

# ANTIASTHMATIC ACTIVITY OF *PROSOPIS CINERARIA*

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**Abstract:** Asthma is a chronic inflammatory lung condition that can cause coughing, wheezing, and trouble breathing. The airway lining in the lungs becomes inflamed and swollen during an acute asthma attack, and extra mucus is produced in the airway. Every ten years, the global incidence of asthma rises by 50%. With the predicted rise in the proportion of the world's urban population from 45 percent to 59 percent by 2025, the number of asthmatics globally is expected to rise significantly over the next two decades. Inhaled asthma triggers such as pollens and moulds, cigarette smoke, and chemical irritants are the highest risk factors for developing asthma, despite the fact that the underlying causes of asthma are unknown. Asthma is a chronic inflammatory lung condition that can cause coughing, wheezing, and trouble breathing. The airway lining in the lungs becomes inflamed and swollen during an acute asthma attack.

**Keywords:** Asthma, Risk factors, Acute Asthma, Airway Lining.

## INTRODUCTION

The word "asthma" comes from the Greek word "aazein," which means "sharp breath." Hippocrates was the first to use the term in relation to a medical condition, and Galen wrote a lot on asthma around 450 BC, although he didn't mention that it was caused by partial or total bronchial blockage. Bernardino ramazzini discovered a link between asthma and organic dust in the 17th century. Bronchodilators were first used in 1901, but it wasn't until the 1960s that the inflammatory component of asthma was identified, and anti-inflammatory medications were included to the treatment regimens. Asthma is an airway condition marked by an increase in the tracheobronchial tree's response to a range of stimuli, resulting in extensive spasmodic constriction of the airway that can be resolved either naturally or by medication. Asthma is a chronic inflammatory lung condition that can cause coughing, wheezing, and trouble breathing. The airway lining in the lungs becomes inflamed and swollen during an acute asthma attack. Mucus is also produced in the airway and the muscles around the airway spasm. When these factors are combined, air flow is reduced. Asthma is defined by the following symptoms:

**Airway inflammation:** The airway lining becomes red, swollen and narrow.

**Airway obstruction:** The muscles encircling the airway tighten causing the airway to narrow making it difficult to get air in and out of the lungs.

**Airway hyper-responsiveness:** The muscles encircling the airway respond more quickly and vigorously to small amounts of allergens and irritants.

Asthma is a chronic respiratory condition that affects a huge percentage of the world's population. Bronchial stimulation with allergen causes an immediate early phase immunoglobulin E (IgE)-mediated reduction in bronchial airflow (forced expiratory volume in one second), followed by a late phase IgE-mediated reduction in bronchial airflow lasting 4-8 hours. Initially, asthma is defined by an increased amount of inflammatory mediators in the bronchial allergen tissues, bronchial secretion, and mucus, such as eosinophils, neutrophils, lymphocytes, and plasma cells.

## SCIENTIFIC CLASSIFICATION

**Kingdom:** Plantae

**Division:** Tracheophyte

**Order:** Fabales

**Family:** Fabaceae

**Genus:** Prosopis

**Species:** cineraria



Figure No. 1 - *Prosopis cineraria* Plant

### BOTANICAL DESCRIPTION

Spunge tree is much branched shrub or small tree. Branches are slender, glabrous, with compressed, straight and scattered prickles. Leaves are pinnate, glabrous or puberulous. The plant has deep root system and has low requirements for water and nitrogen. *Prosopis cineraria* is an almost evergreen tree growing to 6.5 m in height. It has an open crown that becomes rounded under lopping. The bole is 2 m high, straight, up to 30 cm in diameter. The bark is thick, rough, deeply fissured and cinereous (ash-grey in colour), hence the name of the species. *Prosopis cineraria* has many internodal thorns, like rose-trees. It has a deep taproot going down to 3 m or even deeper (down to 20 m). The leaves are pinnately (3 pinnae) compound, petiolated. The leaflets are glabrous or puberulous, borne on 2-7 cm pinnae, in 7-1 pairs. Leafblade is ovate, without nerves, mucronate, 4-15 mm long x 2-4.5 mm broad. The leaflets are green in colour, becoming grey when dry.

### PHYTOCHEMISTRY

*Prosopis cineraria* has been found to contain number of alkaloids, tannins, glycoside, steroids and carbohydrates. Seven compounds have been isolated for the first time from *Prosopis cineraria* namely, methyl heptacosanoate, heneicosanoic acid, 4-hydroxybenzoic acid, methyl 4-hydroxycinnamate, methyl 2-methoxy-5-hydroxycinnamate, methyl 2,5-dihydroxycinnamate and 1-O-coumaroylglycerol, respectively. The bark of *Prosopis cineraria* consist of n-octacosyl acetate, the long chain of aliphatic acid. A new keto alcohol along with ombuin and vitamin K1. Presence of glucose, sucrose and starch is also reported.

