

Pharmacological considerations of *Tylophora asthmatica*

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Abstract

Tylophora asthmatica has recently been included as one of the important drug from natural source for the treatment of respiratory diseases. Clinical studies have shown effectiveness of the drug in bronchial asthma and thus modern research withstands the ancient claims of traditional medicine. This article reviews the various scientific studies and tries to analyze the current status of *Tylophora asthmatica* in bronchial asthma.

Keywords: *Tylophora asthmatica*/Tylophorine/ Bronchial asthma.

Tylophora asthmatica is a perennial plant native to south and east India. It belongs to family Asclepidaceae and is commonly known as Indian ipecac [1]. In Ayurveda, *Tylophora asthmatica* is known as *antamool* [in allusion to shape of the roots]. The drug is official in Bengal pharmacopoeia [2]. Traditionally, *Tylophora asthmatica* has been used in treatment of asthma, dermatitis and rheumatism. The plant has been described as bronchodilator, emetic, expectorant and diaphoretic.

From phytochemistry point of view, *Tylophora asthmatica* contains 0.2-0.3 % of alkaloids. Tylophorine and tylophornine are important alkaloids encountered and the percentage is not affected by seasonal variations [3]. The extract of *Tylophora asthmatica* marketed by pharmaceutical companies is standardized to contain 0.1% of the total alkaloids. Recent studies have confirmed the anti-inflammatory activity of Tylophorine [4]. These alkaloids have phenanthroindalizidine framework and have anti-inflammatory activity.

Many trials have shown anti asthmatic and anti allergic activity of *Tylophora asthmatica* extract. The effect of the alcoholic extract of *Tylophora asthmatica* on weight of the adrenal glands and its functional activities and pituitary adrenal axis was studied on normal, unilaterally adrenalectomised, dexamethasone treated and hypophysectomised male albino rats. The extracts showed stimulation of adrenals as indicated by increase in weight and decrease in cholesterol and vitamin C. The plasma steroid level was increased but skin hydroxyproline level findings were not conclusive. From here it may be concluded that *Tylophora asthmatica* acts by direct stimulation of adrenal cortex [5].

One such study randomly assigned 110 bronchial asthma patients to receive one *Tylophora asthmatica* leaf (150 mg of the leaf by weight) or comparable placebo to be chewed and swallowed daily in the early morning for six days. At the end of one week, 62% of the patients consuming the tylophora reported experiencing moderate to complete relief of their asthma symptoms compared to 28% in the placebo group. Moreover, when patients were switched from the placebo to the active group and vice versa, similar positive trends could be seen, with 50% of the tylophora group and 11% of the placebo group reporting symptomatic relief [5]. In a follow-up study, the alcoholic extract of crude tylophora leaves in 1 gram of glucose had comparable effects to that of chewing the crude leaf, with 56% of the patients reporting moderate to complete improvement in asthmatic symptoms compared to 32% in the placebo group [6].

In another clinical trial, 30 patients with a diagnosis of bronchial asthma for at least two years were assigned at random to one of two treatment groups consisting of 15 individuals each [7]. One group received either 350 mg of tylophora leaf powder or placebo daily in the first week. In comparison, a second group of asthmatics were given a similar amount of the leaf for seven days followed by an anti-asthmatic drug combination. Overall, results of the study showed the amount of oxygen in the lung increased in those using the leaf but decreased in those using the placebo. In

addition, those taking the herb had a notable nighttime reduction in their symptoms of shortness of breath. Unfortunately, *Tylophora* did not fare as well in improving asthmatic symptoms when compared to the anti-asthmatic drug combination [7].

In a double-blind placebo-controlled crossover study of 195 individuals with asthma, participants showed significant improvement when given 40 mg of a *Tylophora asthmatica* alcohol extract daily for 6 days as compared to placebo. Surprisingly, the difference was even more marked months after use of the herb was stopped. Similar long-lasting results were seen in two double-blind placebo-controlled studies involving over 200 individuals with asthma. However, the design of most of these studies was a bit convoluted, and various pieces of information are missing from the reports, making it difficult to evaluate the validity of these trials [8]. A higher quality double-blind study that enrolled 135 individuals found no benefit from *Tylophora asthmatica* in asthma [9].

The chief active ingredient is thought to be an alkaloid Tylophorine. Experiments conducted with various animal models have shown significant anti-inflammatory, anti-anaphylactic and anti-spasmodic activities. Pre-treatment with *Tylophora asthmatica* prevented bronchospasm induced by Freund's adjuvant and bovine albumin in rats. The same researchers observed that the plant extract produced muscle relaxant activity, antagonism of smooth muscle stimulants and immunosuppressive effects in different species. Clinical trails on patients of bronchial asthma and allergic rhinitis indicated marked relief in the symptoms in 40-50% of the cases after a small dose of 3-6 leaves only. In another double-blind placebo-controlled study, *Tylophora asthmatica* produced a significant reduction in sneezing and nasal obstruction, and the improvement noted in ventilatory capacity lasted for nearly 10 days [10].

In a study *Tylophora asthmatica* caused nausea, vomiting, mouth soreness, and alterations in taste sensation in more than half of the participants. The other two studies found similar side effects, but far less frequently. The difference may have been because the second study had people chew the whole leaves from the plant whereas other studies have used dried leaves or powdered extract in capsule form. Preliminary studies on animals have found *Tylophora asthmatica* extracts to be toxic in extremely high doses; however, these extracts were safe in the far smaller doses needed to produce a therapeutic effect. Due to the lack of comprehensive safety studies on *Tylophora asthmatica*, children, pregnant and nursing women [11], should not use the herb. The dosage of *Tylophora asthmatica* leaf in dried or capsule form is 200 mg twice daily or 400 mg total in 2 doses

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