



# Preliminary Phytochemical Screening of Leaf Extracts of *Cassia montana* in Different Solvents

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## Abstract

*Cassia montana* Heyne ex. Roth of *Caesalpiniaceae* family is screened to evaluate different phytochemicals present in the leaf, extracted in different solvents at preliminary level so as to agree with its medicinal properties. Alkaloids, Tannins and Flavonoids are present in the selected plant species which are very important phytochemicals in the pharmaceutical industry.

## Keywords

*Cassia montana*, phytochemicals, Alkaloids, Tannins and Flavonoids.

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## 1. INTRODUCTION:

Plants are important companions of human life providing us food and shelter without which human life is an impossible task on the planet earth [1]. Apart from this, from the time immemorial, basing on the traditional knowledge, plants are playing a major role in the curing of different ailments of the mankind [2]. The secondary metabolic compounds accumulated in the plants are responsible for the medicinal significance of any plant and these compounds are known as Phytochemicals [3]. Phytochemical Screening explores the various phytochemicals of the plant, which establishes the

utilization of the plants in traditional medicine such as ethnomedicine by the ancient people from the time immemorial [4]. The vernacular names of *Cassia montana* Heyne ex. Roth. in Telugu are Konda thangedu, Paidi thangedu, Pagadi thangedu etc. Generally distributed along the roadside of Madanapalle, Kuppam regions of Chittoor Dist.

The habitat is generally a shrub or a small tree. Oblong – elliptic, entire, obtuse leaflets are present. Flowers are generally arranged in axillary or terminal corymbose panicles and are in Yellow colour. Sepals and Petals are 5 in number and are ovate in shape. 10 stamens, 3 upper staminodes are present.

Stipulate ovary with numerous ovules is present. Fruits are Pods which are straight, flat and are with prominent nerves. The fruiting and flowering seasons of this plant species occur throughout the year. [5]

## 2. METHODOLOGY:

### Extraction of Phytochemicals for Analysis:

The collected above said plant species of *Cassia* L. are washed thoroughly in the running tap water and rinsed with distilled water, after these species are shade dried and then the leaves of these species are separated from each plant species.

The shade dried leaf parts of each species are pulverised and are kept in Soxhelt apparatus for the extraction process by using various solvents such as Distilled Water, Ethanol, Acetone and Chloroform. Soxheltation is advantageous process of extraction of phytochemicals as almost all the chemical compounds are soluble in this process and impurities are insoluble in this process. This process is made for the period of considerable time period. Samples are stored till and then subjected sequentially to the various qualitative chemical tests to analyze each sample for the presence of phytochemicals at preliminary level.

### Phytochemical screening:

Different qualitative tests are carried out for each of the sample prepared in different solvents to screen various phytochemicals at preliminary level as per the standard procedures prescribed by the phytochemists like Harborne, Trease & Evans, Sofavara and Edeoga. Qualitative tests are made for the determination of phytochemical compounds such as Alkaloids, Tannins, Saponins, Phenols, Flavonoids, Carbohydrates, Proteins, Steroids, Terpenoids, Cardiac Glycosides etc. [6],[7],[8]

#### 1. Detection of Alkaloids:

Extracts were dissolved in Dil. HCl and filtered and subjected to the following tests for the identification of Alkaloids.

**a. Mayer's Test:** Yellow coloured precipitate formation takes place when filtrate is treated with Mayer's reagent (Potassium Mercuric Iodide) if Alkaloids are present in the sample.

**b. Dangendorff's Reagent:** Red coloured precipitate formation takes place when filtrate is treated with Dangendorff's reagent (Potassium Bismuth Iodide Solution) if Alkaloids are present in the sample.

#### 2. Detection of Tannins:

**Gelatin Test:** Extract is added with 1% (W/V) Gelatin Solution and 10% Sodium Chloride (NaCl) Solution. Formation of White precipitate indicates the presence of Tannins

#### 3. Detection of Saponins:

**a. Froth Test:** Extract is diluted with distilled Water to 20 ml and this is shaken in a graduated cylinder for 15 minutes. Formation of 1 cm layer of foam indicates the presence of Saponins.

**b. Foam Test:** 0.5 g of extract is shaken with 2 ml of Distilled water, if the produced foam persists for ten minutes, it indicates the presence of Saponins.

#### 4. Detection of Flavonoids:

**a. Alkaline Reagent Test:** Extract is treated with few drops of Sodium hydroxide solution. Presence of Flavonoids is indicated by the formation of intense Yellow colour which becomes colourless on addition of Dilute Acid.

**b. Lead Acetate Test:** Extract is treated with few drops of Lead Acetate Solution. Yellow coloured precipitation indicates the presence of Flavonoids.

#### 5. Detection of Phenols:

**Ferric Chloride Solution:** 3-4 drops of Ferric Chloride Solution are added to the extract and the formation of Bluish black colour indicates the presence of Phenols.

#### 6. Detection of Cardiac Glycosides:

**a. Killer Killiani Test:** 0.5 g of each extract is treated with 2 ml of Glacial acetic acid and a drop of 5%(W/V) Ferric Chloride added along with few drops of Conc. Sulphuric Acid, Greenish blue colour appears within few minutes indicates the presence of Cardiac Glycosides.

