ANTIASTHMATIC POTENTIAL OF THE ROOTS OF *ECHINOPS ECHINATUS* ROXB.

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**ABSTRACT**

The present study aims at the evaluation of the ethanolic extract of the roots of *Echinops echinatus* Roxb. on *in vitro* animal model. Histamine induced contraction in isolated goat tracheal chain showed that ethanolic extract of the roots of *Echinops echinatus* Roxb. inhibited the contractile effect of histamine P<0.05. A dose dependent contraction of goat tracheal chain was observed during the evaluation. In addition the root contain Lupeol which can cause reduction of eosinophils, which may also contribute the anti asthmatic action of the plant.

**KEYWORDS**: Antiasthmatic, Antihistamine, Lupeol, *Echinops Echinatus*

**INTRODUCTION**

Asthma is a disease characterized by bronchial airway inflammation resulting in increased mucous production and airway hyper responsiveness. Around 100 to 150 million people are suffering from asthma in the world. The most worrying aspect of these statistics is that the numbers are escalating phenomenally and the deaths from this condition have reached over 180 million annually.¹ India has estimated to be 15-20 million of asthmatics. Genetic predisposition is one of the factors in children for the increased prevalence. Other factors like urbanization, air pollution & tobacco smoke contributes more significantly. However there is no complete remedy to cure asthma. Further several classes of synthetic drugs have been adopted in the treatment of asthma. In many conditions the patient has to be administered with drugs for a prolonged period or even lifelong. Administration of these drugs for long period may result in adverse effects and chronic toxicities or drug-drug interactions. Therefore there are several attempts to explore the possibility of natural drugs...
Keeping this in view, a field survey was conducted to identify an herbal remedy for the management of asthma. *Echinops echinatus* (Asteraceae) is an herbaceous plant, widely distributed in desert regions of Kerala and Tamilnadu. The root, leaves, fruit and bark are most commonly used parts. In traditional medicine most of the diseases have been treated by administration of plant or plant product. *Echinops echinatus* Roxb is the useful traditional medicinal plant in India. Each part has some medicinal property. During the last five decades, apart from the chemistry of the *Echinops echinatus* Roxb compounds, considerable progress has been achieved regarding the biological activity and medicinal applications of *Echinops echinatus* Roxb. It is now considered as a valuable source of unique natural products for development of medicines against various diseases and also for the development of industrial products. The survey revealed the fact that *Echinops echinatus* was traditionally used in asthmatic conditions by the tribals of Marayar forest of Idukki district, Kerala State. Since the antiastmatic potential of this plant was not claimed, the present study was aimed to screen the ethanolic extract of the roots of *Echinops echinatus* for its *in vitro* anti-asthmatic activity.

**MATERIALS AND METHODS**

**Plant collection**

The Plant material was collected from the hilly area of Marayur, Idukki district of Kerala state in the month of September and the botanical identity of the same was confirmed and a voucher specimen bearing No. EeRoxb 837 was deposited at the Pharmacognosy department of Academy of Pharmaceutical Sciences, Pariyaram Medical College, Kannur, Kerala.

**Preparation of extracts**

The roots of *Echinops echinatus* were dried in shade, powdered and sieved. The powdered material was extracted with ethanol. The extract was evaporated under reduced pressure using rotary evaporator until all the solvent has been removed to give an extract sample.

**Phytochemical Screening**

Preliminary phytochemical screening has been carried out as per the standard procedure.
ANTIASTHMATIC SCREENING

Isolated goat trachea chain preparation

Isolated adult goat tracheal tissue was obtained immediately after slaughterhouse of the animals. Trachea was cut into individual rings and tied together in series to form a chain. Trachea was suspended in bath of Krebs solution and was continuously aerator at 37+0.5°C. Dose response curve of histamine in plane Krebs solution and in 800 µg/ml ethanolic root extract of Echinops echinatus act in Krebs solution was taken. Graph of percentage of maximum contractile response on ordinate and concentration of histamine on abscissa was plotted to record dose response curve of histamine, in absence and in presence of drug extract.8,9

Statistics

The statistical analysis was performed by using One way analysis of variance (ANOVA) followed by Dunnett’s test for individual comparison of groups with the control. The p values less than 0.05 were considered as significance.

Result and Discussions

Phytochemical Screening

Phytochemical screening revealed the presence of saponions, flavonoid glycosides, poly phenolic compounds in the alcoholic extract.

Antiasthmatic screening

It was observed that ethanolic root extract of Echinops echinatus inhibits contraction produced by histamine in these tissue preparations. Histamine (10µg/ml) was taken in different dose level and dose response curve was plotted. Study revealed that the root extract of Echinops echinatus exhibits significant (p<0.01) percentage decreased contraction at concentration 800 µg /ml in goat tracheal chain preparation Dose dependent response relationship was observed during the evaluation. Histamine contracts the trachea-bronchial muscle of guinea pig, goat, horse, dog and man.13
Table - 1 Effect of root extract of *Echinops echinatus* root on histamine induced contraction on isolated goat tracheal chain preparation

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Concentration of Histamine (10µg/ml)</th>
<th>Percentage Maximum Response (Mean ± SEM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Control</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>36.57 ± 1.31</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>39.39 ± 1.17</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>48.46 ± 2.15</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>57.35 ± 2.13</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>78.57 ± 2.29</td>
</tr>
<tr>
<td>6</td>
<td>32</td>
<td>99.46 ± 2.88</td>
</tr>
</tbody>
</table>

n = 6 Values are in Mean ± SEM.

Control - D.R.C. of Histamine in the absence of *Echinops echinatus* root extract.

Test - D.R.C. of Histamine in the presence of *Echinops echinatus* root extract

Statistical analysis done by using Student’s ‘t’-test.

**p<0.01, significantly different from control.

For the evaluation of antiasthmatic studies isolated goat tracheal chain is selected because it is very easy to handle and prepare and also when compared with the guinea pig the sensitivity of the goat tracheal chain is much higher. In the present study of isolated goat tracheal chain preparation, there is a right side shift of dose response curve of histamine in the presence of ethanolic root extract of *Echinops echinatus* indicating antiasthmatic action. The plant seems to be having a promising role in the treatment of bronchial asthma could be due to the presence of flavonoid glycosides and steroidal saponins which can inhibit the release of several mediators such as serotonin, prostaglandins and histamines by inhibiting the biosynthetic pathways of inflammatory mediators.

The effects of the alcoholic root extract may be because of presence of phytochemicals such as saponins flavonoids, and tannins, known to possess similar effects. In addition the plant also contains lupeol. Lupeol can cause the reduction of cellularity and eosinophils in the broncho alveolar lavage fluid. Treatment with lupeol can also reduce the production of mucus and overall inflammation in the lung. Thus lupeol attenuates the alterations characteristics of allergic airway inflammation. The investigation of the mechanisms of action of this molecule may contribute for the development of new drugs for the treatment of asthma.
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