Research Article

In-Vitro Evaluation of Anti-mitotic Activity of Different Extracts of *Mucuna pruriens* Linn. Seed

K. Naga Kumari*, A. Ravi Teja, B. Ramu, B. Kalyani, R. Suraga
Victoria College of Pharmacy, Nallapadu, Guntur, Andhra Pradesh, India- 522005.
***Corresponding author's E-mail:** suddapallinagakumari@gmail.com

Received: 18-11-2022; **Revised:** 23-01-2023; **Accepted:** 31-01-2023; **Published on:** 15-02-2023.

ABSTRACT

Mucuna pruriens is a medicinal plant with therapeutic potential, belongs to the family Fabaceae, also known as monkey tamarind or velvet bean, and is known for its anti-mitotic activity. Recently, many biological activities of Mauna Pruriens L. seeds have been reported, including antioxidant, anti-cholesterol, anti-Parkinson, antidiabetic, sexually enhancing, anti-inflammatory, antimicrobial, anti-cancer, and antivenom activities. In this study, several seed extracts from Mauna pruriens L. have been tested for Antimitotic activity. The assay results concluded that the ethanolic seed coat extract and ether seed coat extract of Mauna pruriens showed inhibition of green gram seed growth of 7.2±4.6 mm and ether seed coat extract showed inhibition of 0.01±1.5mm with a concentration of 20mg/ml after 24hrs, 48hrs and 72hrs, compared with percentage inhibition of standard Methotrexate of 0.001±1.1mm with a concentration of 0.1. Among all the seed extracts, ether extract showed more anti-mitotic activity compared with ethanolic extract. In the point of view of seed germination the control, i.e., distilled water, has shown higher seed germination compared to standard and other ethanolic and ether seed coat extracts.

Keywords: *In-vitro* Anti-mitotic activity, Mauna Pruriens, L. seed. Methotrexate, Green Gram.

QUICK RESPONSE CODE →

DOI:
10.47583/ijpsrr.2023.v78i02.018

DOI link: http://dx.doi.org/10.47583/ijpsrr.2023.v78i02.018

INTRODUCTION

Mucuna prurience Plants have been used as an excellent source of medicine from the outset, which established a foundation of traditional medicine. Such traditional medicinal plants play a vital role in addressing the global health needs of today and their use will increase in the future[1]. Belongs to the family fabaceae, also known as tamarind monkey or velvet bean, and is known for its anti-mitotic activity[2]. In this study, a number of Mauna prurience L seed extracts were tested for Antimitotic activity[3, 4]. A green gram was used to assess seed sprouting. This entire drug showed Antimitotic activity Methotrexate, vincristine vinblastine, HST-K, apart from which Methotrexate was taken due to good effective inhibited cell growth[5, 6]. I was picked Mauna prurience having Antimitotic activity, based on the plant three different solvents; water, ether and ethanol were collected to extract samples[7]. Mauna pruriens seed contains many chemical components that are responsible for the achievement of various physiological and therapeutic responses[8]. The extracts of ethanolic and ether extract are then subjected to the various qualitative tests for the detection of Mauna pruriens seed constituents like alkaloids, glycosides, tannins, carbohydrates, coumarins, saponins, flavonoids, proteins etc[9]. Owing to the side effect of chemical drugs, the use of medicinal plant extracts for the treatment of human diseases has greatly increased in the past few decades. The phytochemical in plants act as a medicine; therefore, plants have been used as a source of medicine for thousands of years. I have been taken standard drug Methotrexate, control water, ethanolic extract, ether extract used for sampling, according to experimental procedures. All these procedure tested on green gram for the purpose of seed germination process[10].

MATERIALS AND METHODS

Materials

Monkey tamarind seeds were procured from local market, Ether was procured from S.D. Fine chemicals, Mumbai. Methotrexate drug was obtained as a gift sample from Aurobindo pharma Ltd., Hyderabad. All the other chemicals were procured of analytical grade.

Methods

Monkey tamarind seeds of good quality were purchased from local market and they were cleaned properly and sun dried. 500gm of the seeds were taken and converted into a coarse powder, which was later used in preparing extraction processes.

Extraction of seeds

Ether extract

10 g of seeds were weighed and transferred to soxhlet apparatus and the seeds were extracted with ethanolic at 35°C for 3-4 cycles. The extract was collected and the alcohol was evaporated after extraction by using rotary

evaporator connected to a vacuum pump. The final extract in semi-solid form was dried by placing in desiccators. A rotary evaporator, yielding the extracted compound and their percentage yield is calculated respectively. The extracted crude drug was used for further photochemical evaluation studies.

