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COMPREHENSIVE REVIEWOF *GRUHADHUMA TAILA NASYA* (NASAL DROP): A REMEDY FOR *NASA ARSHA* (NASAL POLYPOSIS)

Review article

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ABSTRACT

Gruhadhuma Taila (GT) is herbo-mineral oil indicated for *Nasa arsha* (nasal polyposis) which has an impact on health-related quality of life (HRQL). GT consists of seven ingredients viz. *Gruhadhuma*, Piper*longum* Linn., *Cedrusdeodare* (Roxb.) Loud., *Yavakshara*, *Hordeum vulgare* Linn., *Pongamiapinnata*Merr.,*Saindhavalavana* and *Achyranthes aspera* Linn.Objective of the study is to review the *Rasadipancaka*, phytochemistry and bio activities exerted by the ingredients of *Gruhadhuma Taila* to find the effectiveness theoretically. Data were composed from authentic Ayurveda, Modern and Traditional medicinal texts and authentic electronic databases as Google scholar, PubMed and MEDLINE. Retrieved data were tabulated and analysed by percentage by SPSS version 19.The ingredients of GT are responsible for pacifying vitiated *Kaphadosha* by *Katu rasa* (pungent) (38.5%), *Ushnavirya* (hot potency) (71.5%) and *Katuvipaka*(post digestion effect) (62.5%). *Vishada* (non - slimy) and *Sara* (mobile) *guna* are 5% each which are responsible for the potency of the drug.The herbal ingredients ofGT has important Ayurveda pharmacological properties as *Rasayana* (rejuvenation), *Arshoghna*(cure piles)and *Vishaghna* (anti toxic/antidote).Further the study revealed the presence of important secondary metabolites such as sesquiterpenes, tannins, phytosterols, phenol compounds and flavonoids which significantly reduce *Nasa arsha*. Further ingredients consist of bioactivities as anti-bacterial, anti-microbial and anti-tumour actions responsible for early clinical remission. Thus, GT is logically proved for the efficacy considering the pharmacodynamic and pharmacological attributes which should be clinically validated with large sample randomized control trials.

Key Words: Anti-microbial,*Arshoghna*,flavonoids, tannins, *Rasayana*, *Vishada*

INTRODUCTION: *Nasa arsha* (nasal polyposis)is a nasal disease with a global prevalence of 1–4%, usually occurring in the setting due to an underlying local or systemic disease[1].Nasal polyposis can occur at any age[2] and it can affect anyone, but it is more common among male adults with male-female ratio of 4:1[3]. The ancient Indian culture had an elementary knowledge of rhinology and they are the first to describe *Nasa arsha*, but the word 'polyp' was first used by Hippocrates which means many footed or feet[4].Nasal obstruction, anosmia, paroxysmal sneezing, watery nasal discharge and itching are the commonest clinical presentation of nasal polyposis[2].*Nasa arsha* is categorized under thirty one *Nasa*

roga (nasal diseases)where there is vitiation of *Twak* (skin), *Mamsa* (flesh) and *Medas* (adipose tissues)[5,6]. Due to the similarities of pathogenesis, clinical manifestation and prognosis *Nasa arsha* is correlated with nasal polyposis[7]. Nasal polyps can be successfully treated medically in a significant proportion of patients, thereby avoiding surgery[8].Surgical removal is performed for non-responders to medical management and the purpose of surgery is to restore the normal nasal physiology[9].But the treatment of choice according to modern Medicine is functional endoscopic sinus surgery (FESS) which is commonly practiced[10]. Statistical evidences show a significant increase of patients seeking herbal treatments in Sri Lanka for the management of nasal polyps due to the quick remission, safety and due to absence of recurrences. Today most nasal diseases including nasal polyposis are treated with anti-allergens, antibiotics and steroidal drugs where prolong use can lead to many adverse effects. Due to concerns about long-term systemic adverse effects, there is an increased demand for herbalmedicaments[11]. *Gruhadhuma Taila* (GT)[12]*nasya* is indicated for nasal polyposis in *Sharangadhara Samhita*: an authentic Ayurveda text. The drugs administered through the nostrils reaches *Shringatakamarma* (receptor cells of olfactory mucosa/ sensory receptors of Trigeminal nerve/ cavernous sinus) by *Nasa Srota* and spreads in the *Shirah* (head) as *Nasa* being the gateway to the *Shirah*.Thus an attempt was undertaken to overview the Ayurveda pharmacodynamics, phytochemistry and pharmacological actions exerted by chemical compounds of herbal and mineral ingredients of GT which is used in the management of nasal polyposis which will be a new pathway for Ayurveda treatments.

