

ANALYSIS OF SEED HULL OF MEDICINAL PLANTS OF FAMILY *FABACEAE*

YASHWANT KUMAR MEHRA, KANTISHREE DE

Department of Post-graduate Studies and Research in Biological Science, Rani Durgawati Vishwavidhyalaya, Jabalpur, Madhya Pradesh, India. Email: yk.biochem@gmail.com

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ABSTRACT

Cajanus cajan, *Lens culinaris* and *Phaseolus vulgaris* are plants belonging to family *fabaceae*. In this present study seed hull extract of all above three medicinal plants were screened for antifungal, phytochemical and antioxidant activity. Antifungal activity screened against *Candida albicans* and *Candida krusei* by well diffusion method. The minimum inhibitory concentration (MIC) value against *Candida albicans* is 18mm at the concentration of 0.40 mg/ml. All these plant extracts contain carbohydrates, proteins and alkaloids. *Phaseolus vulgaris* showed higher free radical scavenging activity in comparison to *Cajanus cajan* and *Lens culinaris* determined by DPPH. All above three plant hull extracts could be beneficial for health purposes as all of them contain *viz.* carbohydrates, proteins sterols, alkaloids and flavonoids, and antioxidants which have non-toxic and eco-friendly properties.

Keywords: Antifungal bioassay, Antioxidant, Minimum inhibitory concentration (MIC), *Lens culinaris*, *Phaseolus vulgaris*

INTRODUCTION

Legume seeds play an important role in human diet. They are recognized as a rich source of proteins, carbohydrates, micronutrients, and phytochemicals, including high phenolic content [1].

METHODS

Survey and collection of plant material

The fresh and healthy plants (hull/pod portion) of *Cajanus cajan*, *Lens culinaris*, and *Phaseolus vulgaris* were collected in the month of February-March 2014 from Narsinghpur district. It was washed thoroughly in running tap water and shade dried at room temperature (27±2), then homogenized to a fine powder by a mechanical grinder and stored in airtight bottles till further use.

Extraction of plant extract

The powdered material was extracted with methanol (45°C) in Soxhlet apparatus. The extract was separately concentrated on water bath [2] at 40°C and stored in air-tight bottles at 4°C.

Microorganisms

Candida albicans and *Candida krusei* strains were obtained from Department of P.G. Studies and Research in Biological Science, R.D.V.V., Jabalpur, India. They were maintained in sabouraud dextrose agar (SDA) medium.

Antifungal bioassay

Antifungal activity of methanolic seed hull extracts of *C. cajan*, *L. culinaris*, and *P. vulgaris* was determined by the agar well diffusion method [3]. Plates were prepared by pouring sterilized SDA media into previously sterile petri dishes. Sterilized cotton swabs were dipped in the *C. albicans* and *C. krusei* culture and swabbed on the agar plates separately. Wells of equal size were cut with proper gaps by cork borer and plant extracts were added into it. The plates were incubated at 28°C. After 24 hrs zones of inhibition were noted down. Only *L. culinaris* showed zone of inhibition against both the fungi *C. albicans* and *C. krusei* (Figs. 1a and b).

Minimum inhibitory concentration (MIC)

The MIC of *L. culinaris* was determined against *C. albicans* and *C. krusei* (Table 1). Six different concentrations of the extract *viz.* 0.20 mg, 0.40 mg, 0.60 mg, 0.80 mg, 1.00 mg, and 1.20 mg/ml were prepared. Sabouraud agar plates were prepared and inoculated with test fungi *C. albicans* and

Table 1: MIC of methanol extract of seed hull of *L. culinaris* against two test organisms

S. no	Test organism	Extract concentration (mg/ml)	Inhibition zone (in mm)
1	<i>C. albicans</i>	0.20	0
		0.40	18
		0.60	22
		0.80	25
		1.00	35
		1.20	46
2	<i>C. krusei</i>	0.20	0
		0.40	10
		0.60	28
		0.80	29
		1.00	30
		1.20	35

MIC: Minimum inhibitory concentration, *L. culinaris*: *Lens culinaris*, *C. albicans*: *Candida albicans*, *C. krusei*: *Candida krusei*

