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Detection of Flavonoids from *Jatropha gossypiifolia* L. var. *Elegans* Muell. Arg.

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Abstract

Flavonoids from *Jatropha gossypiifolia* L. var. *elegans* Muell. Arg were extracted by using different solvent and they were identified and detected by Thin Layer Chromatography (TLC) and spectroscopic method. Flavonoids like anthocyanidins, glycosides, flavonols and flavones were detected from *Jatropha gossypiifolia* L. var. *elegans* Muell. Arg.

1. Introduction

Flavonoids are biological active compounds containing phenolic – OH group. These are widely distributed in plants, played an important role as defense and pigmentation. Flavonoids are mainly water soluble compounds; they are found in the form of glycosides and mostly colored. They are the most important group of color pigments in plants. These pigments are responsible for flower color and are located in the vacuoles. Flavonoids show antioxidant properties flavonoids (Block, 1992). It protect from heart diseases (Di Majo *et al.,* 2005; Hertog *et al.*,). They are very less presented in self pollinated or in hybrid plants are compared to cross pollinated plants. The main interest of the present study is that all plants contain flavonoids which are not similar in proportion. So that it focuses on the evolution of plant take as a chemotaxonomist point of view because plants are morphologically similar but chemotaxonomically different. *Jatropha gossypiifolia* L. var *elegans* Muell. Arg. is branched shrub, with yellow juice, leaves 3-5 fid, green or dark purplish-red, ciliate, petioles and leaf mainly with stalked glands and found in wasteland. This plant is well studied taxonomically but flavonoid chemistry is ignored. Hence, the present study was undertaken to detection and identification of flavonoids in the same plant.

2. Materials and Methods

Jatropha gossypiifolia was collected from Basmath, Dist. Hingoli (M.S.), India.and it was identified on the basis of the morphological characters up to the species level.

Preparation of plant extract for
a. Glycosides

The plant materials i.e. stem, leaves and flowers were dried at 50°C in oven. The dried material was treated with boiling alcohol 90°C for 10 minutes and it was filtered through whatman filter paper. The filtrate was concentrated in Rotary vacuum evaporator (R.V.E.) at 40°C. The concentrated filtrate was treated with light petroleum ether. Latex free extract was treated with diethyl ether (to separate catechin and cinnamic acid) and concentrated in R.V.E. The concentrated extract was treated with ethyl acetate (to remove flavonols and flavones). Then ethyl acetate layer was discarded and concentrated in R.V.E. and it was dissolved in methanolic HCl (97:3). The mixture was blended and centrifuged (2000 Rpm) for 3 minutes to obtained supernatant. This supernatant was concentrated in R.V.E. at 40°C and it was used for TLC to identification of glycosides.

b. Anthocyanidins

Above same preparation of supernatant was prepared and it was taken and boiled with 2M HCl for 40 minutes at 100°C. The small amount of this supernatant was dissolved in the small volume of isoamyl-alcohol and concentrated in R.V.E. Then, this extract was prepared for TLC.

TLC plate was prepared by using MN300 cellulose and activated at 100°C in oven. The conc. extract was spotted on TLC plate. The compounds were separated using forestal solvent (conc. HCl-acetic acid – water, 3:30:10) and formic acid solvent system (conc.HCl-Formic acid–water, 2:5:3). The R_f value of each anthocyanidin was measured.

c. Flavonols and Flavones

Catechin and cinnamic acids free extract was taken and concentrated in R.V.E. and it was boiled

with 2M HCl for 40 minutes at 100°C in oven. The boiled extract was concentrated in R.V.E. and treated with ethyl acetate. Again, the extract was concentrated under vacuum upto dryness. The small amount of the dried residue was dissolved in the small volume of ethanol. This ethanolic solution was prepared for TLC.

TLC plate was prepared and the ethanolic solution was spotted on the proper site of TLC plate. The compounds were separated using forestal solvent system. Kept TLC plate in dark and identified the color under UV light with fuming of ammonia. The colors were identified and R_f values of each flavonol and flavone. were calculated.

