IJAYUSH
International Journal of AYUSH
AYURVEDA, YOGA, UNANI, SIDDHA AND HOMEOPATHY
http://internationaljournal.org.in/journal/index.php/ijayush/

International Journal
Panacea
Research library
ISSN: 2349 7025

Original Research Article **Volume 12 Issue 2** **March-April 2023**

PHYTOCHEMICAL ANALYSIS AND EVALUATION OF ANTIOXIDANT PROPERTY OF *BUTEAMONOSPERMA* (PALASH)

Dr. Sapna Malviya

Assistant Professor, Botany, BLP Govt. PG College, Mhow, India.

Abstract

*Buteamonosperma*is a plant species of Lam natively belongs from tropical and subtropical regions of India. *Buteamonosperma* is commonly known as Palash and found abundantly in Asian region. It possesses various therapeutic properties such as; anti-diarrheal, anti-dysenteric, astringent,purgative, anthelmintic and aphrodisiac activities. It also used for making commercial timber, resin and dye, etc.Bark, flowers, leaves, and seeds are utilizes for their medicinal properties. Considering importance of this plant present study was planned to evaluatephytochemical and antioxidant properties of Palash. Study confirmed presence of phyto-constituents responsible for antioxidant property of plant.

Key-Words: *Plant, Buteamonosperma, Palash, Anti-oxidant*

Introduction

Buteamonosperma is a plant of traditional values and possessing enormous medicinal properties. The bark of plant is used for indigestionand also offers benefits in colitis.The plant acts as *Kaphapittashamak* thus utilizes for treating many health ailments associated with vitiation of *Kapha* and *Pitta.* The constituents of plant such as flavonoids and saponins

considered responsible for anti-inflammatory and antioxidant activities.Plant also used for pimples, haemorrhage, acts as an astringent, diuretic andhelps to suppress pathogenesis of diabetes [1-5]. The Ayurveda property of plant is depicted in **Figure 1**.

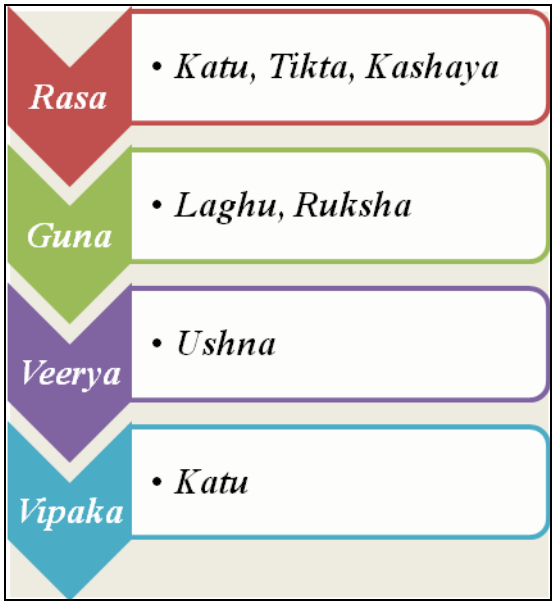

Figure 1: Ayurveda property of *Buteamonosperma*

Botanical Descriptions:

The plant appears as long tree (**Figure 2**), can reach heights of 5 to 20 metres and trunk is crooked and tortuous with rough and fibrous bark that is greyish-brown in colour but exudes a reddish fluid.

The leaves are trifoliate; petiole is 7.5–20 cm long with little stipules. The leaflets are leathery, with terminal shaped having 7-8 pairs of lateral veins.Flowers are 5–40 cm long, towards the top on mostly leafless branchlets; calyx with campanulate tube and corolla 5-7 cm long.

Fruit a non-decomposing pod, stalked, with short brown hairs covering them, turning pale yellowish-brown or grey when ripe, with a solitary seed towards the tip,seeds are ellipsoid-shaped [4-7].

Figure 2: *Buteamonosperma* Tree

Scientific Classification of *Buteamonosperma* Lam

- Kingdom: Plantae
- Order: Fabales
- Family: *Fabaceae*
- Genus: *Butea*
- Species: B monosperma

Material and Methods:

Collection, Identification and Authentication of Plant Material:

The plant was collected from Indore districts and identified by Head department of Dravyaguna, Govt. Asthang Ayurveda College, Indore, (M.P.).