### MATERIALS AND METHODS

#### Preparation of Extracts through Soxhlet extraction

The flask containing the solvents is heated to a certain temperature. The created vapour flows through the syphon into the thimble above, where it condenses and tickles down into the flask, dissolving. It is still in the middle of the procedure. "Continuous extraction" is how the approach is characterized. The procedure is repeated until all of the soluble components have been separated. The bottom extract was collected and dried at a lower temperature and pressure. The supercharged material is always air dried before extraction with additional solvents. The Soxhlet apparatus was set up with around 100gm of dry powder correctly wrapped in Whatmann filter paper and maintained in a thimble. Different solvents with increasing polarity, such as petroleum ether (60-800cc), ethanol, were used to extract the powder. A reflex condenser is used to raise the solvent concentration, which is then stored in desiccators.

### Phytochemical Screening

#### Qualitative examination of phytoconstituents [16][17][18]

##### 1. Test for Alkaloids:

**Dragendorff's Test:** To 1 gm of the extract, add 1 ml of Dragendorff's reagent (Potassium Bismuth iodide solution). An orange-red precipitate indicates the presence of alkaloids.

Ethanol and water both extract of *Ocimum* species give positive result.

##### 2. Test for Glycosides:

Extract is hydrolysed with dil. HCl, and then subjected to test for glycosides.

**(A) Modified Borntrager's Test:** Extract is treated with Ferric Chloride solution and immersed in boiling water for about 5 minutes. The mixture was cooled and extracted with equal volumes of benzene. The benzene layer was separated and treated with ammonia solution. Formation of rose-pink colour in the ammonical layer indicates the presence of anthranol glycosides.

Ethanol and water both extract of *Ocimum* species gives positive result.

**(B) Legal's Test:** Extract is treated with sodium nitropruside in pyridine and sodium hydroxide. Formation of pink to blood red colour indicates the presence of cardiac glycosides.

Ethanol and water both extract of *Ocimum* species gives negative result.

### 3. Test For Tannins:

To 1gm of the extract, add ferric chloride solution, formation of a dark blue or greenish black color product shows the presence of tannins.

Ethanol and water both extract of *Ocimum* species gives positive result.

### 4. Test for phenols:

**Ferric Chloride Test:** Extract is treated with 3-4 drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenols.

Ethanol and water both extract of *Ocimum* species gives positive result.

### 5. Test for Steroids:

**Liebermann-Burchard Test:** 1gm of the test substance was dissolved in a few drops of chloroform, 3ml of acetic anhydride, 3ml of glacial acetic acid were added, warmed and cooled under the tap and drops of concentrated sulphuric acid were added along the sides of the test tube. Appearance of bluish-green color shows the presence of sterols.

Ethanol and water both extract of *Ocimum* species gives positive result.

### 6. Test for Triterpenoids:

**Noller's Test:** Dissolve two or three granules of tin metal in 2ml thionyl chloride solution. Then add 1gm of the extract into test tube and warm, the formation of pink color indicates the presence of triterpenoids.

Ethanol and water both extract of *Ocimum* species gives positive result.

### 7. Test for Flavonoid:

Little quantity of extract is treated with amyl alcohol, sodium acetate and ferric chloride. A yellow color solution formed, disappears on addition of an acid indicates the presence of Flavonoid.

Ethanol and water both extract of *Ocimum* species gives positive result.

### 8. Detection of saponins:

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

Ethanol and water both extract of *Ocimum* species gives positive result.

### 9. Detection of proteins and aminoacids:

**(A) Xanthoproteic Test:** The extract is treated with few drops of conc. Nitric acid. Formation of yellow colour indicates the presence of proteins. Ethanol and water both extract of *Ocimum* species gives positive result.

**(B) Ninhydrin Test:** To the extract, 0.25% w/v ninhydrin reagent is added and boiled for few minutes. Formation of blue colour indicates the presence of amino acid.

Ethanol and water both extract of *Ocimum* species gives positive result.

### Acute Oral Toxicity Study

The dose was selected by using an acute toxicity study (OECD). An acute toxicity study for ethanolic extract of bark *Prosopis cineraria* was performed using wister rat animals. The animals were fasted overnight prior to the experiment and were maintained under standard conditions. To find the LD<sub>50</sub> of ethanolic extract of bark of *Prosopis cineraria*, four groups of animals, containing five in each group, were given *Prosopis cineraria* in doses of 100, 200, and 400, mg/kg orally. The animals were observed for 5 min in gap of every 30 min till 2 h and 4, 8, and 24 h continuously after treatment to observe any behavioral changes/mortality in the rats. They were further observed daily for 7 days for mortality. The body weight of the animal was recorded. The other observations include changes in skin, eyes, and mucous membrane activity and behavior.