METHODOLOGY:

Selection of the formula

Formula of *GruhadhumaTaila* (GT) according to *Sharangadhara Samhita*[12]is tabulated in Table 1.

Table 1: Ingredients of *GruhadhumaTaila*[13,14,15,16,17,18,19,20]

Ingredients	**Family**	**English name**	**Local name**	**Sanskrit name/s**	**Part/s used**	**Quantity**
Gruhadhuma	-	Chimney Soot	*Viyandum bulu*	*Gruhadhuma, Amgaradhuma*	Ash	50 g
Piper longum Linn.	Piparaceae	long pepper	*Tippili*	*Pippali, Magadhi, Krishna, Capala, Tikshnatandula,Upakulya, Kana, Shyama*	Fruit	50 g
Cedrusdeodara (Roxb.)	Pinaceae	Deodar penusdeodara	*Devadara*	*Devadaru, Daru, Surahva, Mahadaru, Bhadradaru, Indradaru*	Bark	50 g
Yavakshara:	Poaceae	Potassiu	*Yavaksha*	*Yavakshara,*	Whol	50 g

Hordeum vulgare Linn.		m carbonate	*ra*	*Pakya, Yavaja, Yavashukaja, Yavahava,*	e plant	
Pongamiapinnata Merr.	Fabaceae	Indian beech	*Magul karanda*	*Karanja*	Seeds	50 g
Saindhavalavana	-	Rock salt/ Sodium chloride impura	*Sahindalu nu*	*Saindhava, Sindhu, Sindhutta, Nadeya, Sindhuja, Shiva*	Crystals	50 g
Achyranthes aspera Linn.	Amaranthaceae	Chaff tree	*Rat karalhaba*	*Apamarga, Shikari, Pratyakpushpi, Mayuraka*	Seed	50 g
Sesamum indicum Linn.	Pedaliaceae	Seasum oil/gingerly oil	*Thala tel*	*Tila, Homadhanya, Pavitra, Pitrutarpana, Papaghna*	Seed oil	1400 ml

Data collection: A comprehensive and related literature search approach was conducted utilizing authentic Ayurveda, Traditional medicinal texts, and databases such as Google scholar, Pub Med, MEDLINE, etc.The searching keywords such aspharmacological actions, chemical constituents, *Gruhadhuma*, etc. were used in combination with specific words to carry out the literature search. The retrieved data were tabulated and analysed by percentage by using SPSS version 19.

Data analysis: Retrieved data were tabulated and analysed by percentage by SPSS version 19.

RESULTS:

Ayurveda pharmacodynamic properties of GT

The drug action depends on the digestion, metabolism, absorption, biotransformation and excretion of the drug. These actions are mainly identified by the reviewed *Rasadipanchaka* or Ayurveda pharmacodynamic properties (Table 2).

Table 2: Ayurveda pharmacodynamic properties of ingredients of GT[13,14,15,16,17,18,19,20,21]

Ingredient	***Rasa* (taste)**	***Guna* (physical property)**	***Virya* (potency)**	***Vipaka* (post digestion effect)**
Gruhadhuma(Chimney soot)	-	-	-	-
Piper longum Linn.	*Madhura, Katu*	*Laghu, Snigdha, Tikshna (Ardra - Guru)*	*Ushna (Ardra – Sheeta)*	*Madhura*

Cedrusdeodara (Roxb.)	*Tikta, Katu*	*Laghu, Snigdha*	*Ushna*	*Katu*
Yava (*Hordeum vulgare* Linn.) *kshara* (Potassium compound)	*Katu*	*Tikshna, Laghu,Snigdha*	*Ushna*	*Katu*
*Pongamiapinnata*Merr.	*Katu, Tikta*	*Tikshna*	*Ushna*	*Katu*
Saindhava (Sodium chloride impure) (rock salt)	*Madhura*	*Snigdha, Laghu*	*Sheeta*	*Madhura*
Achyranthes aspera Linn.	*Tikta, Katu*	*Laghu,Tikshna, Sara*	*Ushna*	*Katu*
Sesamum inducum Linn.	*Madhura, Katu, Tikta, Kashaya*	*Guru,Snigdha Vikashi, Vishada, Sukshma, Vyavayi*	*Ushna*	*Madhura, Katu*

Ayurveda pharmacological attributes of GT : Herbal and mineral ingredients exerts special *Karma* (drug actions),special affinity to body tissues(*Doshaghnata*) and specific action on disease/s (*Rogaghnata*). Ayurveda pharmacological attributes of ingredients of GT are tabulated below[Table 3].