EXTRACTION:

The plantmaterial cleaned and ground to powder or cut into small pieces,that after soaked in petroleum ether first for defeating with occasional shaking atroom temperature for about 4-5 days.

Successive solvent extraction:

Soxhlet apparatus is used for the successive extraction of plant material, in this process powdered plant material wasextracted sequentially with petroleum ether, chloroform and methanol.

Phytochemical Analysis of crude extracts:

The presence of specific phyto-constituents was confirmed by various tests described for phytochemical analysis.Differenttests were conducted to perform qualitative analysis for the presence of Alkaloid, Flavonoid, Tannins, Steroids and Terpinoids.

CHROMATOGRAPHIC PURIFICATION:

Thin layer chromatography (TLC)was performed for eluting the constituent presence in extract. The methanol extract was concentrated by removing the solvent and dried. The origin of spot is commonly noted by drawing a thin line with a pencil across the bottomof the plate. The fraction of thesample was dissolved in a volatile solvent. A little amountof sample solution was applied to the plate using a glass capillary tube, confining thesample in small area. The spots were visualized in ultraviolet (UV) lamp onthe TLC plate.

High-performance thin layer chromatography (HPTLC):

The HPTLC analysis was performed using different mobile phases and final mobile phase was selected on the trial basis analysis. The sample application was done using micro-injector and gradient elution technique was used for the separation of mixture present in plant extract.

Infrared spectroscopy:

IR spectroscopy was performed to check the functional group present in plant extract, in this regard KBr pellet technique was used for sample application and structure elucidation was performed on the basis of spectra obtained after the absorption of IR radiation by specific functions groups present in plant sample.

IN-VITRO ANTI-OXIDANT ACTIVITY:

The 2,2-Diphenyl-1-picrylhydrazyl (DPPH) techniquewas used to test the anti-oxidant activity of the fractions eluted during columnchromatography.

Preparation of standard solution:

The required amount of ascorbic acid was dissolved in methanol to produceconcentrations of 50, 100, 250, 500 and 750µg/ml.

Preparation of test sample:

Sample stock solutions were made by dissolving 10 mg of dried methanolic extract in10 ml of methanol to obtain a concentration of 1 mg/ml.

Preparation of DPPH solution:

4.3 milligram of DPPH was dissolved in 3.3 ml methanol, and the test tubes werecovered with aluminium foil to shield it from light.

Protocol for estimation of DPPH scavenging activity:

For the control reading, 50 lit. of DPPH stock solution were added to 3 lit. ofmethanol and the absorbance was measured at 516 nm immediately. Differentconcentrations of test sample (50, 100, 250, 500, 750µg/ml) were screened, and 200 lof each dose was prepared using methanol as solvent. Each test tube received a 50 l of DPPH solution. After 20 minutes ofincubation, absorbance was measured at 516nm in a UV- Visible spectrophotometer(Systronics) using methanol as a blank. The following formulas were used to calculatethe percentage reduction and the IC_{50} value [7-9].

$$\% \text{ Inhibition} = \frac{\text{Absorbance of control} - \text{Absorbance of sample}}{\text{Absorbance of control}} \times 100$$

Results and Discussion

The present study involves phytochemistry and pharmacology analysis of selected plants. The dried plant bark material was grinded usingelectronic grinder and extracted

consecutively with solvents of increasing polarity namely chloroform,petroleum ether and methanol in Soxhlet apparatus. The petroleum ether extract appears as dark brown and oily, methanolic extract possesses deep green and sticky appearance while green and sticky appearance observed with chloroform extract of plant. The various tests were performed for the phyto-chemical analysis of constituents present in plant extract and result of same is depicted in **Table 1.**

Table 2: Phyto-chemical analysis of plant extracts

Phyto-chemical	**Petroleumetherextract**	**MethanolExtract**	**ChloroformExtract**
Alkaloid	+	+	_
Flavonoid	_	+	+
Tannins	_	+	_
Steroids	_	+	
Terpinoids	_	_	+

Thin layer chromatography (TLC)

The result of separation of bioactive constituents from methanol fraction of *Buteamonosperma*shows that in CHCl3:MeOH (95:5) the residue with Rf value 0.67 and inCHCl3:MeOH (80:20) the residue with Rf value of 0.37, while in other elutingsolvents no residue was observed as depicted in **Figure 3**.

