



Research article

## Preliminary phytochemical screening of *Cicer arietinum* in folklore medicine for hepatoprotection

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### Abstract

The Phytochemical screening is a valuable step for the identification of bioactive component present in the traditional plants. This bioactive component can be used for curing various diseases in human beings. Phytochemicals can be classified into two classes (1) Primary phytoconstituents and (2) Secondary phytoconstituents. Primary Phytoconstituents have chlorophyll, amino acids and proteins. Secondary constituents mainly contains terpenoids and alkaloids. The bioactive constituents presents in the medicinal plants can be used for the discovery of new drug and development of new drug moiety. In this presents research study, the phytoconstituents of Bengal gram or *Cicer aritinum* were identified. This gives us a valuable idea about the activity of the plants. Here the screening of Bengal gram was done in order to determine the presence of alkaloids, flavonoids, saponins, phenols, carbohydrates, steroids and terpenoids, flavanol glycosides, glycosides, tannis, thiols, amino acids, proteins etc using standard procedures. The results indicated the presence of alkaloids, flavonoids, saponins, phenols, carbohydrates, steroids, and terpenoids, flavanol glycoside, tannis, thiols, proteins were present whereas glycoside and amino acids were absent. The phytochemical analysis of the plants is very important because of its commercial value in the Pharmaceutical companies for the development of newer drugs. It can be concluded that Bengal gram or *Cicer arietinum* seed coat have highest therapeutic efficacy because majority of phytochemical present in it have antioxidant, anti inflammatory activities.

**Key words:** Folk lore, Preliminary, Screening, Phytochemicals.

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### 1. Introduction

Phytochemicals or Phytoconstituents means plant chemicals, which can be used both as protective as well as to prevent diseases. The nutrients present in the phytocostituents are not essential for the

human body for maintaining the life, but now a days the research studies showed that the chemicals produced by the plants can prevent diseases in human systems [1].

## **Functions of phytochemicals**

### **Antioxidants**

Antioxidants acts by protecting the cells against oxidative damages. This will reduce the risk of developing cancer.

Eg:- Flavonoids, phenols

### **Hormonal action**

Flavonoids also reduce the menopausal symptoms and osteoporosis.

### **Interference with DNA**

Saponins which is found in beans helps to interfere with the replication of DNA cells. Thus preventing the multiplication of cells in cancer.

## **2. Materials and Methods**

### **Plant materials**

*Cicer arietinum* or Bengal gram belongs to the family *Fabaceae* were purchased from Thiruvalla, Kerala, India and were identified by the Taxonomists from Marthoma College Thiruvalla. The seed coat was used for the screening purpose. It was carefully removed and dried under shade and then powdered and kept for further analysis.

### **Preparation of extracts**

The dried powdered Bengal gram seed coat was extracted with ethanol. The ethanol extract were filtered and dried using rotary evaporator under reduced pressure at 40<sup>o</sup>c.

### **Phytochemical tests**

Screening of the extracts was done for various constituents and was carried out using standard methods and was described in Table No. 1[4, 5].

## **3. Result and Discussion**

The tests revealed the presence of various active components which may be the

reason for the hepatoprotective action (specially phenol) of Bengal gram seed coat. The observation and inference done for the phytochemical analysis are reported as follows.

### **Alkaloids**

The alkaloids were detected by the presence of orange or red precipitate. Confirmation tests were done with Dragendroff test, (yellow Precipitate) Wagner's test (yellow or brown precipitate) and Hager test (yellow precipitate)

### **Flavonoids**

Appearance of green colour indicates the presence of flavonoids. Alkaline reagent test (yellow colour) lead acetate test (yellow precipitate) confirmed the presence of flavonoids.

### **Saponins**

Foam test confirms the presence of saponins by the presence of froth formation.

### **Phenols**

The change of red colour to blue colour was observed in the extracts indicating the presence of phenols.

### **Flavonol glycoside**

Appearance of pink to crimson colour was observed in the extract of active component which indicates the presence of flavonol glycoside.

### **Steroids**

The ethanolic extract treated with concentrated sulphuric acid shows the presence of green to blue colour which confirms the presence of steroids.

### **Tannis**

Appearance of bluish colour after the addition of sulphuric acid in the active

extract plus ferric chloride solution confirms the presence of Tannis.

**Table 1. Preliminary phytochemical tests for plant extract**

Phytoconstituents	Test	Observation
<b>Alkaloids</b>	5ml extract taken, Stir it and dilute with Hcl and then filter. To the filtrate add 1ml of Bismath nitrate and potassium iodide reagent	Presence of orange or red precipitate.
Dragendroff;s test	5ml of filtrate is treated with Dragendroff's reagent.	Presence of yellow precipitate
Wagner's test (Iodine - potassium Solution)	5ml of extract were taken, add Hcl. To this add 1or 2drops of wagner's reagent	Presence of Yellow or brown colour
Hager test (Saturated picric acid solution)	5ml of extract + Hager's reagent	Presence of yellow precipitate
<b>Saponins</b>		
Foam test	5ml of active component, +1 drop of sodium bicarbonate, shake vigorously, allow to stand for 3-5min	Froth is formed
Hemolysis test	5 drops active component + RBC Suspension	Hemolysis is present
<b>Phenols</b>		
Lead acetate test	1ml of alcoholic solution + active component, dilute it with 20% sulphuric acid	Red to blue colour by the addition of NaOH solution.
Gelatin test	Active component +2ml of 1% gelatin solution	White precipitate is formed.
Ferric chloride test	Active component +2ml water + Add 10% fecl <sub>3</sub> solution	Appearance of blue or green precipitate
Mayer's Reagent test (Potassium Mercuric iodide test)	Add 1 or two drops of mayer's reagent in to the acidic solution	Presence white precipitate