Table 3: Ayurveda pharmacological attributes of ingredients of GT[13,14,15,16,17,18,19,20,21,22,23]

Ingredient	***Doshaghnata* (effect on biological humors)**	***Rogaghnata* (therapeutics)**	***Karma* (action)**
Gruhadhuma	*Raktashodaka*	*Atisara, Vranashotha, Krimi*	*Grahi, Vishaghna*
Piper longum Linn.	*Tridoshashamaka, VataKaphanashaka (Ardra-Kaphavardhaka)*	*Arshas, Shwasa, Jvara, Kushtha, Shula, Udara, Pliharoga, Prameha, Gulma, Amavata, Chardi*	*Rasayana, Amadoshanashaka, Dipana, Vrishya*
Cedrusdeodara (Rox b.)	*VataKaphashamaka, Vatashamaka*	*Pinasa, Kasa, Shwasa, Hikka, Adhmana, Javara, Krimi, Kandu, Kushtha, Shopha, Dushtavrana, Prameha*	*Amadoshanashaka,Dipana, Kasahara*
Yavakshara	*VataKaphashamaka, Vitiate Pitta*	*Amadosha, Shula, Shwasa, Gala roga, Pandu, Arsha, Grahani, Gulma,*	*Vishadoshahara, Dipana*

		Anaha, Pleeharoga, Hridaroga, Udara roga, Ashmari, Mutra kruccra	
*Pongamiapinnata*Merr.	*Kaphashamaka, Pitta shamaka, Kaphavatahara*	*Yoni roga, Kushtha, Udavarta, Gulma, Arsha, Krimi, Shotha, Unmada, Pliharoga.Raktapitta, Upadamsha, Vrana, Vidradhi, Nadivrana, Vispota, Shiro roga, Prameha, Medoroga, Netra roga, Kesha roga, Visarpa, Kshudraroga, Urusthambha, Granthi*	*Shothahara, Bhedana Arshoghna, Kushthaghna, Kandughna, Dipana, Pacana, Krimighna, Grahi, Chardinigrahana, Medohara, Vranashodhana-ropana, Bhutaghna, Romasanjanana*
Saindhavalavana	*Tridoshashamaka*	*Hridaroga, Netra roga, Vrana, Vibandha*	*Dipana, Pacana, Vrishya, Chakshushya, Rocana, Avidahi,*
Achyranthes aspera Linn.	*Kaphashamaka, Kapha- Vatahara*	*Visuchika, Sidhma, Nidranasha, Arsha, Kandu, Udara, Vamana*	*Amadoshanashaka, Shirovirecana, Dipana, Pacana, Medohara, Raktagrahi*
Sesamum indicum Linn.	*Kapha Pitta shamaka, Vatahara*	*Vrana, Vatadosha,*	*Tvacya, Balya, Keshya, Sthanya, Grahi, Himasparsha*

Chemical constituents of plant ingredients present in GT: Herbs synthesize various secondary metabolites which makes easy to study the drug action/s in the body. Chemical constituents present in ingredients of GT are tabulated below [Table 4, 5,6,7,8,9,10, 11].