High-performance thin layer chromatograph (HPTLC)

The HPTLCanalysis showed different retention time for various constituents present in *Buteamonosperma*(Lam) extract; Alkaloids appeared at 4.771 min. in HPTLC graph, Flavanoidsat 36.970 min.,Terpenoidsat 14.622 min., Steroids at 16.412 min. and the

retention time for Saponinswas found to be 21.785 min. (**Figure4**). The peaks at various intervals confirmed presence of manyphyto-constituents in plant extract.

Figure3: TLC Plate of fraction of *Buteamonosperma*

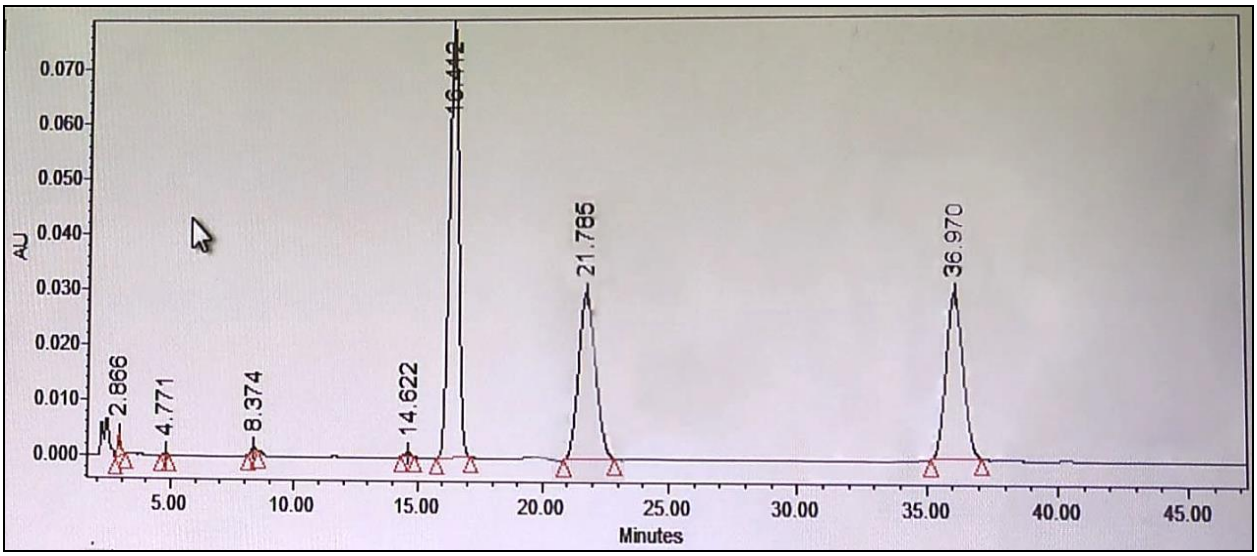

Figure4: HPTLC of *Buteamonosperma*(Lam.)

IR-Spectroscopy:

The IR spectra of plant extract confirmed presence of several functional groups including aromatic ring, carbonyl group and hydroxyl group, etc. The in plane C-H bending vibration was observed as 932 cm^{-1}, peak at 3474cm^{-1}observed for O-H stretch, 2926 $cm^{-1}$for –C-H stretch of aromatic ring, 1622cm^{-1}(–C=C stretch) 1478 cm^{-1}(–O-H deformation vibration) and peak at 1274 cm^{-1}observed for –C-O carbonylstretch (**Figure 5**).

