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Phytochemical study of seeds of *Mucuna pruriens* (L.) DC

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Abstract
This study examines the phytochemical composition and acute oral toxicity of a methanolic extract derived from Mucuna pruriens seeds. Using Soxhlet's extraction process, fresh, mature seeds were coarsely pulverized, shade dried at room temperature, and then extracted with metahanol. After that, a rotary flash evaporator was used to concentrate the extract, yielding semisolid crude extract with a yield of 09.534%. The phytochemical components of *Mucuna pruriens* seed extract were examined. The initial phytochemical analysis of the Mucuna pruriens seed extract identified the following compounds: starch, amino acids, carbohydrates, alkaloids, tannins, steroids, and resins.

Keywords: *Mucuna pruriens*, phytochemical constituents

1. Introduction
Nature is usually the best example of the remarkable occurrence of symbiosis. All of nature's elements, biotic and abiotic, are interrelated. The desire to live a long, healthy, and happy life is as ancient as humanity. A vast reservoir of natural treatments exists to alleviate human illnesses. Many efficient ways of guaranteeing health care have been developed as a result of the constant impacts. The Ayurvedic seers were able to comprehend and document a variety of drug-related characteristics that are still challenging to comprehend using the current standards (Anonymous, 1992 and Das, 1961) [1-2].
Phytomedicine refers to the use of plant-based therapeutic components, such as stem bark, leaves, fruits, and seeds, that have a specific physiological effect on human health. The most important of these natural bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds (Hill, 1952, Veeraraghavan, 2000 & Gavishiddappa, *et al.* 2015) [3, 17, 23]. Itching bean *Mucuna pruriens* an underutilized legume species grown predominantly in Asia, Africa and in parts of America (Vadivel and Janardhanan, 2000) [4].
The tribes in North-East India, North-Western Madhya Pradesh, and South India soak, boil, roast, and eat mature seeds, unripe pod seeds, and immature pods of itching beans, Mucuna pruriens, either on their own or combined with salt (Arora, 1991, Sahu, 1996 and Jain, 1981) [5-7]. To make this less- known legume palatable, tribal people follow a special processing method of continuous boiling and draining for about eight times until the boiled water changes from black to milky white. Consumption of improperly boiled seeds of itching bean is known to cause increase in body temperature and skin eruptions (Shankaranarayanan, 1978) [8]. It is attributed to the presence of high levels of 3, 4-dihydroxy-L-phenylalanine, L-Dopa, the aromatic non-protein amino acid (Jabadhas, 1980) [9].
To evaluate the phytochemical potential of *Mucuna pruriens* seeds, the chemical composition of the seeds was examined in the current study.

2. Material and Methods
Preparation of extract
To get rid of the dust, seeds were cleaned twice with tap water and once more with distilled water. After being shade-dried at room temperature for seven to twelve days to remove any remaining moisture, the seeds were ground into a coarse powder. Using Soxhlet's extraction procedure, methanol was used to extract the powdered substance. After that, a rotary flash evaporator was used to concentrate the extract, yielding semisolid crude extract. It was discovered that the extract had a percentage yield of 09.534%. The extract was kept in a refrigerator below 10 °C in an airtight container. For the ensuing investigations, the desired =

concentration of stock solution was created using distilled water, and preliminary phytochemical analysis was carried out.

Fig 1: *Mucuna pruriens* (L.) DC

Preliminary phytochemical screening

The conventional procedures listed below, which are included in Trease and Evans' Pharmacognosy text book, were used to perform preliminary phytochemical tests on test extract in order to identify the presence of phytochemicals.

1. Test for Steroids (Gibbs, 1974) [11]

Salkowski test: 2-3 drops of concentrated sulphuric acid was added to chloroform solution, shaken and allowed to stand, appearance of red color in lower layer indicates the presence of sterols.

Liebermann-Burchard test: Chloroform, a few drops of acetic anhydride, and extract were combined and thoroughly mixed. A reddish-brown ring that forms when concentrated sulfuric acid is gently introduced from the test tube's sides confirms the presence of steroids.

2. Test for Flavonoids (Peach, 1956 and Rizk, 1982) [12-13]

Shinoda test: Concentrated hydrochloric acid and a few pieces of magnesium ribbon were added to the extract. After a few minutes, the color changes from red to pink, signifying the presence of flavonoids.

Lead acetate test: To the extract added few drops of aqueous basic lead acetate solution. Formation of yellow precipitate indicates presence of flavonoids**.**

Alkaline reagent test/ NaOH test: Few drops of sodium hydroxide solution was added to extract. Intense yellow color disappeared after adding dilute HCl which indicates the presence of flavonoids.

3. Test for Alkaloids: Chloroform was used to extract the extract after it had been basified with ammonia. After thoroughly shaking and filtering the chloroform solution, diluted hydrochloric acid was added to acidify it. The alkaloids were tested using the filtrate.

Hager's test: The filtrate was treated with few drops of Hager's reagent. Formation of yellow precipitate indicates the presence of alkaloids (Varadarajan, *et al.* 2008) [18].

Wagner's test (Iodine in Potassium iodide): Wagner's reagent was applied in little drops to the acid layer. Alkaloids are present when a reddish-brown precipitate forms.