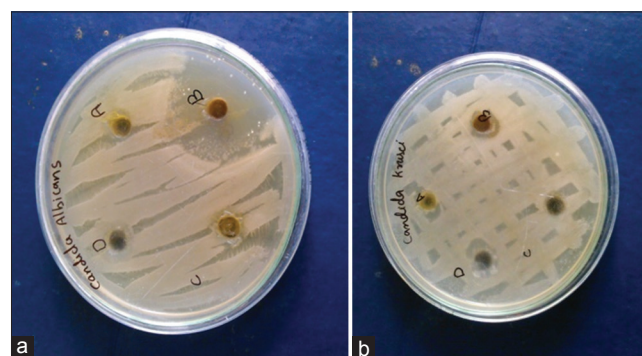


Fig. 1: Antifungal activity of three selected seed hull extracts against two test organisms: (a) *Candida albicans*, (A) Methanol extract of seed hull of *Cajanus cajan*, (B) methanol extract of seed hull of *Lens culinaris*, (C) methanol extract of seed hull of *Phaseolus vulgaris* (D) control - methanol; (b) *Candida krusei* (A) methanol extract of hull of seed *C. cajan*, (B) methanol extract of hull of seed *L. culinaris*, (C) methanol extract of hull of seed *P. vulgaris*, (D) control - methanol

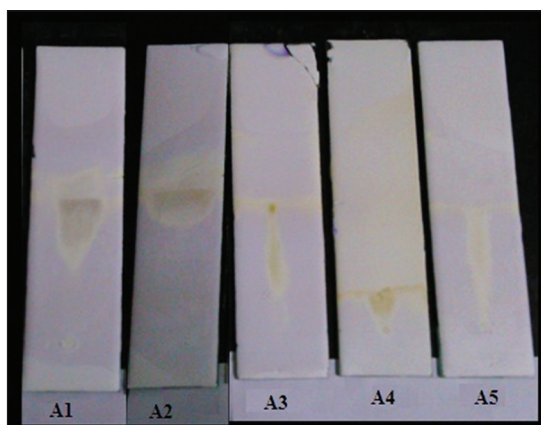


Fig. 2: Qualitative analysis of antioxidant: - 2,2-diphenylpicrylhydrazyl assay on thin layer chromatography, A1=Ascorbic acid, A2=Gallic acid, A3=Phaseolus vulgaris, A4=Cajanus cajan, A5=Lens culinaris

Table 2: Phytochemical and nutrient analysis of extracts of three selected

S. no	Phytochemicals	<i>C. cajan</i>	<i>L. culinaris</i>	<i>P. vulgaris</i>
1	Test for alkaloids			
	Mayers	-	-	-
	Wagners	+	+	+
	Dragendroff	+	-	-
2	Test for flavonoids	-	-	+
3	Test for tannin			
	Ferric chloride test	+	-	-
	Gelatin test	+	+	-
4	Test of saponin			
	Foam test	-	-	-
5	Test of resin	-	-	-
Nutrients				
1	Test for carbohydrates			
	Molisch	+	+	+
	Benedicts	-	-	+
	Tollens	-	+	-
	Fehlings	-	-	-
2	Test for proteins			
	Biuret	+	+	+
	Nitric acid	-	-	-
3	Test of lipid			
	Solubility test	+	+	-
	Glycerol	-	+	-
4	Test of sterols			
	Salkowski	-	-	+

+: Positive, -: Negative, *C. cajan*: *Cajanus cajan*, *L. culinaris*: *Lens culinaris*, *P. vulgaris*: *Phaseolus vulgaris*

C. krusei. 15 µl of different concentrations of *L. culinaris* were added to previously prepared well in the petri plates separately. The petri plates were incubated at 28°C for 24 hrs. The minimum concentration that showed a zone of inhibition around well was recorded.

Analysis of phytochemical and nutrients

Analysis of phytochemicals and nutrient of selected plants were done [4,5].

Test of antioxidant of plant extract

Antioxidant activity was determined by 2,2-diphenylpicrylhydrazyl (DPPH) assay [6,7]. The presence of antioxidant compounds was detected by yellow spots against a purple background on thin layer chromatography plates sprayed with 0.2% DPPH in methanol.

RESULT AND DISCUSSION

The result showed that the seed hull extract of *L. culinaris* showed a zone of inhibition against both the test fungi, i.e., *C. albicans* and *C. krusei*, i.e., 32 mm and 12 mm, respectively. Phytochemical analysis of the methanol extract of *C. cajan*, *L. culinaris*, and *P. vulgaris* showed the presence of alkaloids and flavonoids. Whereas tannin was present only in *C. cajan*. All these three plants extract contain carbohydrates and proteins. Lipid was present only in *C. cajan* and *L. culinaris*, *P. vulgaris* showed the presence of sterols (Table 2). *P. vulgaris* showed the maximum antioxidant property in comparison to *C. cajan* and *L. culinaris* (Fig. 2).

CONCLUSION

All these three plant hull extracts could be beneficial for health purposes as all of them contain viz. carbohydrates, proteins sterols, alkaloids and flavonoids, and antioxidants which have non-toxic and eco-friendly properties.

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