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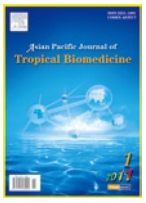

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Effect of *Abrus precatorius* leaves on milk induced leukocytosis and eosinophilia in the management of asthma

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ABSTRACT

Objective: To evaluate the effect of ethanol extract of *Abrus precatorius* (*A. precatorius*) for the management of asthma. **Methods:** In the present study, ethanol extract of *A. precatorius* leaves at doses of 100-150 mg/kg i.p. was evaluated for the management of asthma using milk induced leukocytosis and eosinophilia in mice. **Results:** The results of the present investigation showed that ethanol extract of *A. precatorius* at (100-150 mg/kg, i.p.) significantly decreased milk induced leukocytosis and eosinophilia in mice in a dose dependent manner when compared with control group. **Conclusions:** It can be concluded that ethanol extract of *A. precatorius* leaves may be used in the management of asthma.

1. Introduction

Asthma affect about 300 million people worldwide and it has been estimated that a further 100 million will be affected by 2025[1,2]. Asthma is a complex inflammatory disease causing airway narrowing and is associated with changes in the levels of mast cells, lymphocytes, cytokines and other inflammatory cell products. *Abrus precatorius* (*A. precatorius*) Linn (Fabacease) is climbing shrubs. Its leaves are pinnate with many pairs of leaflets. Leaves are 5-10 cm long. Leaflets have 10-20 pairs. On the contrary, flowers are pink clustered. The leaves and roots are sweetish and traditionally used to cure fever, stomatitis, asthma and bronchititis[3]. The roots, stems, and leaves also contain glycyrrhizin[4]. It possesses different pharmacological activities including antimicrobial[5,6], antifertility[7], anti-implantation[8], antibacterial[9], anti-tumor[10], immunopotentiating[11] and anti-inflammatory activities[12]. Ethanol extract of leaves possesses mast cell stabilizing and antianaphylactic activity[13]. Lectins isolated from *Abrus* shows immunostimulant activity[14]. Two triterpenoid saponins isolated from the aerial parts of *A. precatorius* exhibited anti-inflammatory activity[15]. The steroidal fraction of seeds of *A. precatorius* causes decrease in production and release of testosterone in testis of rats[16]. Abruquinone A, an isoflavanquinone isolated from *A. precatorius* significantly reduces the bradykinin- and substance P-induced plasma extravasations in normal as well as in compound 48/80-pretreated mice[17]. Three new triterpenoids (20S, 22S)-3-β, 22-dihydroxycucurbita-5(10), 24-diene-26,29-dioic acid δ-lactone, 3-O-(6′-methyl-β-D-glucuronopyranosyl)-3β, 22β-dihydroxyolean-12-en-29-oic acid methyl ester and 3-O-β-D-glucuronopyranosylsophoradiol methyl ester were isolated from methanol extract of leaves[18]. A new biologically active flavonol glycoside 7,3′,5′-trimethoxy-4′-hydroxy flavone-3-O-β-D-galactosyl-(1→4)-alpha-L-xyloside was isolated from chloroform soluble fraction of methanol extract of the seeds of *A. precatorius*[19]. The seed proteins are rich in most of the essential amino acids, and they are deficient only in cystine and threonine[20]. A four abrusoside A-D novel sweet-tasting triterpene glycosides was isolated from n-butanol soluble extract of the leaves of *A. precatorius*[21]. In the present study, effect of ethanol extract of *A. precatorius* leaves (EAPL) was studied on milk induced leukocytosis and eosinophilia in mice.

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2. Materials and methods

2.1. Plant material

Leaves of *A. precatorius* were collected in December 2008, from Baramati Localities, (Maharashtra, India), and the plant was authenticated by Professor Deshmukh RB, Department of Botany, Shardabai Pawar Mahila Mahavidyalaya, Baramati. A voucher specimen (PASR 114) was deposited in the herbarium for further use.

2.2. Extraction

Dried and coarsely powder of *A. precatorius* leaves (500 g) was defatted with petroleum ether and the marc remaining was extracted successively by 95% ethanol in Soxhlet extractor. Solvent was evaporated in rotary evaporator under reduced pressure to produce EAPL at 10.26% w/w.

2.3. Animals

Swiss albino mice of either sex weighing (25-30 g) were housed under standard laboratory conditions. The animals had free access to food and water. The Animal Ethical Committee of the Institute approved all the protocols of the study (Registration No.1214/ac/08/CPCSEA).

