



## Research Paper

### A review on the role of an important medicinal plant *Inula racemosa* Hook. F. in asthma management

Prachi Sharma and Prahlad dube \*

Career Point University, Kota, Rajasthan, India

Department of Life science, University of Kota, Kota, Rajasthan, India

\*Corresponding author Email: [dube.prahlad@gmail.com](mailto:dube.prahlad@gmail.com)

Received: 25/09/2017

Revised: 06/10/2017

Accepted: 16/10/2017

**Abstract:** *Tamaka Shwasa* is one among the five types of *Shwasa Roga* explained in Ayurveda classic. *Tamaka Shwasa* shows close similarity with bronchial asthma. Asthma is disease of the human respiratory system in which the airways constrict and become narrow, often in response to a “trigger” such as exposure to an allergen, cold air, exercise or emotional stress. Due to rapid industrialization and urbanization, asthma prevalence is predicted to increase more rapidly in the coming years. Despite the availability of a wide range of drugs for the treatment of asthma, the relief offered by them is mainly symptomatic and short lived. Moreover the side effects of these drugs are also quite disturbing. Medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents for the prevention of diseases and ailments. The importance of herbal medicine in the treatment of asthma is indisputable. In *Ayurveda Pushkarmool* is mainly used as a bronchodilator and expectorant. *Pushkarmool* has anti-histaminic and a bronchodilator action that make it work in *Shvasa roga* which make

it very effective in the management of bronchial asthma.

**Keywords:** Ayurveda, *Tamak Shvasa*, Asthma, *Pushkarmool*, *Inula racemosa*, Raj Nighantu, Dhanvantri Nighantu, Charaka Samhita

## INTRODUCTION

The three main constituents of living body are considered as *vata*, *pitta*, *kapha* which are collectively referred to as *doshas* and according to *Ayurveda* imbalance to their existing proportion is responsible for generation of any disease. In asthma, *dosha* imbalance is caused by simultaneous aggravation of *prana vayu* due to obstruction of *kapha* and *vata* (Sharma and Dash, 2004). Several drugs have been described in *Ayurveda samhita* as single or compound drugs for *Shvasa*. In *Ayurveda* asthma is closely resembles with *Tamak Shvasa*. *Tamak Shvasa* is mentioned as one of the varieties among five type of *Shvasa*. *Tamak Shvasa* is “*swatantra vyadhi*” having its own etiology, pathology and management. It is mentioned as “*Yapya vyadhi*” (Tripathi, 2011)

The word 'asthma' is derived from the Greek meaning 'panting' or 'laboured breathing'. Asthma is a condition characterized by a paroxysmal wheezing dyspnea (difficulty in breathing), mainly expiratory (Nagarajan and Naik, 1995). Asthma is the disease of the respiratory system in which the airways constrict, become inflamed, and are lined with excessive amounts of mucus, often in response to one or more "triggers," such as exposure to an increased industrialization, environmental stimulate (or allergen), cold air, exercise, or emotional stress (Homer, 2007).

Asthma is one of the most common chronic diseases in the world. It is estimated that around 300 million people in the world currently have asthma. In the global burden of asthma report of the Global Initiative for Asthma, the prevalence of asthma in different countries has been considered to range from 1% to 18% of the population. The prevalence of asthma increases as a community adopt modern life styles and become urbanised. With the proportion of the world's population living in urban areas projected to increase from 45 % to 59 % in 2015, there is likely to be a marked increase in the number of people with asthma worldwide over the next two decades. It is estimated that there may be as additional 100 million people with asthma by 2025 (Masoli M. *et al*, 2004).

Hundreds of herbal drugs are being screened at present for better therapeutics principle throughout the world. Herbal preparations have been cited as the third most popular complementary treatment modality. The therapeutic efficacy of herbal combination in asthma is due to multiple blocking and homeostasis of very complex and interdependent cellular and mediator networks supporting and involved in the inflammatory process of asthma whereas modern drugs are aimed at

blocking one mediator alone would be unlikely to have any significant effect on disease process (Gabrielian, *et. al.*, 2004). Almost all the traditional health care delivery systems claim effective management of asthma. Ayurveda has a strong scientific background, which was translated into recommendations for clinical management of this condition. (Tavhare and Nishteswar, 2014). In this study single herbal drug *Pushkarmool* are taken for review in the management of asthma.

### **HERBAL DRUG *PUSHKARMOOL* (*Inula racemosa*)**

*Pushkarmool* is an herbaceous perennial plant which belongs to family Asteraceae. According to *Aacharya Charaka* it is *shvasahara* and *Hikkanigrahana* dravya. The root of *Inula racemosa* is an effective traditional herbal medicine for bronchial asthma. In *Charak Samhita, sutrasthana*, ch-25 *Acharya Charka* considered the use of *pushkarmool* in the *shvasa* (Tripathi, 2004). *Bhavprakasha Nighantu*, *Dhanvantri Nighantu* and *Raj Nighantu* explain the properties of *Pushkarmool* in the management of *Shvasa*. *Pushkarmool* is a respiratory supports that smoothens the irritated bronchial tree. It is rejuvenative for lungs. It is useful in many conditions including inflammation, anorexia, cough, hiccough, cardiac and bronchial asthma, bronchitis, anaemia and general debility.

