



A UNIQUE AMALGAMATION OF SALINE, TULSI, AND XYLITOL TO RELIEVE NASAL AND SINUS CONGESTION

Kanchan B Jangid¹, G Parthasarathy², Saji Jose³, Jayasekhar P⁴

¹Pharm D (Doctor of Pharmacy), Innovator and Pharmacology Specialist at BIBO (Hilt Brands India Pvt Ltd)

²HOD of Pharmacy Practice, The Oxford College of Pharmacy, Bangalore, Kamataka, India

³Proprietor at Advanced Herbal Remedies Research Laboratories, Director at Eubelle Global Ltd UK

⁴Former Professor & Chair of Pharmacy, National University of Science and Technology, Muscat, Sultanate of Oman

Corresponding Author: kanchan@bibo.health www.bibo.health

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ABSTRACT

Upper respiratory tract infections are a common cause of morbidity. They may include mild common cold and cough to chronic inflammatory conditions such as sinusitis. Using a saline solution to rinse the nasal cavity is an ancient practice. It helps to keep the nasal area moist and also flush the dust, pollutants, allergens, and microbes from the nasal and sinus cavity. Adding herbs like tulsi to a saline solution is known to reduce cough and cold symptoms at a faster rate. Also, xylitol acts against nasopharyngeal bacteria and reduces the chances of infections.

Key words: Saline, Saline solution, Nasal wash, Nasal irrigation, Tulsi, Xylitol, Upper respiratory tract infections

INTRODUCTION

Nasal mucosa not only helps to keep the nasal area moist but also acts as a protective layer. It prevents the entry of allergens, pollutants, and microbes deep into the nasal passages. ^[1] Many people have dry nasal mucosa without being aware of it. However, the

unequivocal definition of a dry nose is not available. The major causes of dry noses are low humidity (due to air-conditioning, and cold weather), dehydration, and dry air. ^[2] Upper respiratory tract infections including common cold, rhinitis, and rhinosinusitis are

common health conditions in all age groups, especially in children. Saline nasal irrigation (SNI) is an ancient practice that bathes the nasal and sinus cavity with saline solution. Saline solution is a safe, inexpensive, and effective way to manage the symptoms of upper respiratory conditions but is underutilized. It is found to be safe for both adults and children with no major side effects documented to date. [3] The saline solution helps moisten and removes dust, foreign particles, and microbes from the nasal cavity and promotes mucociliary clearance. [4-5] An isotonic saline solution is used in different ways such as a nasal spray, nasal drops, nasal rinse, and humidifier to moisten and irrigate the nasal cavity. [6] Various studies have shown a saline solution to irrigate the nasal and sinus cavity. [7-8] A study evaluated the effectiveness of isotonic saline application in children (n=401) to prevent the reoccurrence of cold and flu in winter. [9] Various studies have shown the effectiveness of saline irrigation in reducing nasal and sinus complications including the common cold, sinusitis, and nasal polyps. Different concentrations of saline solutions are used for nasal irrigation. [10-13]

A study reported the effectiveness and compliance of saline irrigation in pediatric patients with chronic rhinosinusitis and allergic rhinitis. Nasal saline irrigation is an effective and alternative treatment for children with allergic rhinitis who do not want or wish to use intranasal corticosteroids. [14]

Tulsi



Tulsi (*Ocimum sanctum*) belongs to the family *Lamiaceae*. It is known as "The Queen of Herbs" or "Mother Medicine of nature". Tulsi is effective

against anxiety, cough, asthma, fever, diarrhoea, and arthritis. [15]

In the Indian Materia Medica, the tulsi leaf extracts can effectively manage bronchitis, rheumatism, and pyrexia. Other therapeutic uses of tulsi include the treatment of asthma or dyspnea, epilepsy, hiccups, cough, inflammation, wounds, skin, and haematological diseases. [15-17]

The leaves and stems of this herb contain various phytochemicals such as carbohydrates (xylose and polysaccharides), saponins, flavonoids, triterpenoids, tannins, glycosides, and phenolic compounds. The phenolic compounds include rosmarinic acid, apigenin, cirsimartitin, isothymusin, and isothymonin which exhibit antioxidant and anti-inflammatory activities. The volatile oils present in the leaves of tulsi include eugenol, euginal, urosolic acid, carvacrol, linalool, limatrol, caryophyllene, and methyl carvicol. [16-17]

A study reported that the anti-inflammatory and antibacterial properties of different species of tulsi could be due to the presence of linoleic acid. [18-19]

Various *in-vitro*, animal, and human experiments have proved antimicrobial (including antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, and anthelmintic), anti-inflammatory, antioxidant, chemopreventive, hepato-protective, neuro-protective, mosquito repellent, cardio-protective, analgesic, antipyretic, anti-allergic, immunomodulatory, anti-asthmatic, anti-tussive and anti-ulcer properties. [20-21]

Various studies have shown inhaling tulsi to be more effective in reducing the symptoms of common cold and cough than taking steam inhalation with plain water. [22-23]

Xylitol



Xylitol is a 5- carbon-containing alcohol sugar. It is naturally present in some fruits, vegetables, and berries as well as synthesized from xylan-rich plant materials like birch and beechwood. This sugar alcohol is widely used as a sweetener and is non-carcinogenic. [24]

Various studies reveal xylitol reduces dental plaque and caries. [25-28] Studies have revealed that chewing gums containing xylitol reduced the salivary and plaque *S. mutans*. [26] Xylitol can act on the bacteria responsible for nasopharyngeal infections. An *in vitro* study on xylitol was conducted by adding 1% and 5% of xylitol to the medium containing α -hemolytic streptococci, including *S. pneumoniae*. Both 1% and 5% xylitol significantly reduced the growth of these bacteria by 35 and 72% respectively. [29] Xylitol in water is a well-tolerated agent for Sino nasal irrigation. Xylitol irrigations result in greater improvement of symptoms of chronic rhinosinusitis as compared to saline irrigation. [30]

CONCLUSION

A saline nasal spray is an effective and alternative treatment for people suffering from respiratory tract infections like the common cold, and sinusitis. It acts as an adjunct therapy to reduce the symptoms of respiratory conditions. Adding tulsi extracts and xylitol to a saline solution can be used as a nasal spray, nasal irrigation, and gargle. The combination of Tulsi extract and Xylitol in nasal applications can have synergistic antimicrobial action. Moreover, they have antioxidant and anti-inflammatory effects to reduce the inflammatory process in the nasal mucosa and sinuses.

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