<b>Flavonoids</b>		
Ferric chloride test	0.5ml of active component + 10 drops of Hcl	Presence of red or pink or brown colour
Alkaline reagent test	2ml test solution + 1 to 5ml ferric chloride solution	Appearance of green colour
Lead acetate test	2ml test solution + sodium hydroxide	Presence of yellow colour
<b>Flavanol glycoside</b>		
Magnesium Hcl reduction test	1-2ml of lead acetate solution	Presence of yellow precipitate
<b>Steroids and Terpenoids</b>		
Libermann burchard test	50mg dried extract in 5ml alcohol + magnesium ribbon + Conc. Hcl	Appearance of pink to crimson colour
Salkowski test	Ethanolic extract 1ml + conc. H <sub>2</sub> SO <sub>4</sub>	Presence of green colour – blue
<b>Tannis</b>		
Ferric ehloride Test	2 ml ethanolic extract +1ml conc. H <sub>2</sub> SO <sub>4</sub>	Alcohol layer shows red colour
Lead acetate test	2 ml active ethanolic extract + 1ml of Fec <sub>13</sub> solution	Bluish – Blackish colour after H <sub>2</sub> SO <sub>4</sub> addition yellow – brown precipitate
Potassium Dichromate test	1ml Ethanolic extract + 5ml lead acetate solution	Presence of yellow to red precipitate
<b>Thoils test</b>	5ml of test solution + 1-2 ml of potassium dichromate solution	Formation of red precipitate
<b>Test for Glycosides</b>		
Kellerkillani test	0.5ml of ethanolic solution + 5% sodium nitro peroxide. Add 2 drops of conc. Nitric acid	Appearance of magenta colour

Legal's test	2ml of extract + ferric chloride solution (2ml) and glacial acetic acid (1drop) Add 2 drops of conc. H <sub>2</sub> SO <sub>4</sub>	Presence of 2 layers. Upper layer Bluish green. lower layer Raddish brown
Borutroager's test	1ml test solution + 1ml pyridine	Absence of pink to red colour
<b>Protein test</b>		
Millon's reagent test	Test solution is heated with H <sub>2</sub> SO <sub>4</sub> filter it. Add chloroform	Absence of red colour
Biuret test	5ml test solution + millon's reagent heat the mixture. Add sodium hydroxide and copper sulphate solution	Formation of red colour
<b>Aminoacids</b>		
Ninhydrin reagent	To 2ml test solution add ninhydrin reagent heat it	Absence of bluish colour

**Table 2. List of phytochemicals present in *Cicer arietinum***

Sr. No.	Experiments	Test	Observation
1.	Test for a Alkaloids	Dragondroffs test	Yes
		Wagners test	Yes
		Hagers test	Yes
		Mayer"s Reagent test	Yes
2.	Test for a Flavanoids	Ferric Chloride test	Yes
		Alkaline test	Yes
		Lead Acetate test	Yes
		Magnesium test	Yes
3.	Test for a Saponins A	Foam test a	Yes
		Haemolytic test a	Yes
		Bromine a water test	Yes
4.	Test for a Phenol	Lead Acetate test	Yes
		Gelatin test	Yes
		Ferric Chloride test	Yes

5.	Test for a Carbohydrates	Molischs test	Yes
		Barfoeds test	Yes
		Benedicts test	Yes
6.	Test for a Steroids and Terpenoids	Salkowaskia test a	Yes
		Lieberman test a	Yes
7.	Test for Flavonol Glycoside	Magnesium Hydro chloride reductiona test a	Yes
8.	Test for Glycoside	Keller Killinni test	No
		Legal test	No
9.	Test for Tannis	Ferric Chloride test	Yes
		Lead Acetate test	Yes
10.	Test for Thoils	Thoils test	Yes
11.	Test for Protein	Millions test	Yes
		Biurete test	Yes
12.	Test for Amino acid	Nin Hydrin Test	No.

#### 4. Discussion

The Phytochemical constituents contribute the biological activities of the herbal plants such as antidiabetic, antimalarial, antioxidant activities [6]. *Cicer arietinum* or Bengal gram, in the screening analysis were found to have with phenols. This indicates and confirms the presence of antioxidant activity and hepato protective property of bengal gram. Tannins were also present. This helps to fasten the wounds to heal and inflamed mucous membranes. Flavonoids were also present in Bengal gram which have strong anticancer activity, and hepato protective activity. Flavonoids are potent water soluble anti oxidants [7, 8]. It helps in controlling liver diseases as well as diabetes. Terpenoids have been used to cure certain diseases like cancer and necrosis. It is known to possess antimicrobial, antiviral, anti-inflammatory properties [9, 10]. Steroids reduce the cholesterol levels. It also helps in regulating

immune system [11]. Presence of protein helps to repair and helps in maintaining the body. It is the building blocks of life.

#### Conclusion

It can be concluded the *Cicer arietinum* seed coat contains maximum classes of phytoconstituents which have highest therapeutic efficacy especially with antioxidant, anti-inflammatory activities. It was claimed by the traditional system of medicine or folks that, *Cicer arietinum* is effective for various ailments in humans. The results give validity to the claim. It can also be concluded the folk lore claims were true and effective which may be due to the presence of phytoconstituent.

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