2.4. Milk induced leukocytosis and eosinophilia

Mice were divided into five groups with six in each group. Blood samples were collected from retro-orbital plexus. Group I served as control and received Tween-80 1% solution, groups II-IV received EAPL at (100-150 mg/kg i.p.), group V received dexamethasone at 50 mg/kg i.p. All the groups injected boiled and cooled milk (4 mL/kg, s.c.) 30 min after treatments. Total leukocyte and eosinophile count was done in each group before administration of test compound and 24 h after milk injection. Difference in total leukocytes and eosinophile count before and after 24 h drug administration was calculated[22].

3. Results

The maximum increase in difference of leukocytes (4483.34 ±297.96) and eosinophil (166.67±24.21) count was observed in control group 24 h after administration of milk (4 mL/kg, s.c). Groups of mice pretreated with EAPL at 100 mg/kg dose did not show statistically significant inhibition of leukocytosis while EAPL at 125 mg/kg (3441.67±285.31) and 150 mg/kg (3091.67±203.88) showed significant inhibition of milk induced leucocytosis 24 h after treatment in dose dependent manner as shown in Figure 1. While in milk induced eosinophilia EAPL at 100-150 mg/kg showed statistically inhibition in dose dependent manner as shown in Figure 2 when compared with control group.

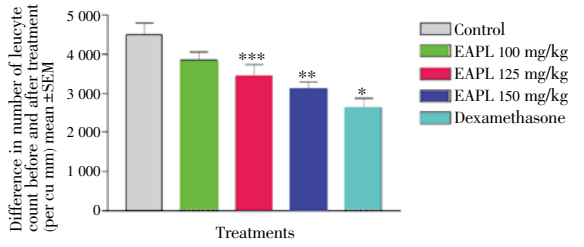

Figure 1. Effect of EAPL on milk induced leukocytosis in mice. *P<0.001, **P<0.01, ***P<0.05 when compared with control.

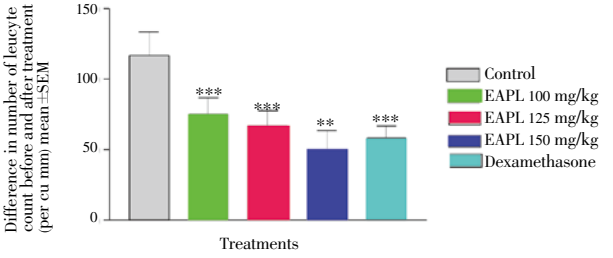

Figure 2. Effect of EAPL on milk induced eosinophilia in mice. **P<0.01, ***P<0.05 when compared with control.

4. Discussion

In the present investigation EAPL at doses of (100-150 mg/kg, i.p.) was evaluated for management of asthma using milk induced leukocytosis and eosinophilia in mice. Asthma involves various types of mediator in pathology. It was demonstrated that parental administration of milk produces a marked increase in the leukocytes and eosinophils count after 24 h of its administration[22,23]. Leukocytes during asthmatic inflammation release the inflammatory mediators like cytokines, histamine, and major basic protein, which promote the ongoing of inflammation[24]. The infiltration of leukocytes potentiates the inflammatory process by the release of reactive oxygen species into the surrounding tissue, resulting in increased oxidative stress[25] and associated with many pathogenic features of asthma[26]. In this study we observed that leukocytes count was decreased in mice treated with EPAL at doses of 100-150 mg/kg significantly as compared to vehicle treated group. Result suggests that EPAL decreases milk induced leukocytes count by normalizing oxidative stress. An abnormal increase in peripheral eosinophil to more than 4% of total leukocytes count is termed as eosinophilia. In asthmatic patient there is an increase in eosinophil count and mucus hypersecretion and airway hyperreactivity were stimulated[27,28]. Eosinophils infiltrating the airway also have an effect on mucus secretion by epithelial goblet cells[29]. In our study it was observed that EPAL at doses of 100-150 mg/kg significantly decreased milk induced eosinophils count. Previous study reported that ethanol extract of *A. precatorius* leaves showed the presence of steroids, saponin, alkaloids, flavonoids, and glycosides[13]. The decrease in leukocytes and eosinophils may be the presence of these phytoconstituents. EPAL

decreases leukocytes count by normalizing oxidative stress and/or adaptogenic activity, and decrease in eosinophils, may reduce type I hypersensitivity in asthma.

In conclusion, EAPL is effective in the management of asthma.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgements

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