According to *Charaka* it is the drug of choice in *Hikka*, *Shvasa* and *Parshwashool*. *Pushkarmool* has anti-histaminic and a bronchodilator action that make it work in *Shvasa roga*. The root of *pushkarmool* is useful in all edematous condition and helpful in curing swelling and pain. The root of this drug is bitter, acrid, thermogenic, aromatic, stimulant, expectorant, bronchodilator (Pharmacologyonline.silae.it/files/archives/2009/vol-2/008). The chemical

constituents of root are inulin (10%), aromatic oil (1.3 %). Main alkaloid in oil is Alantolactone. Roots of *Inula racemosa* gave  $\beta$ -sitosterol, dancosterol, and iso-alantolactone (Girish, 2006).

In *Ayurveda* it is mainly used as bronchodilator and expectorant. *Pushkarmool* has *ushna virya* and *vatakaphahara* properties which is the main *dosha* in bronchial asthma. It can produce relaxation of bronchioles like adrenaline but action is less powerful and took a longer time to develop and also persisted for a longer period. In bronchial asthma the *srotodushti* is of *sanga* which is relieved by *ushna* and *shvasahara* property of drug. By these properties they break the pathogenesis of *Tamak Shvasa* and help in curing. *Pushkarmool* is mainly used in the form of *Churna* (Lokhande and Gawai, 2007).

Bronchial asthma is a reversible obstructive airway disease along with bronchial hyper responsiveness as prominent features. The main pathology includes airway obstruction, bronchial hyper responsiveness and chronic inflammation. The main *doshas* included are *vata* and *kapha*. The root of *Pushkarmool* is described in various *Ayurvedic classics* for the management of asthma. It is mainly used as bronchodilator and expectorant. Due to *kaphavatahara* properties it helps in balancing the disturbed *doshas* i.e. *vata* and *kapha* in bronchial asthma. It can produce relaxation of bronchioles like adrenaline but action is less powerful and took longer time. *Sanga* type of *srotodushti* in *Tamak Shvasa* is relieved by *ushna* and *shvasahara* properties of *Pushkarmool*. *Pushkarmool* has *katu* and *tikta rasa* which act on *kapha dosha* and help in restoring the function of *amashaya* which is the *adhishtana* of bronchial asthma. By these properties it helps in breaking the pathogenesis of asthma and help in management of asthma. *Pushkarmool* is already mentioned as

*shvasahara dravya* in *Raj Nighantu*, *Dhanvantri Nighantu*, *Charaka Samhita* which is (Khurana *et. al.*, 2015).

The alcoholic extract of the root of *Inula racemosa* is also protected against bronchi spasms induced by histamines, pollen, etc. The anti-asthmatic activity of the roots extracts of *I. racemosa* was evaluated by measuring the antagonistic effect on histamine induced contraction, milk induced eosinophilia, leukocytosis and protection against mast cell degranulation in wistar rats. Petroleum ether extract the plant at a dose of 4 mgmL<sup>-1</sup> (55.41 ± 3.04) and 10 mgmL<sup>-1</sup> (48.87 ± 1.36) exert significant antagonistic effect on histamine induced (1.6 µgmL<sup>-1</sup>) contraction as compared to its ethanol and aqueous extract. Milk-induced eosinophilia in mice of petroleum ether extract at a dose of 50 & 100 mgkg<sup>-1</sup>. Intraperitoneal (i.p.) was found to be 44.77% and 54.36% respectively as compared control group (43.1 ± 2.41). Similarly, dose dependent inhibition of petroleum ether extract at a dose of 50 and 100 mgkg<sup>-1</sup>, i.p. on milk induced leukocytosis (59.53% and 77.47%) supports the adaptogenic potential of the drug. Pre-treatment with petroleum ether extract at a dose of 100 mgkg<sup>-1</sup>, i.p. significantly offered protection (74.68%) against mast cell degranulation when compared with control group (Singh *et.al.*, 1980)

Gautam *et. al.*, 2009 also investigated the anti-asthmatic activity of *Inula racemosa* Hook. F. by using petroleum ether (60-80o), ethanol (95%), water extract of air dried roots of the plant obtained by successive extraction. Petroleum ether extract (PEEIR) at a dose of 4 mg/ml (55.41±3.04) and 10 mg/ml (48.87±1.36) exert significant antagonistic effect (p<0.05) on histamine induced (1.6µg/ml) contraction as compared to its ethanol and water extract. A dose dependent contraction was observed in goat tracheal chain preparation. Significant control of

milk-induced eosinophilia in mice was seen at a dose of 50 & 100mg/kg i.p. by petroleum ether extract (44.77 % & 54.36 % respectively) as compared control group (43.1±2.41). Same dose dependent inhibition of milk induced leukocytosis 59.53 % and 77.47% by petroleum ether extract supports the adaptogenic potential of drug. Challenge with clonidine induces mast cell degranulation in mice and clonidine- induced mast cell degranulation was inhibited by standard mast cell stabilizer disodium cromoglycate (DSCG 200µg/kg, i.p.) as 14±1.22 (83.57%) when compared with control group. Pre-treatment with petroleum ether extract at a dose of 100 mg/kg i.p significantly (p<0.05) offered 74.68% of protection against mast cell degranulation when compared with control group. Altering significantly (p<0.05) the capillary permeability as evident again from the optical density value by treatment group of petroleum ether extract at a highest dose of 100 mg/kg i.p (212±18.9) as compared to control group (602±27.8). Results thus obtained substantiate the potential role of herb in immunologically, physiologically and biochemically heterogeneous disorder, asthma and related conditions.

