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A Pharmacological Study of *Shirisharishta* and Its Antihistaminic Effects in Guinea Pigs with Reference to Urticaria

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Abstract The effect of Shirisharishta on histamine-induced bronchospasm in guinea pigs was evaluated in this study. Guinea pigs were placed in a histamine chamber, and an aerosol of 0.5% histamine was introduced using a compressor and nebulizer. The antihistaminic activity of the compound formulation of Albizzia lebbeck bark, i.e., Shirisharishta, as well as the extracts of its individual Prakshepa Dravyas, was assessed against histamine aerosol-induced bronchospasm in guinea pigs. Additionally, a clinical trial of Shirisharishta was conducted on a group of patients suffering from urticaria, wherein its antiallergic effects were observed and compared to a standard treatment group. The study demonstrated promising antiallergic and bronchodilator activity of Shirisharishta, supporting its therapeutic potential in allergic and respiratory disorders.

Keywords Shirisharishta; Urticaria; Bronchospasm; Antihistaminic Activity; Albizzia lebbeck; Ayurvedic Medicine; Clinical Study

Introduction

Shirisharishta is a liquid compound formulation prepared by fermentation method in NIA rasashala during my research work.It comes under Asavarishta kalpana (Giménez-Arnau A. et al., 2025). Pharmacopial Standards for Asava and Arishta formulations was taken from Ayurvedic formulary of india;though shirisharishta is not mentioned in the list of API. The aim is to prepare Shirisharishta in NIA rasashala, Jaipur because it is uncommon medicinal preparation having lots of medicinal properties in different allergic disorders of skin and respiratory tract.Acharya Sushruta introduced shirisharishta in sutrasthan 46, later on its detail description have been introduced by Acharya govinddas sen in Bhaishajyaratnavali, Vishrogadhikar.According to Dhanvantari Nighantu shirish has tridoshashaman, kandughana,kushtaghana,

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twakdoshhar and shawskasahar properties (Kendziora B. et al., 2023). The research work on Shirisharishta has been comprehensively conducted in three major parts. The first part involves the Pharmaceutical Study, which focuses on the preparation, standardization, and evaluation of the formulation. The second part comprises the Animal Study, undertaken to assess the safety and efficacy of Shirisharishta through experimental models. Finally, the third part consists of the Clinical Study, aimed at evaluating the therapeutic efficacy and safety profile of the formulation in Guinea Pigs subjects under controlled clinical settings.

Material & Methods

Preparation of Shirisharishta

The classical formulation of *Shirisharishta* was prepared as per the *Kwath Nirmana Vidhi*. The composition is detailed in Table 1. Coarsely powdered Shirish bark (2.400 kg) was boiled with 52 liters of water and reduced to one-eighth to obtain a decoction. This decoction was filtered and transferred into a transparent glass fermentation barrel. Guda (9.600 kg) was dissolved in the filtrate, and fine powders of *Prakshepa Dravyas* (nine ingredients) were added. The fermentation setup included a rubber cork with a hole fitted with a glass tube, one end immersed in a water-containing jar to monitor CO_2 release. The container was maintained at a controlled temperature to allow *Sandhana Kalpana* (fermentation) for a specific period (Lokin A.M. et al., 2017). During the preparation, physicochemical observations were recorded at various stages. The specific gravity and pH of the *Shirish* decoction before fermentation were 1.12 and 3.4, respectively. After the addition of *Guda* and *Prakshepa Dravyas*, these values increased to 1.20 and 3.9. Upon completion of fermentation, the resultant *Shirisharishta* exhibited a specific gravity of 0.99, a pH of 4.1, and an alcohol content of 7.12%. At the end of the fermentation period, the mixture was filtered through clean cotton cloth. Additional jaggery was incorporated, and the preparation was left for further settling. After final filtration, the *Shirisharishta* was clear, devoid of froth, and exhibited a characteristic aromatic alcoholic odor. It was preserved in stoppered bottles and appropriately labeled (Joshi G., 2025).