Mayer's test (Potassium Mercuric Iodine solution): The acid layer was treated with few drops of Mayer's reagent. Formation of creamy white precipitate indicates the presence of alkaloids.

Dragendorff's reagent (Potassium Bismuth Iodide): The acid layer was treated with few drops of Dragendorff's reagent. Formation of reddish brown precipitate indicates the presence of alkaloids.

4. Test for Tannins (Kokate, 1994) [15]

Gelatin test: To the extracts of the drug added 1% solution of gelatin containing 10% sodium chloride. Formation of white precipitate indicates the presence of tannins.

Ferric chloride test: To extracts few drops of 1% neutral ferric chloride solution were added, formation of blackish blue color indicates the presence of tannins.

5. Test for Saponins (Trease, 2002 and Sofowara, 1993) [14, 16]

Foam test: Small amount of extract of the drug was shaken with little quantity of water, if foam produced persists for 10 minutes; it indicates the presence of saponins.

Froth test: To 5 ml of extract of the drug added single drop of sodium bicarbonate solution. Shaken the mixture vigorously and left for 3 minutes. Formation of honey comb like froth indicates presence of saponins.

6. Test for carbohydrates

Small amount of extracts of the drug were dissolved in little quantity of distilled water and filtered separately. The filtrates were used to test presence of carbohydrates.

Molisch's test: The filtrate of the drug was treated with Molisch reagent and concentrated sulphuric acid was added from the sides of the test tube to form a layer. A reddish violet ring shows the presence of carbohydrates.

Benedicts test: To the filtrate added 2 ml Benedict's reagent and boiled in water bath. Formation of Green or reddish brown precipitate indicates presence of carbohydrates.

Fehlings test: Filtrates were hydrolyzed with dilute hydrochloric acid, neutralized with alkali and heated with equal amount of Fehling's A and B solutions. Formation of green to yellow to red precipitate indicated the presence of reducing sugars.

7. Test for Amino acid/ Protein

Ninhydrin test: Heated the 3 ml of extract of the drug and 3 drops of ninhydrin solution in boiling water bath for 10 minutes. Appearance of purple color shows the presence of amino acids.

Biuret test
To 3 ml of extract of the drug added 4% NaOH and few drops of 1% copper sulphate solution. Formation of violet color confirms the presence of protein.

Millon's reagent test
Mixed the extract with million's reagent. Formation of brick red precipitate indicates the presence of protein.

8. Test for resins
Dissolved the extract in acetone and pour the solution in to distilled water. Turbidity indicates the presence of resins (Harborne, 2007) [10].

9. Test for starch
Dissolved 0.015 gm of iodine and 0.075 gm of potassium iodide in 5 ml of distilled water and add 2-3 ml of an aqueous extract of drug, blue color is produced.

Table 1: Preliminary phytochemical screening of Methanolic *Mucuna pruriens* seed extract

S. No.	Phytochemical	Test	Result
1.	Test for Steroids	Salkowski test:	+
		Liebermann-Burchard test	+
2.	Test for Flavonoids	Shinoda test	-
		Lead acetate test	-
		Alkaline reagent test/ NaOH test	-
3.	Test for Alkaloids	Hager's test	+
		Wagner's test	+
		Mayer's test	+
		Dragendorff's reagent	+
4.	Test for Tannins	Gelatin test	+
		Ferric chloride test	+
5.	Test for Saponins	Foam test	-
		Froth test	-
6.	Test for Carbohydrates	Molisch's test	+
		Benedicts test	+
		Fehlings test	+
7	Test for Amino acid/ Protein	Ninhydrin test	+
		Biuret test	+
		Millon's reagent test	+
8.	Test for Resins		+
9.	Test for starch		+

+ = Present, - = Absent

3. Results
Preliminary phytochemical screening
Table 1 summarizes the various types of phytochemical components that were found in the methanolic extract of *Mucuna pruriens* seeds after preliminary phytochemical screening.

4. Discussion
The current study's findings are generally consistent with previous Mucuna pruriens reports. The methanolic extract of *Mucuna pruriens* seeds contained steroids, alkaloids, tannins, carbohydrates, amino acids, and resins. The phytochemicals that make up the seeds may be connected to their therapeutic properties. According to Varadarajan *et al.*, (2008) [18] the secondary metabolites (phytochemicals) and other chemical constituents of medicinal plants account for their medicinal value. For example, saponins are glycosides of both triterpene and steroids having hypotensive and cardiodepressant properties, while anthraquinones posses' astringent, purgative, anti-inflammatory, moderate antitumor, and bactericidal effects (Olaleye, 2007 and Muzychkina, 1998) [19-20].
Mucuna pruriens shows the presence of polysaccharides, which are carbs and starch. Proteins have been reported to be present in *Mucuna pruriens* by Fathima *et al.* (2010) [22] Comparing *Mucuna pruriens* to other popular pulse crops including cow pea, chick pea, pigeon pea, green gram, and black gram, the latter has more crude protein (Nagmain, *et al.* 2012) [21].

5. Conclusion
The results of this study indicate, in summary, that the *Mucuna pruriens* seed extract contains steroids, alkaloids, tannins, carbohydrates, amino acids, resins, and starch.

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