Ethanolic extract

10 g of seeds were weighed and transferred to soxhlet apparatus and the seeds were extracted with ethanolic at 35°C for 3-4 cycles. The extract was collected and the alcohol was evaporated after extraction by using rotary evaporator connected to a vacuum pump. The final extract in semi-solid form was dried by placing in desiccators. A rotary evaporator, yielding the extracted compound and their percentage yield is calculated respectively and used for further the extracted crude drug phytochemical evaluation studies.

$$\text{Percentage yield (\%w/w)} = \frac{\text{Weight of extract}}{\text{Weight of drug taken}} \times 100$$

Extractive value

The extractive values were recorded in different solvents with a view to study the distribution of various constituents Monkey tamarind of seed. Accurately weighed 4.0 g of coarsely powdered air-dried material was placed in a glass stoppered conical flask and macerated with 100 ml of the solvent for 6 hrs, shaking frequently, and then allowed to stand for 16 hrs. The mixture was filtered rapidly taking care not to lose any solvent. 24 ml of the filtrate was transferred to a tarred thin porcelain dish and evaporated to dryness on water bath.

The residue was dried at 103°C for 5 h, cooled in a Desiccators for 30 min, and weighed without delay and Calculated the percentage w/w of extractive with Reference to air- dried drug.

$$\text{Extractive value (\%)} = \frac{W2-W1}{\text{Weight of drug take}} \times 100$$

Where W_1= weight of empty dish

W_2=weight of dish +residue

Phytochemical Screening

The process of detection of various constituents in a Monkey tamarind seed extract is known as phytochemical screening. The Monkey tamarind seed contain numerous chemical constituents that are responsible for eliciting various physiological and therapeutic responses. The extracts of ethanolic and ether extract are then subjected to the various qualitative tests for the detection of Monkey tamarind seed constituents like alkaloids, glycosides, tannins, carbohydrates, coumarins, saponins, flavonoids, proteins etc.

Antimitotic activity

The anti-mitotic activity of Mucuna prurience

Seed germination assay

Seed germination assay was evaluated by using green gram seeds.

Experimental design

Green gram seeds were collected from the local market and each seed weighed individually. 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml, concentrations of seed coat extracts were prepared. Methotrexate was used as standard drug. Distilled water was used as a control. Equal weights of seeds were added in the sample in Petri plates containing different concentration. The Petri plates were left at room temperature for 24hrs for imbibitions of water. After 24hrs and 72 hrs drug treatment dried on dry tissue paper and weighted. The time of sprouting was extended to 72hrs and photographs were taken.

Percentage of inhibition =

$$[(\text{wt D-wt E})]/ [(\text{wt D-wt M})] \times 100$$

Where, Wt D = seed weight in distilled water

Wt E = seed weight in extract sample

Wt M = seed weight in Methotrexate

Table 1: Drug treatment of green gram seeds in seed germination.

Group number	Drug treatment	Concentration (mg/ml)	Treatment schedule (hrs)
1	Control (distil led water)	0	24 to 72
2	Standard (Methotrexate)	0.1	24 to 72
3	Ether extract	10	24 to 72
4	Ether extract	20	24 to 72
5	Ethanolic extract	30	24 to 72
6	Ethanolic extract	40	24 to 72

RESULTS

Seed Germination Assay results

The assay results showed that the ethanolic seed coat extract of green gram has significantly increased the percentage inhibition after 24hrs, 48hrs and 72hrs treatment which was comparable with percentage inhibition of Methotrexate.

The ethanolic extract of 40mg/ml concentration showed seed growth of 7.2±4.6mm i.e., percentage inhibition of seed germination of the standard drug-Methotrexate of 0.1mg/ml showed seed growth of 0.001 ±1.1mm.

The assay results showed that the ether seed coat extract of green gram has significantly decreased the percentage of inhibition after 24hrs, 48hrs, and 72hrs, treatment which was comparable with percentage of inhibition of Methotrexate.