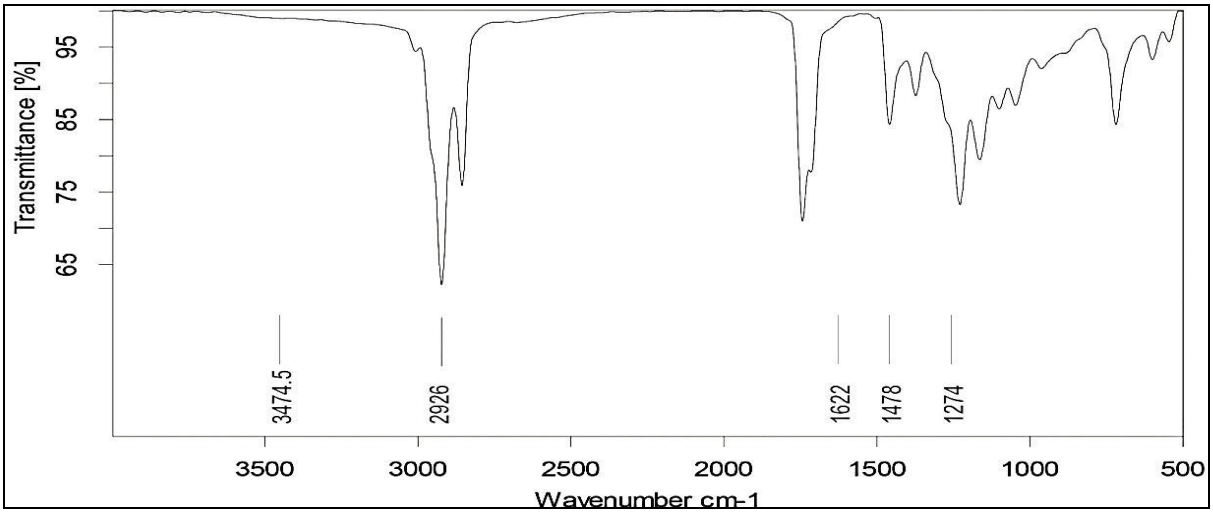

Figure5: IR spectrum of isolated compound of *Buteamonosperma* Lam extract

***INVITRO* ANTIOXIDANT ACTIVITY**

The DPPH radical scavengeranalysis of plant extract wasperformed using ascorbicacid as standard and an IC50 value was recorded with non linearregression analysis. The higher percentage inhibition of DPPH and lowest IC_{50} indicates thestrongest ability of the extracts to act as DPPH radical scavengers. Highest percentage inhibition and lower IC_{50} value was found in methanolic extract.The IC_{50} value wasfound to be 478.41µg/mlfor methanol extract.The DPPHradical scavenging activity was checked at different concentration levels (50, 100, 250, 500, 750µg/ml)and more than 50% inhibition was observed at concentration level of 500µg/ml (**Figure 6**).The IC_{50}value was calculated at 478.41 µg/ml.

