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Pharmacognostic evaluation of pods of *Cyamopsis tetragonoloba* L

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Abstract
Cyamopsis tetragonoloba L. (Family, Fabaceae), commonly known as Guar or Guvar bean. Its bean is potentially high source of phytochemical. *C. tetragonoloba* is very well known folklore medicine. The basic aim of this study was to established Pharmacognostic and Phytochemical profile of *C. tetragonoloba*. For the pharmacognostic evaluation of *C. tetragonoloba*, histological examination and fluorescence analysis of powdered material was carried out. And for the determination of constituent in the plant material, phytochemical analysis was done. The extract of *C. tetragonoloba* showed the presence of carbohydrate, saponins, amino acids and resins.

Keywords: *Cyamopsis tetragonoloba* L., phytochemical analysis, pharmacognostic evaluation

1. Introduction
Cyamopsis tetragonoloba L. (Family: Fabaceae) or cluster bean is also known as Guar or Guwar and Guvar beans. It is cultivated in Pakistan, India and Asia for many centuries [1]. Guar as a plant has multitude different functions for human and animal nutrition but its gelling-agent containing seeds (guar gum) is today the most important use [2]. *Cyamopsis tetragonoloba* has a height of 2 to 3 m. It has a main single stem with either basal branching or fine branching along the stem. Additionally, this legume develops root nodules with nitrogen-fixing soil bacteria rhizobia in the surface part of its rooting system. Its leaves and stems are mostly hairy, dependent on the cultivar. Its fine leaves have an elongated oval shape (5 to 10 cm length) and of alternate position [3]. *C. tetragonoloba* bean is commercially grown for its seeds as a source of natural polysaccharide (galactomannan), commercially known as guar gum [4, 5]. Its pods have an effective anti-diabetic activity that's why it is used for herbal medicine. Its pods are 3 to 4 inches long in clusters. They are both dwarf and tall cultivars. *C. tetragonoloba* has a number of uses in food, paper industries and in pharmaceuticals [6, 7]. *C. tetragonoloba* is very well known folklore medicine. It acts as an appetizer, cooling agent, digestive aid, laxative, dyspepsia and anorexia, obesity, hardening of arteries, and most important use in diabetes. In addition, *C. tetragonoloba* beans are potentially high sources of additional phytochemicals [5, 6, 8].
For pharmacognostic evaluation of *C. tetragonoloba*, histological examination and fluorescence analysis of powdered was carried out. To determine the presence of constituent in the plant material of phytochemical analysis was done. After the vast literature survey it is revealed that no pharmacognostic work has been done on this morphological part of plant.

2. Materials and Methods
Cyamopsis tetragonoloba pods have been collected from market of Karachi. The pods were identified and authenticated by Professor Dr. Ghazala H. Rizwani (Meritorious), Department of Pharmacognosy, Faculty of Pharmacy, Hamdard University, Karachi, Pakistan. The plant material was dried and powdered using blender and kept in fine glassware container for analysis. The powder was stored at low temperature and low moisture for further analysis.

2.1 Extraction of plant
Pods of *C. tetragonoloba* (1.5 kg) were soaked in methanol for 15 days. After that it was filtered by using Whatman filter paper No 1. Extraction has been done by using rotary evaporator (Buchi Rotavapor R-200) under controlled temperature (40 °C) and reduced pressure. The crude extract thus obtained in vial and used for further investigation of phytochemical screening.

2.2 Histological examination of *Cyamopsis tetragonoloba*
Fresh pods of *C. tetragonoloba* were taken and finally sectioned to obtain a thin traverse section and it stained and observe under the microscope.

2.3 Fluorescence analysis
Powdered pods of *C. tetragonoloba* were subjected to fluorescence analysis (ultra violet light and day light) after treatment with various chemical and organic reagents. Three parameters were used, i.e. observation under long UV (365 nm), short UV (256nm) and normal day light.
The powder is treated with various solvents (KOH, NaOH, HCl, H_2SO_4, distilled water, methanol) and the colour change was observed in day light and at different intervals [17].

2.4 Phytochemical analysis
For the identification of constituent in the extract phytochemical screening was used [9, 10, 11].
For different constituents different test were performed i.e. alkaloids (Dragendroffs reagent), carbohydrate (Fehlings reagent, Molish reagent), flavonoids(ferric chloride and Alkaline reagent, lead acetate test), saponins (Frothig, Foam test),proteins (Ninhydrin reagent), tannins (gelatin test), resins (acetone-water test)[13,14,15,16].

2.4.1 Detection of Alkaloids
Dragendroff's Test
Extract was treated with 1 to 2 drops of dragendroff's reagent. Formation of yellow and orange precipitate indicates the presence of Alkaloids.

2.4.2 Detection of carbohydrates
Fehling's Test
Extract was added in equal volume of Fehling A and Fehling B reagents. Mix it and boiled gently. A brick red precipitate appeared at the bottom of the test tube indicate the presence of reducing sugar.

Molish Test
Filtrate was treated with 2 drops of alcoholic α naphthol solution in a test tube and 2 ml. of conc. Sulphuric acid was added carefully along the sides of the test tube. Formation of violet ring at the junction indicates the presence of Carbohydrates.

2.4.3 Detection of Protein
Ninhydrin test
Crude extract when boiled with 2ml of ninhydrin reagent, a violet colour appears indicate presence of amino acids and proteins.