Table 4: Chemical constituents present in *Gruhadhuma*[23]

Ingredient	**Chemical constituents**
Gruhadhuma	Carbon

Table 5: Chemical constituents present in *Piper longum* Linn. [24]

Ingredient	**Chemical constituents**
	Essential oil, mono and sesquiterpenes, caryophyllene (mainly), piperine, piplartine, piperlongumine, piperlonguminine, pipernonaline,

	piperundecalidine, pipercide, sesamin, β- sitosterol

Table 6: Chemical constituents present in *Cedrusdeodara* (Roxb.) [25]

Ingredient	**Chemical constituents**			
	Seed oil	**Pine needles**	**heartwood**	**Leaves**
Cedrusdeodara (Roxb.)	Sesquiterpene, sesquiterpene alcohols	ethyl laurate, ethyl stearate, 3-beta-hydroxy-oleanolic acid methyl ester,9-hydroxy-dodecanoic acid,shikimic acid	Matairesinol, nortrachelogeni	flavonoids, alkaloids, tannins and saponins

Table 7: Chemical constituents present in *Hordeum vulgare* Linn. [26]

Ingredient	**Chemical constituents**
Hordeum vulgare Linn.	Phenolic acid, Flavonoids,Lignans,Tocols,Phytosterols, Folate

Table 8: Chemical constituents present in *Pongamiapinnata*Merr. [27]

Ingredient		**Chemical constituents**	
*Pongamiapinnata*Merr.	Pongapin, 3-methyloxypongapin, pongalabrone, kanjone, pongol, gamatin, lonchocarpin, isolonchocarpin, karanjachromene, porgachromene, isopongaflavone, pongomol, glabrin, ovalitenone, kanugin		

Table 9: Chemical constituents present in*Saindhava*[28]

Ingredient	**Chemical constituents**
	$NaCl$, KCl, $CaSO_4$, $CaCl_2$, $MgCl_2$, $NaHCO_3$

Table 10: Chemical constituents present in*Achyranthes aspera* Linn.[29]

Ingredient	**Chemical constituents**			
	Root	**Seed**	**Fruit**	**Whole plant**
Achyranthes aspera Linn.	Ecdysone, ecdysterone, inokosterone, oleanolic acid, glycoside	Saponin	Hentriacontane, saponins	Alkaloids, achyranthine, betaine

Table 11: Chemical constituents present in*Sesamum indicum* Linn. [30]

Ingredient	**Chemical constituents**			
Sesamum indicum Linn.	**Seed**	**Leaves**	**Plant**	**Flower**
	Neutral lipids, glycolipids and phospholipids (also in flower), isoleucine, leucine lysine, methionine, phenylalanine threonine, arginine, cystine, histidine, tryptophan, tyrosine, valine, alpha and beta globulins,	Pedalin	Pinoresinol, 3-H- furo furan, salicylate	Neutral lipids, glycolipidsand phospholipids

	folic acid			

Pharmacological actions of plant ingredients: The pharmacological actions of plants material and their active compounds are scientifically proven by various experiments and clinical trials. The pharmacological actions of the herbal ingredients of GT are tabulated below [Table No 12].

Table 12: Pharmacological actions of the ingredients of GT[23, 24,25,26, 27, 31]

Ingredient	Pharmacological actions
GruhadhumaTaila	Antidote
Piper longum Linn.	Immunomodulatory effect, stimulant, antiasthmatic, bio-availability enhancement, hepatoprotective, anti-inflammatory, anti amoebic, antibacterial
Cedrusdeodara (Roxb.)	Antibacterial, anti microbial, anti fungal, insecticidal, anxiolytic, anticonvulsant, neuroleptic, anti diabetic, ati oxidant, diuretic, anti-urolithiatic, anti spasmodic, anti-secretory, anti-ulcer, wound healing property, immunomodulatory, cyto toxic, anti allergic
Hordeum vulgare Linn.	Antioxidant, anti proliferative, anti cancer, anti coronary heart diseases, antitumor, antiviral, antibacterial, insecticidal, cancer suppression, promote apoptosis induction, anti inflammatory
PongamiapinnataMerr.	Antiseptic, antipyretic, analgesic, bronchitis, whooping cough, leprous sores, skin diseases, painful rheumatic joints, scabies, herpes, leukoderma, cutaneous diseases, antiseptic properties,hypertension
Saindhava	Laxative, improves appetite, skin protector, removes halitosis, rheumatic fever, nerve stimulant, relaxes mind and body
Achyranthes aspera Linn.	Diuretic, spasmolytic, hypoglycaemic, antimicrobial, antibiotic, antifungal, abortifacient, hypotensive, purgative, vasodilator, cardiac depressant, cardiac stimulant
Sesamum indicum Linn.	Astringent, decrease the digestive capacity, galactogouge, diuretic, appetizer, wound healing