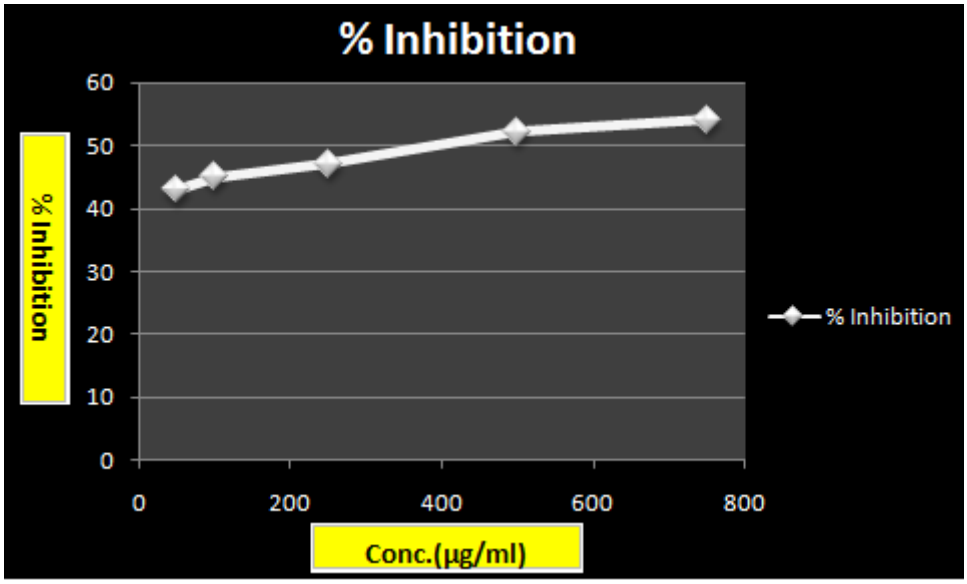

Figure6: DPPH inhibition curve of methanol extract of *Buteamonosperma*

Discussion

Themethanol extract of *Buteamonosperma*confirms the presence of saponins, terpenoidsand flavonoids. HPTLC results confirm the presence ofnatural products saponins and terpenoids. The constituents present in the bark of *Buteamonosperma*is flavonoids and saponins,which contributed remarkably towards the antioxidant activity of plant extract.The antioxidant activity was observed in dose-dependent manner and study confirmed presence of phyto-constituents responsible for antioxidant property of plant [10-12].

Conclusion

Buteamonospermais commonly known as Palashand found abundantly in Asian region. It possesses various therapeutic properties such as; anti-diarrheal, anti-dysenteric, astringent,purgative, anthelmintic and aphrodisiac activities. Plant contains alkaloids andflavonoids. The HPTLC analysis showed presence of several phyto-constituentsincluding terpenoids,steroids and saponins, etc.The peaks at various intervals confirmed presence of manyphyto-constituents in plant extract. The finding of anti-oxidant activity revealed more than 50% inhibition of free radicals at concentration level of 500µg/mlof plant extract. The IC_{50}value was calculated at 478.41 µg/ml. Low IC_{50}value

ensure potent anti-oxidant capacity of plant extract. The Flavonoid contents in *Buteamonosperma*can be considered as responsible for antioxidant activity.

References

1. Anonymous, The Wealth of India. A Dictionary of Raw Materials and Industrial Products, Raw Materials. Publications and Information Directorate, CSIR, New Delhi, 2002; 2: 341-346.
2. Kritikar and Basu 1999 Indian Medicinal Plants. Sri Satguru Publications, Shakti Nagar, Delhi, India,1999; I: 1096 – 1100.
3. Borkar V.S. 2008. "In vitro evaluation of Buteamonosperma Lam. Forantioxidant activity". Oriental Journal of Chemistry. 24: 753-755.
4. Borkar V.S. 2010. "Evaluation of in vitro anti-inflammatory activity ofleaves of Buteamonosperma". Indian Drugs. 47 (6): 62-63.
5. Mazumder P.M. 2011. ButeaMonosperma (LAM.) Kuntze – AComprehensive Review. International Journal of PharmaceuticalSciences and Nanotechnology. 4 (2): 1399-1402.
6. Mishra M.K. 2016. Preliminary phytochemical screening andpharmacological evaluation of the leaves of Buteamonosperma. JPSR. 7(2): 714-718.
7. Munawar T. Mohammad, K. Aruna and R. SrinuVenkatRao 2017.Evaluation of antibacterial and antioxidant activity of ethanolic extracts ofButeamonosperma. World J Pharm Res. 7 (2): 730-740.
8. Muralidhar A., Sudhakar B.K., Ravi Sankar T., Reddanna P., ReddyG.V., Latha J. 2010b. Anti Inflammatory Activity of Flavonoid factionisolated from the stem bark of Buteamonosperma(Lam): A mechanismbased study. International Journal of Phytopharmacology. 1 (2): 124-132.
9. Patil P., Prakash T., Shivakumar H. and Pal S. 2006. Anti-Ulcer andantisecretory Properties of the ButeaMonosperma(Lam) Bark Extractwith Relation to anti-oxidant Studies. Iranian J PharmacolTher. 8: 1-6.
10. Rasheed Z,.Akhtar N., Khan A., Khan K.A., Haqqi T.M. 2010. Butrin,isobutrin, and butein from medicinal plant Buteamonospermaselectivelyinhibit nuclear factor-κB

in activated human mast cells: Suppression oftumor necrosis factor-α, interleukin (IL)-6, and IL-8. J PharmacolExpTher. 2: 354-363.

11. Velis H. 2008. “Antidopaminergic activity of isoflavone isolated fromButeamonospermaflowers”. PlantaMedica. 1 (1): 159-168.
12. Tiwari P, Jena S, Sahu PK. Buteamonosperma: Phytochemistry and Pharmacology. ActaSci Pharm Sci. 2019;3(4):19–26.