

Evaluation of Anti-Asthmatic Activity of Methanolic Extract of the Fruit of *Scindapsus officinalis* (Roxb.) Schott

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Abstract: The effect of methanolic extract of fruit of *Scindapsus officinalis* (MESO) on experimental models were evaluated for its antihistaminic activity. Phytochemical screening of the methanolic extract showed the presence of alkaloids, tannins, saponins, flavonoids, glycosides, phenolic compounds, terpenoids and steroids as chemical constituents. Significant increase in preconvulsion time was observed due to pretreatment with *Scindapsus officinalis* when the guinea pigs were exposed to histamine. This bronchodilating effect of *Scindapsus officinalis* was comparable to Ketotifen fumarate. Thus, the present study revealed that the methanolic extract of fruit of *Scindapsus officinalis* has significant antihistaminic (H₁ receptor antagonist) activity. The *Scindapsus officinalis* by virtue of the said action will prove to be very effective in the antihistaminic therapy of asthma. Thus, the antiasthmatic effect produced by methanolic extract of *Scindapsus officinalis* suggested that anti-asthmatic activity could be due to its bronchodilator, mast cell stabilizing and antimicrobial property. The possible mechanism of action may be blockade of H₁ and Ach receptors leading to inhibitory of smooth muscle to respond histamine and Acetylcholine induced spasm leading to inhibition of bronchoconstriction. It was concluded that apart from the folklore uses of *Scindapsus officinalis* as antioxidant agents, the methanolic extract of fruit of the plant *Scindapsus officinalis* also possess anti-asthmatic activity.

Key words: *Scindapsus officinalis* • Anti-asthmatic • Bronchodilators • Histamine

INTRODUCTION

Bronchial asthma is an inflammatory disorder of the airways characterized by various airway obstruction, airway inflammation and bronchial hyper responsiveness [1] and is a global health problem that results from a complex interplay between genetic and environmental factors [2]. Nearly 7-10% of the world population suffers from bronchial asthma. Among several respiratory diseases affecting man, bronchial asthma is the most common disabling syndrome. Despite the availability of a wide range of drugs, the relief offered by them is mainly symptomatic and short lived. Moreover, these drugs produce side effects. Therefore, there is a dire need to identify effective and safe remedies to treat bronchial asthma [3]. The current accepted modern medicine or

allopathy has gradually developed over the years by scientific and observational efforts of scientists. However, the basis of its development remains rooted in traditional medicine and therapies [4].

Asthma is a chronic condition involving the respiratory system in which the airways occasionally constrict, become inflamed and are lined with excessive amount of mucous, often in response to one or more triggers. These episodes may be triggered by exposure to environmental stimulants such as an allergen, environmental tobacco smoke, cold or warm air, perfume, pet dander, moist air, exercise or exertion or emotional stress. [5].

Scindapsus officinalis (Roxb.) Schott. known as 'Gajapeepal' in Hindi, is a member of the family; Araceae. Gajapeepal consists of dried, transversely cut pieces of mature female spadix of *Scindapsus officinalis* Schott. a

large epiphytic climber, found all along the sub-Himalayan tract between an altitude of 330-1000 m in West Bengal, Orissa andhra Pradesh and the Andaman Islands. Fruit occurs in transversely cut circular pieces of about 2.0-3.0 cm in diameter and 2.0-3.5 cm thick, brownish-grey, rough and scaly, cut surface has a central core, surrounded by fruits enclosing the seed covered partly by aril; odour and taste not distinct. Fruit shows more or less loosely arranged, thin-walled, parenchymatous cells having more or less isodiametric cells filled with brown content and numerous acicular crystals of calcium oxalate [6]. Ethanolic extract (50%) and ethyl acetate extracts of *Scindapsus officinalis* fruit were found to be significant antioxidant property. This antioxidant property may be due to the presence of flavonoids and phenolics compounds [7]. The present study was undertaken to find out the possible actions on *Scindapsus officinalis* fruit for its antiasthmatic activity using experimental animals.

MATERIALS AND METHODS

Chemicals: Histamine; Ozone International, Mumbai, Ketotifen; Airyfen Syr. contains 1mg/5ml, Panacea Biotec, New Delhi. All other chemicals used were of analytical grade.

Plant Material: The fruits of the plant *Scindapsus officinalis* for the proposed study were collected from the Kuwari River, Gormi, Bhind, MP, India, in the month of July 2009. It was identified the help of available literature and authenticated at the Department of Pharmaceutical Sciences, Dr. H.S. Gaur University, Sagar (MP). The voucher specimen of the plant and fruit has deposited in departmental herbarium (voucher specimen no. J-88).

Preparation of Extracts: The fruit of the plant *Scindapsus officinalis* was shade dried and coarsely powdered with mechanical grinder. Powdered drug was extracted successively with methanol by cold maceration method. After complete extraction, the extracts were concentrated by distilling off the solvent and then evaporated to dryness on water bath. The methanolic extract of *Scindapsus officinalis* (MESO) were subjected to its antiasthmatic activity.

Animals: Guinea pigs of either sex (350-450 g) were selected for the experiment of present study. Six animals

were taken in each group and maintained under standard laboratory conditions. They were allowed free access to standard dry pellet diet and water *ad libitum* during the experiment. All experimental procedures were followed in strict accordance with the guideline prescribed by the Committee for the Purpose of Control and Supervision on Experimental on Animals (CPCSEA) and the protocol was approved by the Institutional Animal Ethical Committee (Registration no. 1030/a/07/CPCSEA).