**b. Bromine Water Test:** Each extract is added with Bromine water, formation of Yellow coloured precipitate indicates positive test for Glycosides.

#### 7. Detection of Steroids:

**Salkowski's Test:** 2 ml of extract is treated with 2 ml of Chloroform and filtered and then filtrate is treated with few drops of Conc. Sulphuric Acid, shaken and allowed to stand. Appearance of Golden Yellow colour at the interface indicates the presence of Steroids.

#### 8. Detection of Terpenoids:

**Liebermann Burchard's Test:** Each of the extract is added with Chloroform and filtered. Filtrates are treated with few drops of Acetic anhydride boiled and cooled and then Conc. Sulphuric Acid is added, Red colour in the lower layer indicates the presence of Terpenoids.

#### 9. Detection of Carbohydrates:

Extracts are dissolved individually in 5 ml Distilled water and filtered. The filtrates are used to test for the presence of Carbohydrates.

**a. Molisch's Test:** Filtrate is added with 2 drops of Alcoholic  $\alpha$ -naphthol solution in a test tube. Formation of violet ring at the junction indicates the presence of Carbohydrates.

**b. Benedict's Test:** Filtrate is added with Benedict's reagent and heated gently; orange red precipitate indicates the presence of Carbohydrates.

**c. Fehling's Test:** Filtrate is added with Dilute Hydrochloric Acid, Neutralised with Alkali and heated with Fehling's A & B Solutions, formation of Red precipitate indicates the presence of Reducing Sugars.

**10. Detection of Proteins:**

**a. Xanthoproteic Test:** The extract is added with few drops of Conc. Nitric Acid, formation of Yellow colour indicates the presence of Proteins.

**b. Biuret Test:** Each extract is added with 5% (W/V) of Sodium Hydroxide and 1% (W/V) Copper sulphate, formation of violet coloured complex indicates the presence of Proteins in the sample.

**11. Detection of Amino Acids:**

To the test solution 0.25% (W/V) Ninhydrin reagent is added and boiled for few minutes, formation of Blue coloured complex indicates the presence of Amino acids.

**TABLE 1: Preliminary Phytochemical Screening Tests for Leaf Extracts of *Cassia montana* Heyne ex. Roth. in Distilled Water, Ethanol, Acetone and Chloroform**

S. No.	Qualitative Phytochemical Screening Test	Distilled Water Extract	Ethanol Extract	Acetone Extract	Choroform Extract
1.	Alkaloids				
	Mayer's Test	-	++	-	-
	Dangendroff's Reagent:	-	++	-	-
2.	Tannins (Gelatin Test)	+	+	-	-
3.	Saponins				
	Froth Test	-	-	-	-
	Foam Test	-	-	-	-
4.	Flavonoids				
	Alkaline Reagent Test	++	-	+	-
	Lead Acetate Test	++	-	-	-
5.	Phenols (Ferric Chloride Test)	-	-	-	-
6.	Cardiac Glycosides				
	Killer Killiani Test	-	-	-	-
	Bromine Water Test	-	-	-	-
7.	Steroids (Salkowski's Test)	+	-	-	-
8.	Terpenoids	-	-	-	-
	(Liebermann Burchard's Test)				
9.	Crabohydrates				
	Molisch's Test	++	++	++	+
	Benedict's Test	++	++	++	+
	Fehling's Test	++	++	++	+
10.	Proteins				
	Xanthoproteic Test	++	++	+	-
	Biuret Test	++	++	+	-
11.	Amino Acids	-	-	-	-

(++ Indicates Presence, + Indicates Moderate Presence, - Indicates Absence)

**3. RESULTS & DISCUSSION:**

The leaf *Cassia montana* Heyne ex. Roth. extracts prepared by using solvents like Distilled Water, Ethanol, Acetone and Chloroform are showing following observations in the qualitative tests of preliminary phytochemical screening. Alkaloids are present in only one sample. i.e. the sample prepared with ethanol as solvent and the same are found absent all the remaining samples prepared from the solvents like Distilled Water, Acetone and

Chloroform. Tannins are present in the first two samples of extracts prepared from the solvents of Distilled Water and ethanol. Flavonoids are present in the samples of extracts prepared from the solvents of Distilled Water and acetone. Steroids are absent in all except in the extract prepared from the Distilled water solvent. Carbohydrates are present in all the four samples, but amino acids are absent in all the four extracts and proteins are present in all except the extract prepared in chloroform. Saponins,

phenols, cardiac glycosides and terpenoids are absent in all the samples prepared by using solvents like Distilled Water, Ethanol, Acetone and Chloroform.

#### 4. CONCLUSIONS:

Alkaloids, Tannins and Flavonoids are present in the selected plant species which are very important phytochemicals in the pharmaceutical industry and these compounds are imparting medicinal attributions to *Cassia montana* Heyne ex. Roth. Further extensive study is needed to find out the biological activities of the existing above said compounds.

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