The ether extract of concentration 20mg/ml showed seed growth of 0.01±1.5mm

In the point of view of seed germination, the control i.e., distilled water has shown the higher seed germination compared to standard and other ethanolic and ether seed coat extracts. As the concentration of ethanolic seed coat extracts was increased, the seed growth was found to be decreased. As the concentration of ether seed coat extracts was increased, the seed germination was found to be decreased. Thus, the % inhibition was increased as the concentration of ethanolic and ether seed coat extracts was increased and among the two extracts, ether extract showed more % of inhibition of seed growth, which indicated that the ether extract of Mucuna pruriens showed more anti-mitotic activity and it is compared with the standard drug Methotrexate.

Table 2: The average seed lengths in control, standard and in extracts after 72 h.

Group number	Drug treatment	Concentration (mg/ml)	Treatment schedule (hrs)	Average Seed growth (mm)
1.	Control (distilled water)	0	24 to 72	28.5±5
2.	standard (Methotrexate)	0.1	24 to 72	0.001±1.1
3.	Ether extract	10	24 to 72	1.4±4.1
4.	Ether extract	20	24 to 72	0.01±1.5
5.	Ethanolic extract	30	24 to 72	14.5±10
6.	Ethanolic extract	40	24 to 72	7.2±4.6

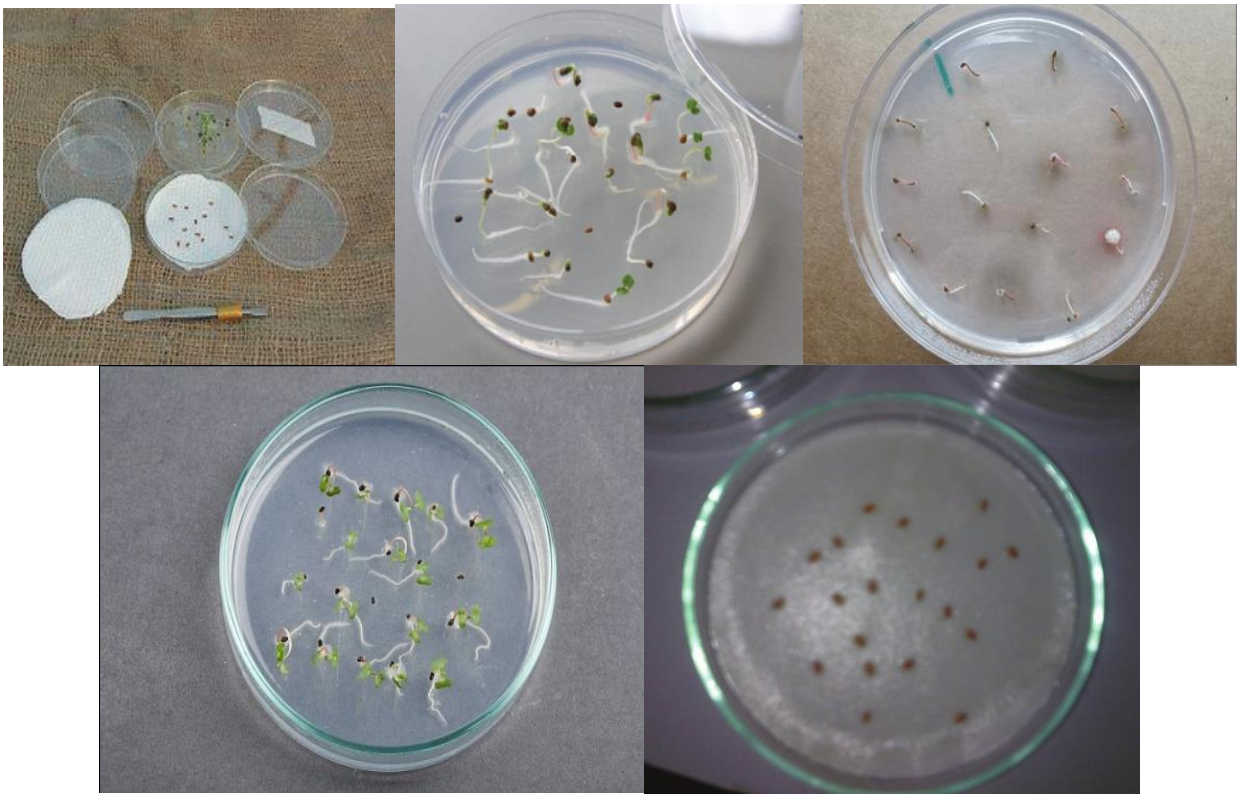

Figure 1: Green gram experiment: treatment of Green gram seeds with different solvents a) Green Gram Seeds b) with water (control), c) Ether 20mg/ml, d) Ethanolic 30mg/ml and e) Methotrexate (standard).