**Conclusion:** Plants are always an exemplary source of drugs; in fact many of the currently available drugs were derived either directly or indirectly from them. In the past decade, research has been focused on scientific evaluation of traditional drugs of plant origin for the treatment of various diseases. There are an increasing number of herbs that can be used to treat many of the precursor or chronic conditions of bronchial asthma. Many synthetic drugs are used to treat asthma, but they are not completely safe for long term use. Bronchial asthma is a reversible obstructive airway disease along with bronchial hyper responsiveness as prominent features. The main pathology

includes airway obstruction, bronchial hyper responsiveness and chronic inflammation. The root of *Pushkarmool* is described in various *Ayurvedic classics* for the management of asthma. It is mainly used as bronchodilator and expectorant. It can produce relaxation of bronchioles like adrenaline but action is less powerful and took longer time. *Sanga* type of *srotodushti* in *Tamak Shvasa* is relieved by *ushna* and *shvasahar* properties of *Pushkarmool*. *Pushkarmool* has *katu* and *tikta rasa* which act on *kapha dosha* and help in restoring the function of *amashaya* which is the *adhishtana* of bronchial asthma. By these properties it helps in breaking the pathogenesis of asthma and help in management of asthma. *Pushkarmool* is already mentioned as *shvasahara dravya* in *Raj Nighantu*, *Dhanvantri Nighantu*, *Charaka Samhita* which is now again proved by latest researches. Latest research explains the mast cell stabilizing activities, antibacterial and anti-asthmatic effect of root of *Inula racemosa*. So as a single herb *Pushkarmool* is very effective in the management of bronchial asthma.

#### REFERENCES:

- Sharma R. K., and Dash B. (2004) *Charaka Samhita*, Chaukhambha Prakashan, Sanskrit series, Varanasi; 4: 117-155.
- Tripathi (2011) *Charaka Samhita Chikitsasthana* Chaukhambha Prakashana, Varanasi; 614
- Nagarajan R. and Naik S. R. (1995) Recent Developments on Antiasthmatic agents – An Overview. *Indian Drugs*. 33(7): 303-315.
- Homer A. and Boushey M. D. (2007) *Drugs used in Asthma*. In *Basic and Clinical Pharmacology*, Edited by Bertram

G. Katzung, McGraw Hill LANGE. 10: 315-331.

Masoli M., Fabian D., Holt S. and Beasley R. (2004). The global burden of asthma: executive summary of the GINA Dissemination Committee Report. *Allergy* 2004; 59, 469-78.

Gabrielian E. S., Narimanian M. Z, Asianian G. (2004). A Placebo controlled double blind study with an Ayurvedic drug pulmoflex in bronchial asthma. *Phytomedica* .5, 45-9

Swagata T. and Nishteswar K. (2014). Role of *Deepaneeya and Shwashara Dashemani* in the Management of *Tamakashwasa w.s.r.* to Bronchial Asthma: a review. *International Journal of Ayurvedic Medicine*. 5(1), 11-22.

Tripathi (2004). *Charka Samhita*, Sutrasthana, Chaukhambha Prakashana, Varanasi : 338

[Pharmacologyonline.silae.it/files/archieves/2009/vol-2/008.Gautam.pdf](http://Pharmacologyonline.silae.it/files/archieves/2009/vol-2/008.Gautam.pdf) Dr.

Hemalatha- Shunthi Pushkarmuadi Yoga-Tamak Shvasa- childhood asthma- KB-2006- IPGT&RA, GAU, Jamnagar, cited in “Khurana P. , Singh A. and Saroch V. (2015). Role of Pushkarmool in the asthma management: a conceptual study. *J. Tradt Nat Med* 2015; 1(1): 10-12.

Lokhande P. D. and Gawai K. R. (2007). Antibacterial activity of isolated constitutes and extracts of root of *Inula racemosa*. *Research journal of medicinal plant*. 1(1), 7-12

Khurana P., Singh A. and Saroch V. (2015). Role of Pushkarmool in the asthma management : A conceptual study. *Journal of Traditional & Natural Medicines*.1(1).

Singh N., Nath R., Gupta V. and Kohli R. P. (1980). An experimental evaluation of anti-asthmatic potentialities of *Inula racemosa*, *Q. J. Crude Drug Res*. 18(2),89-96.

Gautam P.V., Ram S. G., Singhai A. K. And Somani R. S. (2009). Effect of *Inula racemosa* root extract on various aspects of asthma. *Pharmacologyonline*. 2, 84-94.