DISCUSSION: Ayurveda pharmacological attributes are the gateway to identify the efficacy of a drug therapy. Focusing on Ayurveda pharmacodynamic properties of the ingredients, GTis responsible for pacifying vitiated *Tridosha*, *Rakta*, *Mamsa* and *Medasdatu* which are predominant in manifestation of the *Nasa arsha*, by *Katu*, *Tikta* (bitter)*rasa* and *Laghu*, *Snigdha* and *Tikshnaguna*. Further *Ushnavirya* (hot potency) (71.5%) and *Katuvipaka* (62.5%) were prominent exhibiting the pacification of provocated *Kaphadosha*. In order to produce desired action of a particular drug formula it should be absorbed quickly at the cell level and enter the micro channels of the body as a dynamic agent. For this purpose, it should be in appropriate concentration and form, at the site of action. *Vikashi*, *Vishada*, *Sukshma*, *Vyavayi* and *Sara guna* are 5% each which are responsible for the efficacy and the potency of the nasal drop through high absorptive capacity of the nasal mucosa.The results of the study indicate that the seven (07) herbo- mineral

ingredients of GT with *Tila Taila*, possess with the bio activities as *Rasayana* (rejuvenation), *Amadoshanashaka* (cure of diseases), *Vranashothahara* (anti-inflammatory), *Arshoghna* (cures piles), *Balya* (strength promoting) etc. The present study demonstrate that *Gruhadhuma*, *Piper longum* Linn., *Cedrusdeodara* (Roxb.), *Hordeum vulgare* Linn., *Pongamiapinnata*Merr., *Saindhava*, *Achyranthes aspera* Linn and *Sesamum indicum* Linn have the anti-microbial, anti-bacterial and anti-inflammatory properties mainly which suppresses the microbial growth with early microbial and clinical remission of the nasal infections. While *Cedrusdeodara* (Roxb.) has the anti-allergic property which too, inhibit the allergic reaction. The herbal ingredients have the property of anti-inflammatory which is beneficial in subsiding the features of inflammation such as redness, oedema, pain, nasal blockage, anosmia and other clinical features which hinder the health-related quality of life (HLQL).

The study reveals many secondary metabolites present in different parts of the plantswhich are important in the healing process, as the particular pharmacological properties are based on the active ingredient of the plant material as a drug, without isolating the active compounds.*Achyranthes aspera* Linn. contains Glycosides which significantly transfer fluid from tissues to the circulation, reducing oedema. *Cedrusdeodara* (Roxb.) contains Tannins which has the power of improving resistance to infections and act as a strong astringent reducing the excessive secretions. Also contains Phenol compounds which possess with anti-septic and anti-inflammatory properties. The anti-oxidant and free radical scavenging activities of secondary metabolites present in the herbal ingredients reduce the free radical induced oxidative stress, leading to healthiness of nasal mucosa. Further the Immunomodulatory activity of plant drugs exert the healthiness of the nasal mucosa. *Gruhadhuma* is a main ingredient of GT responsible in managing of various poisons according to Ayurveda. It is used in combination with other herbs which can be used internally as well as in *Nasya* preparations. As it is a carbon compound it binds with the poison and act as an antidote. The processing of chimney soot with other herbal and mineral drugs is used with *Tilataila* (sesame oil/gingerly oil) which also increase its anti-poisonous effect. The nasal drop formula contains *TilaTaila* as the *Sneha* of the preparation. *AcaryaSushruta* being a surgeon mainly specifies *Vranashodhana* and *Vranaropana* action of *Tila*. Sesame (*Sesamum indium* L.) is one of the herbal remedy described in ancient *Veda* literature for *Vranashodhana* and *Vranaropana* actions which is a need in the management of *Nasa arsha* (nasal polyposis).In nasal pathologies the topical application, should act accordingly to the site of manifestation of the disease. Thus, the ingredients of GT possess with the healing and rejuvenating properties for the healthiness of the nasal mucosa.

CONCLUSION: Hence it can be concluded that *GruhadhumaTaila* is an effective and potent herbo-mineral nasal drop in the management of *Nasa arsha* w.s.r. to nasal polyposis, by considering Ayurveda pharmacodynamic properties, phytochemicals and Ayurveda and modern pharmacological actions of the ingredients. Further large sample randomized

controlled trials are necessary to prove scientifically of the efficacy and safety of *GruhadhumaTaila* in the management of *Nasa arsha*.

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