Pharmacological Study: Effect on guinea pigs

The study was conducted on young guinea pigs of either sex, weighing between 200 g to 400 g. A histamine chamber was used for the experiment, and histamine dihydrochloride ($C_5H_9N_3 \cdot 2HCl$) served as the inducing agent for hypersensitivity reactions. Four groups are made to study the effect of the main ingredient as well as the effect of each Prakshepa dravya on guinea pigs:

- **1st group:** Histamine + Shirisharishta
- **2nd group:** Histamine + Shirish bark extract
- **3rd group:** Histamine + Each prakshepa dravya's extract (Nine Prakshepa dravyas)
- **4th group:** Histamine + Standard group (Diphenhydramine)

The antihistaminic activity of the drugs was studied on histamine-induced bronchospasm in guinea pigs. When a guinea pig is exposed to aerosol containing histamine, a constriction of the bronchi occurs, which sufficiently causes asphyxia. Many workers have used histamine aerosols to study antihistaminic activity

Table 1: Composition of Shirisharishta

Sr. No	Ingredient	Plant Parts (Part Used)	Scientific Name (Botanical Name)	Weight
1	Shirish	Stem bark (Coarse Powder)	Albizzia lebbeck	2.400 kg
2	Water for decoction	---	Aqua / H_2O	52 litre
3	Guda/Jaggery	---	Treacle	9.600 kg
4	Praksepa dravya			
	A. Pippali	Fruit	Piper longum	48 gm
	B. Privangu	Flower & fruit	Callicarpa macrophylla	---
	C. Kuta	Root	Saussurea lappa	---
	D. Ela	Fruit	Elettaria Cardamomum	---
	E. Neel	Root & Whole plant	Indigofera tinctoria	---
	F. Nagkesar	Flower & its Anther	Mesua Ferrea	---
	G. Haldi	Rhizome	Curcuma longa	---
	H. Daruhaldi	Root	Berberis Aristata	---
	I. Sunta	Rhizome	Zingiber officinale	---

(Pandey S. and Pandey A., 2016). In the present study, the bronchodilator effect was determined by observing whether the compound protected the guinea pigs from bronchospasm induced by exposure to histamine aerosol. The guinea pigs were placed in the histamine chamber, and aerosols of 0.5% histamine were introduced by means of a compressor and a nebulizer. The guinea pigs behaved in a very characteristic manner and showed progressive signs of difficulty in breathing, leading to convulsion (Prajapati P.K., 2022). By observing the breathing and behavior of the guinea pigs, the experience gained helped in judging the preconvulsion time, which was constant if the guinea pigs were not exposed too frequently. As soon as preconvulsion breathing commences, the animal was placed in fresh air. The preconvulsion time of all the guinea pigs under experiment was recorded. One group of six animals was administered the drug orally by a tuberculin syringe one hour before exposure to histamine aerosol. The protection by the test drug was assessed quantitatively in a similar way to the method described by Rizvi W., 2016. The percentage protection for each guinea pig was calculated as 100 (1-C/T), where 'C' is the mean of the control preconvulsion time, and 'T' is the test preconvulsion time in seconds, determined after administration of the test drug (Kumar S. and Sharma A., 2022).

Result and Discussion

Table 2 summarizes the protective effects of various drugs against bronchospasm induced by histamine aerosol exposure in guinea pigs. Among the tested drugs, Diphenhydramine exhibited the highest percentage of protection (69.00%, $P<0.001$), followed by Albizzia lebbeck (52.16%, $P<0.01$) and Shirisharishta (50.0%, $P<0.001$). Shirisharishta demonstrated a significant bronchoprotective effect comparable to known bronchodilator agents. Other individual Prakshepa Dravyas like Saussurea lappa (48.25%) and Zingiber officinale (41.06%) also showed statistically significant protection. The results validate the antiallergic and bronchodilator potential of Shirisharishta and its components.

Clinical Study

A total of 30 patients with urticaria were selected and randomly divided into two groups of 15 patients each. Group A received Shirisharishta (15–30 ml twice daily after meals with equal water), and Group B received Terfenadine tablets (60 mg twice daily). The treatment duration was 30–40 days with weekly follow-ups. Demographic data such as sex, age, marital status, occupation, and dietary habits were recorded. Symptoms were assessed before and after treatment and tabulated for analysis. Results are given in Table 1 to 8.