2.4.4 Detection of Flavanoids
Alkaline reagent Test
Extract was mixed with 2ml of 2% of NaOH solution. An intense yellow colour was formed which turn colourless on addition of few drops of dilute acid which indicate the presence of flavonoids

Ferric Chloride Test
Extract was boiled with water and filter the filtrate and add 2 drops of freshly prepared ferric chloride solution. A green, blue or violet colour appears confirmed the presence of flavanoids.

Lead acetate test
Few drops of lead acetate were added in to 5 ml of extract, a yellow precipitate were shown the presence of flavanoids

2.4.5 Detection of Saponin
Froth Test
Extract was diluted with distilled water to 20ml and shake it in a cylinder for 15 minutes. Formation of 1 cm layer of foam indicated the presence of saponins.

Foam Test
Small amount of extract was diluted with little quantity of water. Formation of foam which can persists for 1 minute indicates the presence of saponins.

2.4.6 Detection of Tannins
Gelatin Test
To the extract 1% gelatin solution containing sodium chloride has to be added. Formation of white precipitate indicates the presence of tannins.

2.4.7 Detection of Resins
Acetone-water test
Extract was treated with acetone. Small amount of water was added and shake well. Appearance of Turbidity indicates the presence of resins.

3. Results and Discussion
The pods of *Cyamposis tetragonoloba* are flat and compressed. The transverse section of pod showed uniformly thin-walled epidermis. Below the epidermis, there is layer of cells which are arranged systematically. There is a layer of parenchyma cells which are color less and thin walled. After that, endosperm is present. At the center of the transverse section radicle is present (Fig. 1).
Fluorescence is the phenomenon exhibited by various chemical constituents present in the plant material. Some constituents show fluorescence when exposed to visible light or exposed to ultraviolet radiation. In the study the plant material showed characteristic color when exposed to UV light (256 and 365) and ordinary light (Table 1).
The result of phytochemical screening of *C. tetragonoloba* extract showed the presence of carbohydrate, saponins, resins and proteins and absence of alkaloids, flavonoids and tannins (Table 2).
Histological examination is carried to determine cellular characterization of plant material. Pharmacognostic studies play a very vital role in the standardization. Phytochemistry is the study of science that is derived from plants [9-11]. From the phytochemical analysis of *C. tetragonoloba* extract revealed that saponin, resins, carbohydrate and proteins are the major constituents. The presence of these phytochemicals is responsible for various pharmacological activities i.e. anti-inflammatory, anti-diabetic and laxative. As herbal medicine are safe economic and easily available. This plant can be utilized as a source to derived new compound with beneficial medicinal use for mankind.

Table 1: Fluorescence analysis of *Cyamopsis tetragonoloba* L.

Solvents	TIME (0 MIN)			30 mins			48 hours		
	day time	short UV	long UV	day time	shot UV	long UV	Day time	short UV	Long UV
KOH	Yellow	light yellow	black/brown	light green	light green	brown	light yellow	light yellow	Black
NaOH	Yellow	light yellow	black	light green	light green	brown	light yellow	pale yellow	Black
Distilled water	lemon yellow	light yellow	black/brown	pale yellow	light green	brown	Brown	Green	Black
H_2SO_4	Brown	greenish yellow	brown	Brown	brown	black	Black	Black	Black
Methanol	pale yellow	light yellow	light brown	pale yellow	pale yellow	brown	White	green	Black
HCl	greenish yellow	light yellow	brown	light green	light green	dark brown	light brown	green	Black

Table 2: Phytochemical analysis of *Cyamopsis tetragonoloba* L.

Reagents	Observation
Test For Alkaloid	
Dragendroff's Test	-
Test For Carbohydrate	
Fehling's Test	+
Molish Test	+
Test For Flavanoids	
Ferric Chloride	-
Alkaline Reagent	-
Lead Acetate	-
Test For Tannins	
Gealtin Test	-
Test For Saponins	
Frothig Test	+
Foam Test	+
Test For Proteins/Aminoacids	
Ninhydrin Test	+
Test For Resins	
Acetone-Water Test	+

+ indicates present
-indicates absent

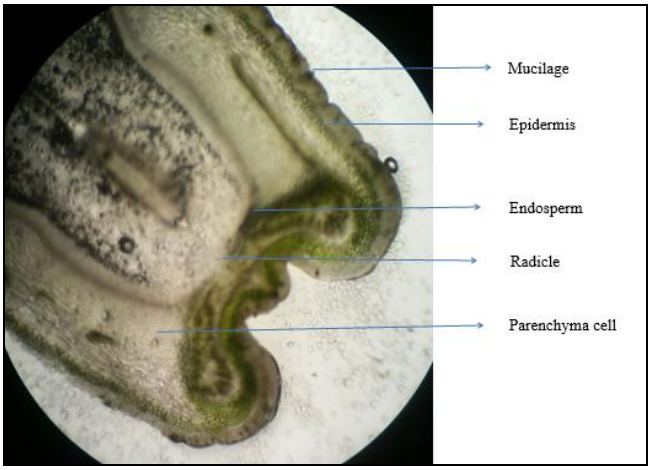

Fig 1: Transverse section of fruit of *Cyamopsis tetragonoloba* L.

4. Conclusion

The phytochemical screening of *C. Tetragonoloba* showed the presence of saponins, amino acids, proteins, carbohydrate and resins as the major phytochemical constituents. Fluorescence analysis and histological examination provide a tool for standardization for the future research.

5. Conflict of Interest

The authors have not declared any conflict of interests.

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