### Isolated guinea pig ileum preparation

The guinea pig 200 – 250 g was deprived of food overnight. After the fasting animal was dissected terminal pieces of ileum isolated from guinea-pig suspended in krebs solution at 50 ml. Pieces 4 to 6 cm long was cut from the guinea-pig ileum about 5 cm above the ileo-caecal valve. A piece of ileum was suspended in a 50 ml. bath containing Krebs solution at 37°C, gassed with 95% O<sub>2</sub> and 5% CO<sub>2</sub> for stabilization period 45 mins. To be record the DRC of histamine, after the incubation of standard drug perform the DRC of histamine and also followed by above procedure with aqueous ethanolic extract of *Prosopis cineraria* were incubated 2 mins later observe the response. Tissue bath, connected through aerator which are maintaining the aeration (3 Bubbles per min) for tissue survival. The movements of the ileum were recorded magnified frontal-writing lever with Sherrington rotating drum.

## RESULTS

### YIELD OF CRUDE EXTRACT

#### Appearance and percentage yield of Extract

*Prosopis cineraria* extract was discovered to be a light semisolid brownish colour extract with a percentage yield of 35.52 percent.

#### Phytochemical Analysis

The findings of the phytochemical screening indicated that the alkaloids were present, which was determined by the presence of turbidity and/or precipitate formation. In certain samples, the colour shifted from violet to blue or green, indicating the presence of steroids. As a favourable consequence, an interface with a reddish-brown hue did not form in the absence of terpenoids. The presence of flavonoids is shown by the presence of red colouring (Shinado's test). In the test tube, there was a colour shift, indicating the presence of tannins. The presence of phytosterols was verified by a brown ring forming at the junction and the top layer developing a dark green hue. Saponins were found in the following two observations. The test was validated by the formation of stable foam. The test was validated by the production of a soluble emulsion. The test was validated by the appearance of a blue colour in the acetic acid layer. The test was validated by the formation of a red colour. Glycosides were found in both of the above observations.

**Table No.1 :** Phytochemical Analysis

S. No	Phytochemicals	Inference
1	Alkaloids	+
2	Steroids	+
3	Terpenoids	-
4	Flavonoids	+
5	Tannins	+
6	Phytosterol	+
7	Saponin	+
8	Glycosides	+

+, Presence of the compound -, Absent

The LD50 value is 5000mg/kg, which is used to calculate dosages such as 125, 250, and 500 mg/kg for antidepressant action. The following is a 15-day observation report:

OECD 423 is a method that was developed by the Organization for Economic Cooperation and Development. Wistar rats are a kind of animal. 18 animals were employed in all. 200-400 gms body weight Gender: female

**Table No.2:** Toxicity Study

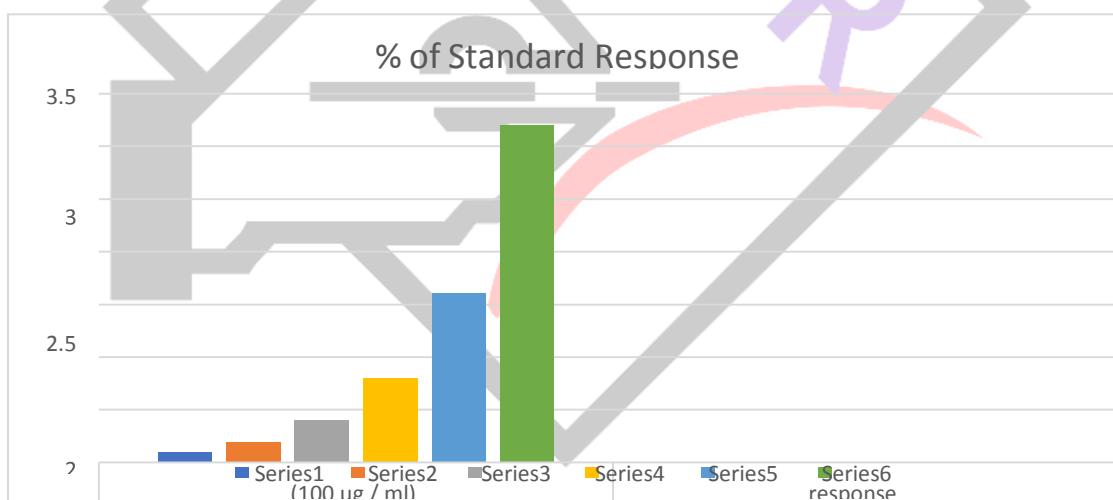
S. No	Parameters	Inferences
1.	Mortality	2000 mg/ kg: 1 & 5000mg/ kg: <b>No death was observed during the study</b>
2.	Percentage of Mortality	0%
3.	Alive Percentage	100%
4.	Convulsion	<b>Not found all the groups</b>
5.	Locomotion	<b>Absent</b>
6.	Sniffing	The character was located after a six-hour period of special inspection, but he was missing on other days.
7.	Rearing	The character was subjected to a six-hour period of special scrutiny, although he was absent on the other days.
8.	Grooming	The character was located after a six-hour period of special surveillance, although he was missing on other days.
9.	Hair loss	<b>Not observed</b>
10.	Excess urination	<b>Not found</b>
11.	Excess Feces elimination	<b>Not found</b>