Spectral analysis

a. Anthocyanidins

The proper band from TLC plate was taken and eluted with water, methanol and acetic acid in the proportion of 25:70:5 v/v mixture. The mixture was filtered through whatman filter paper. The filtrate was concentrated in R.V.E. and finally evaporated upto dryness in desiccators. The dried residue was dissolved in methanol containing 1% HCl. The solution was used for spectrophotometric identification. The anthocyanidins were measured by scanning the sample in the region between 450-600 nm.

b. Flavonols and Flavones

Each band (of flavonol and flavone) was dissolved in 95% ethanol at room temperature in dark. The ethanolic solution was filtered through whatman filter paper. The filtrate was used for spectral analysis. Sepctral maxima was recorded by using the trace amount of $AlCl_3$, sodium ethoxide and sodium borohydrate in ethanolic solution for coloration reaction. Flavonols and flavones, absorbed the visible spectra in the region between 268-386 nm.

3. Result and Discussion

Flavonoids like anthocyanidins, glycosides, flavonols and flavones were detected from *Jatropha gossypifolia* L. var. *elegans* Muell. Arg.

The anthocyanidins like Rosinidin and Pelargonidin were detected byTLC. The visible colors of Rosinidin and Pelargonidin were observed on TLC plate as magenta and red, respectively. The R_f values of these anthocyanidins were measured as 39 and 68 in the formic acid and forestal solvent system. The spectral values of both anthocyanidins were recorded as 524 and 520 nm, respectively. Rosinidin was not observed in Forestal solvent and Pelargonidin was not recorded in Formic acid solvent system (Table 1).

Only one glycoside i.e. 3-rutinoside (Pelargonidin) was identified as a dull orange red in color. The R_f value measured as 44 in acetic acid HCl solvent system (Table 2).

Some flavonols and flavones are also recorded from *Jatropha gossypifolia* Azaleatin and Myricetin (Flavonols) were appeared as fluorescence yellow and yellow in color in presence of ammonia fuming under UV light. The R_f values of both flavonols were measured as 49 (Azaleatin) and 28 (Myricetin) in the forestal solvent system. The spectral values of flavonols were observed in 95% ethanol as 369 and 378 nm, respectively. Flavones were observed as dull ochre (Apigenin) and yellow green (Tricin) in coloration. The R_f values of these flavones were measured as 83 and 72 in the same solvent system as flavonols and the spectral values were recorded as 336 and 355 nm in 95% of ethanol, respectively (Table 3).

Thus it can be concluded that flavonoids viz anthocyanidins, glycosides, flavonols and flavones are present in *Jatropha gossypifolia* and these detected flavonoids shows different color pigments, R_f values and spectra.

Table 1. Detection of anthocyanidins from *Jatropha gossypiifolia* L. on the basis of the colors, R_f values and absorption maxima

Sr.No	Visible color	R_f (x100) in		Visible *max.* (nm) in Me OH-HCl *max.*	Anthocyanidins
		Forestal	Formic Acid		
1	Magenta	----	39	524	Rosinidin
2	Red	68	---	520	Pelargonidin

Table 2. Detection of glycoside from *Jatropha gossypiifolia* L. on the basis of the color and R_f value

Sr.No.	Visible color	R_f (x100) in HOAc- HCl	Glycoside
1	Dull orange red	44	3 – rutinoside (Pelargonidin)

Table 3. Detection of flavonols and Flavones from *Jatropha gossypiifolia* L. on the basis of the colors, R_f values and absorption maxima

Sr.No.	Color in UV and UV plus ammonia	R_f (x100) in Forestal	Spectral *max*. in EtOH (nm)	Flavonoids	
1	Fluorescent Yellow	49	369	Azaleatin	Flavonols
	Yellow	28	378	Myricetin	
2	Dull ochre	83	336	Apigenin	Flavones
	Yellow green	72	355	Tricin	

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