CONCLUSIONS

This study of the Antimitotic activity of M. pruriens (monkey tamarind) suggests that the plant has a potential Antimitotic activity. This activity showed that the presence of many major chemical compounds that is responsible for obtaining various physiological and therapeutic responses. This plant could therefore be used as a potential source of medicines for the treatment of cancer. It can be concluded that the ethanolic and ether seed coat extract of green gram has significantly increased the percentage inhibition after 24hrs, 48hrs and 72hrs treatment which was

compared with percentage inhibition of Methotrexate. The ether extract of concentration 20mg/ml has shown the Antimitotic activity of 0.01±1.5mm i.e., percentage inhibition of seed germination as significant as the standard drug Methotrexate 0.001mg/ml±1.1mm.

REFERENCES

1. Fabricant DS, Farnsworth NR, "The value of plants used in traditional medicine for drug discovery", Environ, Health Perspect, 2011;109(1): 69–75.
2. An assay for screening anti-mitotic activity of herbal extracts satyanarayana murthy, current science, 2011;100(9):15-21.
3. Antimitotic activity of Lantana camara flowers, ghangale g. d, international journal of institutional pharmacy and life sciences July august 2011;1(1):1-5.
4. Al-Ghamdi M.S, The anti-inflammatory, analgesic and antipyretic activity of *Nigella sativa*, Journal of Ethno pharmacology, 2001;76:45-48.
5. Aljabre S.H.M., Randhawa M.A., Akhtar N., Alakloby O.M., Alqurashi A.M. And Alnossary A., Antidermatophyte activity of ether extract of *Nigella sativa* and its active principle, thymoquinone, Journal of Ethno pharmacology, 2005;101:116-119.
6. Aggarwal BB, Kumar A, Bharti AC. Anticancer potential of curcumin, preclinical and clinical studies, Anticancer Res M.L, Immunomodulatory and therapeutic properties of the *Nigella sativa* L. seed, International Immune pharmacology, 2005; 23(1A):1749-1770.
7. Veeresham, Natural products derived from plants as a source of Drugs, J Adv Pharm Techno, 2012;3(4):200–201.
8. Screening of Nutritional, Phytochemical, Antioxidant and Antibacterial activity of the roots of *Borassus flabellifer* (Asian Palmyra Palm), Chayanika Sahni, Journal of Pharmacognosy and Phytochemistry 2014; 3(4):58-68.
9. Pharmacognostical standardization of Borassus Flabellifer root, Sandhya S, Annals of Biological Research, 2010;1(4):85-94.
10. Harborne, J.B Phytochemical methods, 3rd edition, 7, London: springer international, 1998.
11. Ajayi, I. A, Alidade, and Oderinde, R. A., Preliminary Physiochemical Analysis of some Plant Seeds. Research Journal of Chemical Sciences, 2011;11(3):81-86.
12. Evans, W.C. Trease and Evans Pharmacognosy 14th edition WB ascender company ltd, 1996, 290.
13. Mccutcheon, A.R, Ellis, S.M, Hancock, R.E. and Towers, G.H, Antibiotic screening of medicinal plants of the British Colombian native people. Journal of Ethno pharmacology 1992;37:212-223.
14. Zaoui A, Cherrah Y, Mahassini N, Alaoui K, Amarouch H, And Hassar M, Acute and chronic toxicity of *Nigella sativa* fixed oil. Phytomedicine, 2002;9:69-74.
15. Blumenthal, M. J. and Staples, I.B. origin, evaluation and use of Mycrotyloma – as forage- a review. Tropical grasslands, 1993;27:16-29.
16. Doss, Preliminary photochemical screening of some Indian Medicinal Plants. Ancient Science of Life, Kadam, S. S. and salunke, D. k., Nutritional compositional processing and utilization of Horse gram Critical reviews of food science and Nutrition, 2009;22:1-26.
17. Morris, J. B. *Mycrotyloma axillare* and M. uniflorum. Descriptor analysis, anthocyanin indexes and potential uses. Genetic Resources of Crop Evolution. 2019;55:5-8.
18. Nigwekar, A. S, and Chavan, Biology of horse gram (*Dolichos biflorus*), Indian reviews of life sciences, 2008;11:179-198.

Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.