### Antihistamine action of an isolated guinea pig ileum preparation

The antihistaminic activity of a medicine may be tested using Guinea pig ileum preparation, as proven in Spasmogen, where histamine causes dose-dependent contraction of Guinea pig ileum preparation. H1 receptors may be found in the ileum of Guinea pigs. The ileum contracts when H1 receptors are stimulated. The histamine-induced contraction of isolated neurons was considerably reduced by ethanolic extract and essential oil of EAEUC (100 g/ml) in this investigation. Antihistaminic action was detected in a guinea pig ileum preparation. Antihistaminic action is tested in the ileum of Guinea pigs. The stimulation of H1 receptors produces graded dose related contraction of isolated guinea pig ileum. In the present study, EAEUC (100 µg/ml) significantly inhibited the histamine-induced contraction of isolated guinea-pig ileum preparation indicating H1 receptor antagonistic activity shown in **Table no. 3**

**Table No.3 :** Results obtained from guinea pig illeum preparation.

S.No	Dose of Histamine Co (100 µg / ml)	Concentration of Histamine	Log molar concentration	CRC of Histamine (%)	% of Standard Response	% of Extract response
1.	0.1	8	0.032	24.54±1.7	11.23± 0.95***	18.25±0.75**
2.	0.2	16	0.4503	49.25±0.52	27.54±1.2***	38.24±0.54**
3.	0.4	32	0.6426	68.24±1.23	41.24±1.95***	45.25±1.56**
4.	0.8	64	1.406	82.15±2.4	47.25±0.85***	52.56±1.75**
5.	1.6	128	2.743	92.56±1.56	52.56±0.28***	54.25±0.50**
6.	3.2	256	4.923	101.25±0.29	59.23±2.5***	58.26±1.8**



**Figure No. 2:** Results obtained from guinea pig illeum preparation of Standard

### CONCLUSION

The current study on evaluation of anti-asthmatic activity of bark of *Prosopis cineraria*. Asthma is a chronic inflammatory lung condition that can cause coughing, wheezing, and trouble breathing. Asthma is a chronic respiratory condition that affects a huge percentage of the world's population. Bronchial stimulation with allergen causes an immediate early phase immunoglobulin E (IgE)-mediated reduction in bronchial airflow. Allopathic drugs are used in the treatment of asthma but also have serious side effect. Therefore, a herbal extract was used in the study to overcome such side effect with more effectiveness. The extraction process was carried out with the Soxhlet apparatus. The animals were used for this study were Guinea pig and Wister rats. The study was performed using The current study on evaluation of anti-asthmatic activity of bark of *Prosopis cineraria*. Asthma is a chronic inflammatory lung condition that can cause coughing, wheezing, and trouble breathing. Asthma is a chronic respiratory condition that affects a huge percentage of the world's population. Bronchial stimulation with allergen causes an immediate early phase immunoglobulin E (IgE)-mediated reduction in bronchial airflow. Allopathic drugs are used in the treatment of asthma but also have serious side effect. Therefore, a herbal extract was used in the study to overcome such side effect with more effectiveness. The extraction process

was carried out with the Soxhlet apparatus. The animals were used for this study were Guinea pig and Wister rats. The study was performed using two model histamine induced convulsion and milk induced lymphocytes in both studies the animals were test with controlled and vehicle drug. It was observed that the bark extract of *Prosopis cineraria* plant was significantly induce the anti-asthmatic effect in both the model. In future prospective *Prosopis cineraria* may be have the good option for asthmatic patients who have some serious side effect of allopathic drugs. Our scientists also shifting their focus towards allopathic plants research because now a days ayurvedic drugs are best alternative of allopathic drugs with having the best therapeutic options and economical too.

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