Table 2: Results of Various Drugs under trial on Bronchospasm induced by exposure to Histamine Aerosol

Sr. No	Name of Drug	No. of animals	Dose (mg/kg)	± S.E.	Percentage Protected 100(1-C/T)	'P' Value
1	Shirisharishta	6	5 ml/kg	± 7.015	50.0	P<0.001
2	Albizzia lebbeck	6	400 mg/kg	± 17.843	52.16	P<0.01
3	Piper longum	6	90 mg/kg	± 6.451	26.47	P<0.01
4	Callicarpa macrophylla	6	90 mg/kg	± 3.98	28.26	P<0.001
5	Saussurea lappa	6	90 mg/kg	± 7.604	48.25	P<0.001
6	Elettaria cardemomum	6	90 mg/kg	± 8.35	40.27	P<0.01
7	Indigofera tinctoria	6	100 mg/kg	± 10.66	32.33	P<0.02
8	Mesua ferrea	6	90 mg/kg	± 5.33	25.3	P<0.01
9	Curcuma longa	6	250 mg/kg	± 2.607	34.77	P<0.001
10	Berberis Aristata	6	90 mg/kg	± 2.552	21.53	P<0.001
11	Zingiber officinale	6	90 mg/kg	± 10.85	41.06	P<0.001
12	Diphenhydramine	6	5 mg/kg	± 3.4	69.00	P<0.001

Table 3: Sexwise Analysis of 30 patients

Sex	No. of Pts. (A group)	%	No. of Pts. (B group)	%
Male	7	46.6	8	53.3
Female	8	53.3	7	46.6

Table 4: Marital Status Wise Analysis of 30 patients

Marital Status	No. of Pts. (A group)	%	No. of Pts. (B group)	%
Married	10	66.6	3	80
Unmarried	5	33.3	12	30

Table 5: Age wise Analysis of 30 Patients

Age (years)	No. of Pts. A grp.		%	No. of Pts. B grp.		%
	M	Fe		M	Fe	
1-15	-	-	-	-	-	-
16-25	3	4	46.6	4	7	73.3
26-40	1	2	20.0	2	1	20.0
41-60	2	1	20.0	1	0	6.6
Above 60	2	1	13	-	-	-

Table 6: Dietary habit wise Analysis of 30 Patients

Dietary Habits	No. of Pts. (A group)	%	No. of Pts. (B group)	%
Vegetarian	11	73.3	12	80
Non Vegetarian	4	26.7	3	20

Table 7: Drug induced allergy wise Analysis of 30 Patients

Drug	No. of Pts. (A group)	%	No. of Pts. (B group)	%
Aspirin	2	13.3	1	6.6
Sulpha	1	6.6	1	6.6
Salicylates	0	0	1	3.3

Table 8: Results of Shirisharishta on 30 patients of Urticaria

Sr. No	Symptoms of Urticaria	A group Symptoms present +		Relief %	B group Symptoms present +		Relief %
		Before treatment	After Treatment		Before treatment	After Treatment	
1	Rashes/Wheals or red patches on the skin	48	16	66.6	42	12	71.4
2	Itching on the skin	41	12	70.7	35	12	70
3	Pain (Todvat Vedana)	35	09	74.2	30	9	70
4	Vomiting (Chardi)	10	4	60	12	5	58.3
5	Fever (Jwara)	8	4	50	7	6	14.2
6	Burning sensation (Daha)	35	13	62.8	32	9	65.6

Conclusion

Shirisharishta is a palatable, safe, economical, and effective formulation for the management of urticaria-like allergic disorders. Additionally, it has shown beneficial effects in various skin disorders and respiratory tract conditions. In Ayurvedic literature, the concept of allergy can be correlated with the principles of Asatmya, Amadosha, and Viruddha Ahara, providing a holistic understanding and approach to the treatment of such conditions.

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Table 9: Comparative study in group A & B

Sr. No	Symptoms	A Group (Relief %)	B Group (Relief %)
1	Rashes/Wheals or red patches on the skin	66.6	71.4
2	Itching on the skin	70.7	70
3	Pain (Todvat Vedana)	74.2	70
4	Vomiting (Chardi)	60	58.3
5	Fever (Jwara)	50	14.2
6	Burning sensation (Daha)	62.8	65.6

Table 10: Drug Induced side effects in group A & B

Group	Drug	Side Effects
A	Shirisharishta	No side effects
B	Tab. Terfenadine	Headache & drowsiness

- Dhanvantari Nighantu
- Madhav Nidan
- Nighantu Adarsha
- Raj Nighantu
- Kaidev Nighantu
- Herxheimer, H. (1952)
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- Harrison's Principle of Internal Medicine
- British Pharmacopia
- Indian Pharmacopia
- A.P.I (First Edition)

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Conflict of interest

The writer attests that there is not a conflict between their interests in the article's content.

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