Evaluation of Anti-asthmatic Activity

In Vivo Study: Histamine-induced Bronchospasm in

Guinea Pigs [8]: The activity was evaluated by using the method histamine-induced bronchospasm in guinea pigs. Guinea pigs of either sex (350-450 g) were selected and randomly divided into four groups each containing six animals. The guinea pigs fasted for 24 h were exposed to an atomised fine mist of 2% histamine dihydrochloride aerosol (dissolved in normal saline) using nebulizer at a pressure of 300 mm Hg in the histamine chamber (24 x 14 x 24 cm, made of perplex glass). Guinea pigs exposed to histamine aerosol showed progressive signs of difficulty in breathing leading to convulsions, asphyxia and death. The time until signs of convulsion appeared is called pre-convulsion time. By observation experience was gained so that the preconvulsion time can be judged accurately. As soon as pre-convulsion time commenced, animals were removed from the chamber and placed in fresh air to recover.

In Vitro Study: Isolated Guinea Pig Ileum Preparation

[9, 10]: Overnight fasted guinea pigs were sacrificed using cervical dislocation method. Ileum was quickly dissected out and mounted in an organ bath maintained at 30±0.5°C and containing 20 ml Tyrode's solution under basal tension of 500 mg. The solution was continuously bubbled with air. The responses to drug were recorded on student physiograph using isotonic transducer, which exerted a basal tension equivalent to 500 mg load on tissues. The tissues were allowed to equilibrate for 30 minutes, during which, the bathing solution was changed at every 10 minutes. The contractile responses of ileum to Histamine were recorded in presence and absence of MESO in table 2.

Statistical Analysis: Results were expressed as Mean ± SEM, statistical significance was calculated by applying *t- test*. P<0.05 was considered as significant.

Table 1: In vivo study of MESO on histamine induced bronchospasm in guinea pigs

S. No.	Group	% increase in preconvulsion
1.	Group I (Ketotifen; 1 mg/kg)	29.64±2.14
2.	Group II (MESO; 50 mg/kg, p. o.)	31.25± 2.54
3.	Group III (MESO; 100 mg/kg, p. o.)	45.58±3.98
4.	Group IV (MESO; 200 mg/kg, p. o.)	52.91±4.42

Table 2: In vitro study of MESO on histamine induced contraction of isolated guinea pig ileum preparation

S. No.	Dose of Histamine in ml (10 µg/ml)	50µg/ml of MESO		100µg/ml of MESO		200µg/ml of MESO	
		Control group	Test Group	Control Group	Test Group	Control Group	Test Group
1.	0.3	23.22±1.23	16.47±1.04	33.25±2.54	25.54±2.74	36.55±3.61	25.78±1.24
2.	0.6	41.22±4.57	28.67±3.66	61.64±4.57	37.27±3.66	65.33±3.57	37.28±3.46
3.	1.2	56.19±3.54	36.14±4.41	83.94±4.87	53.22±4.55	84.99±3.47	61.31±1.82
4.	2.4	68.21±4.17	51.15±2.41	92.36±5.01	62.05±3.74	90.24±4.11	71.41±4.64
5.	4.8	75.14±5.24	54.44±2.57	98.29±6.11	64.55±3.47	99.05±4.24	65.59±4.79

n=6, values are expressed in Mean ± SD, P <0.05, using student 't' Test

RESULTS AND DISCUSSION

Histamine is one of the important mediators of allergy, inflammation and bronchoconstriction, which were released after degranulation of mast cell by an antigen exposure. Targeting histamine, either prevention of its release from mast cell or use of histaminergic receptor antagonist becomes part of antihistaminic therapy in allergic diseases [11]. *In vivo* study of MESO has been also shown the significant increase in preconvulsion time due to pretreatment with MESO at the dose of 50, 100 and 200 mg/kg of bodyweight of guinea pigs, when the guinea pigs were exposed to histamine. The results of MESO suggested that it is effective in reducing the symptoms of bronchial asthma and also improve the lung function parameters of asthmatic subjects. *In vitro* study of MESO has been performed on isolated guinea pig ileum. Results showed the increase in the contractile responses of the tissues significantly at the level of P<0.05 when treated with MESO at the different doses of 50, 100 and 200 µg/ml.

Results of the experimental studies of methanolic extract of fruit of *Scindapsus officinalis* suggested that anti-asthmatic activity could be due to its bronchodilator, mast cell stabilizing and antimicrobial property. The possible mechanism of action may be blockade of H₁ and Ach receptors leading to inhibitory of smooth muscle to respond histamine and Acetylcholine induced spasm leading to inhibition of bronchoconstriction. It has been reported that these patients are resistant to main antibiotics prescribed. It is possible that these patients are suffering from bronchial infection but have been diagnosed, as asthmatic patients because of their symptoms like breathless [12].

In conclusion, the results of present investigation suggested that, methanolic extract of fruit of *Scindapsus officinalis* (MESO) have significant bronchodilatory activity against histamine. Thus, it can be concluded that MESO possess significant antihistaminic (H₁ receptor antagonist) activity. However, further studies are suggested to establish molecular mechanism and also to isolate and characterize the active principles responsible for the action.

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