 ml of chloroform. 3mlConcentrated sulphuric acid was carefully added to form a layer. A reddish brown colour at the interface was indicating the presence of terpenoids.

Result and Discussion

The phyto-chemical characterstics of both the plants was tested and have been summarized in the table-1. The results reveal the presence of medically active compounds in both the plants studied. From the table it could be seen that the hydro-ethanolic bark extract of *R. Communis* shows the presence of high (+++) phenols, terpenoids and glycosides, moderate (++) tannins, saponins, steroids, low (+) flavonoids and alkaloids,absence (-) of fatty acids and resins whereas, in *P. Dulce* all the tested phyto-constituents are found to be persent in high (+++) concentration except moderate (++) alkaloids and low (+) phenols and resins.

The flavonoids are highly (+++) present, tannins, saponins and steroids are moderately (++) and phenols, terpenoids, alkaloids and glycosides are present in low (+) concentration in the hydro-ethanolic leave extract of *R. Communis* whereas, in case of *P. Dulce* low (+) flavonoids, phenols, tannins, saponins, resins, terpenoids and moderate (++) alkaloids and steroids. Fatty acids are absent (-) in the leave extracts of both the plants and glycosides which are found to be absent (-) in leaves of *P. Dulce* only.

In case of flower extract of *R. Communis* moderate (++) phenols, tannins, flavonoids and glycosides, low (+) saponins, terpenoids, alkaloids and steroids and fatty acids and resins are absent (-). However, in flower extract of *P. Dulce* high (+++) phenols, moderate (++) tannins, saponins, flavonids, terpenoids, glycosides and steroids, low (+) fatty acids, alkaloids and absent (-) resin.

Table-1
Preliminary Phytochemical Screening of Hydro-ethanolic Extracts of Various Parts of *P. Dulce* and *R.communis*

Phytochemicals	RCL	RCF	RCP	RCB	PDL	PDF	PDP	PDB
Alkaloids	+	+	++	+	++	+	+	++
Fatty Acids	-	-	+++	-	-	+	-	+++
Flavonoids	+++	++	++	+	+	++	++	+++
Glycosides	+	++	++	+++	-	++	++	+++
Phenols	+	++	-	+++	+	+++	+++	+
Resins	-	-	+	-	+	-	+++	+
Saponins	++	+	+	++	+	++	++	+++
Steroids	++	+	-	++	++	++	++	+++
Tannins	++	++	-	++	+	++	++	+++
Terpenoids	+	+	++	+++	+	++	+++	+++

+++ High concentration, ++ Moderate concentration, + Low concentration, - Absence
RCL, RCF, RCP, RCB :- (*Ricinus communis* Leaf, Flower, Pod, Bark); b) PDL, PDF, PDP, PDB :- (*Pithecellobium dulce* Leaf, Flower, Pod, Bark).

The pods of *R.Communis* contain high (+++) fatty acids, moderate (++) flavonoids, terpenoids, alkaloids and glycosides and low (+) saponins and resins, whereas, in case of *P. Dulce*, the hydroethanolic pod extract contain high (+++) phenols, resins, terpenoids, moderate (++) tannins, saponins, flavonoids, glycosides and steroids, low (+) alkaloids. Phenols, steroids and tannins are absent in pods of *R. Communis* and in case of pod of *P. Dulce* fatty acids are absent.

The phyto-chemical analysis which have been carried out on various plants, reveal the presence of constituents of medicinal as well as physiological importance[16]. The results from the present study show the presence of tannins, flavanoids, terpenoids, glycosides, phenols, saponins, alkaloids, steroids fatty acids and resins in low (+), moderate (++) and high (+++) quantity in all the hydro-ethanolic extracts of both the plants except the absence of tannins in the pod and terpenoids in flowers of *R. communis* and glycosides are absent in the leaf extract of *P. dulce*.. Tannins suggesting the ability to play a major role for the treatment of sore throat, wound healing, antidiarrhoea and antihaemorrhagic agent[17,18]. Tannins are also reported for the antimicrobial degradation of dietary proteins of semen[19]. Flavanoids are reported to inhibit the initiation, promotion and progression of tumors. Phenols and flavanoids, both are potent water soluble antioxidants[20]. These phenolic compounds also possess some biological properties such as anti apoptosis, anti-septics, anticarcinogen, antiageing, anti-inflamation, antiatherosclerosis, improvement of endothelial function and cardiovascular protection[18]. These phenolic compounds are also capable for inhibition of angiogenesis and cell proliferation activities[21]. The anti-oxidative or free radical scavenging activity for scheming degenerative diseases are previously reported[22, 23]. Terpenoids have carboxylic acid group due to which their presence is responsible for the activity of organic extracts[24, 14]. Glycosides are present in all the hydro-ethanolic extracts of *P.dulce* and *R. communis* except the leaves of *P. dulce*. Presence of glycosides makes the plants responsible for lowering the blood pressure as previously they have been known to lower blood presssure[25]. Alkaloids are one of the major phyto-constituent present in traditional plants known for anti-fungal, anti-microbial and anti-inflammatory activity[18]. Presence of moderate (++) and low (+) quantity of alkaloids in the hydro-ethanolic extracts of both the plants tested makes them responsible for the treatment of such diseases. Alkaloids are also reported for its cytotoxicity[26], antispasmodic, antibacterial[18] and analgesic activity[25, 14]. The hydro-ethanolic extracts of both the plants are tested positive for saponins. Presence of saponins in traditional plants known to posses reduction in cholesterol level and can manage cardiovascular diseases in humans[19]. Saponins are also reported for their use as emulsifying agents and having anti-fungal[27], anti-inflammatory activity[28], coagulating and precipitating property in red blood cells. Due to the formation of forms in aqueous solution saponins have characterstic property of heamolytic activity and bitterness[18]. The hydro-ethanolic extracts of *P. dulce* and *R. communis* are also tested found positive for steroids. Steroids are very important compounds and previously reported for antibacterial[29] activity and their association with such compounds as sex hormones[30]. Except all the hydro-ethanolic extracts of aerial parts of both the plants fatty acids are found present in pod of *R. communis* and flower and bark extracts of *P. dulce.* They are previously reported for their anti-fungal and anti-bacterial activities[31]. Resins are good traditional medicinal source reported for the treatment of anti-flammatory, anti-microbial, arthritis, wound healing, anti-tumor, anti-hyperlipidemia[32].

Conclusion

The qualitative analysis elucidated that all the plant extracts have medicinally active phyto-constituents. The barks of both the plants, *R.communis* and *P.dulce* are the best parts owing to the presence of excellent phyto-constituents in them. Out of the two, the bark of *P.dulce* can be said to have more medicinal importance. The phyto-constituents identified in this study have earlier been reported to be bioactive and have therapeutic as well as physiological properties by various workers. Plant extracts could consequently be seen as the potential source of valuable drugs. These plants are often used and therefore should be encouraged as traditional medicine. Further, study on these plants should be suggesting their use in treatment of common disorders.

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