



PHARMACEUTICO ANALYTICAL STUDY ON GUNJA -ASHWAGANDHA DENTAL GEL – A MODIFIED FORMULATION FROM HARAMEKHALA

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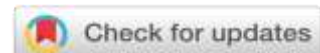
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ABSTRACT

Dental caries is a chronic infectious condition caused by tooth-adherent cariogenic bacteria, primarily *Streptococcus mutans*. A common oral disease hinders achieving and maintaining oral health in all age groups. Because of dental caries, teeth lose their strength and may form cavities if not controlled.

Ayurveda explains many *Krimighna Dravyas*, which will help provide a solution for all *Krimija Vyadhis*. *Haramekhala* is one of the ancient Ayurvedic texts written by Mahuka between the 6th and 11th centuries AD. This book explains different formulations for the diseases of oral cavities in the form of *Kavala*, *Gandoosha*, *Dhoopana* and *Danta Dhavana*. Chewing the roots of *Gunja* and *Ashwagandha* is mentioned in the text as an easy remedy to cure *Krimidanta*, thereby reducing the pain.

Many preparations, like toothpaste, powders, dental gels, etc., are used for curing dental diseases and prevention. Chewing the roots is not feasible for the patient and is not user-friendly. Hence, the formulation is modified into a dental gel form and subjected to an analytical study for product standardisation. The results of the drug design and product development and its analytical study are encouraging.

Keywords: *Haramekhala, Gunja, Ashwagandha, Dental caries, Dental gel.*

INTRODUCTION

The mouth is the window to health. Oral health is the foundation of total health, happiness, and quality of life. Those with a healthy mouth can eat, speak, and interact with others without experiencing any discomfort or shame. Oral disease has a subtle but extensive effect on people's daily lives, affecting their eating, sleeping, working and social duties. Dental conditions are likely to affect most people with these oral cavity diseases. The most common conditions include tooth decay and cavities.

Many preparations, like toothpaste, powders, dental gels, etc., cure and prevent dental diseases. All these products are chemically prepared and contain compounds such as hydrogen peroxide, sodium bicarbonate, sodium pyrophosphate, dioctyl sodium sulfosuccinate, sodium saccharin, etc. These chemicals may cause some side effects on general health². Oral or dental gel is the medicated gel used for dental diseases.

Haramekhala is one of the ancient Ayurvedic texts written by Mahuka between the 6th and 11th centuries AD³. This book explains different formulations for the diseases of Oral cavities in the form of *Kavala*, *Gandoosha* (Holding fluid inside the mouth), *Dhoopana* (fumigation) and *Danta Dhavana* (Brushing the teeth). One such reference is Charvana of roots of *Gunja* (*Abrus precatorius L.*) and *Ashwagandha* (*Withania somnifera (L.) Dunal*) for controlling dental caries⁴.

This procedure helps remove the *Danta Krimi* and reduce the pain caused by *Krimi* (germs).

Chewing the roots is not feasible for the patient and is not user-friendly. Hence, the present study is intended to modify the ancient method into a user-friendly herbal formulation with the least chemicals.

Gunja is a native plant of India subcontinent and the East & West Indies. Plant parts such as leaves, seeds, stems, and roots are used to treat different health issues. The standard functions of *Gunja*, as per Ayurveda are *Krimighna* (kills germs), *Kandughna* (reduces itching), *Shulaghna* (analgesics), *Kushtaghna* (cures skin diseases), *Vranahara* (cures

ulcers), *Chakshushya* (Good for eyes), *Shwasahara* (Anti asthmatic), and *Balya*⁵ (strength promoting activity).

Ashwagandha is another commonly used drug in Ayurveda. The roots of the plant are widely used as medicine. Sometimes, the leaves are also used. This has actions like *Krimighna*, *Rasayana*, *Shukrala*, *Kandughna*, *Vranahara*, *Balya*, *Vishaghna*, and *Shophahara* (anti-inflammatory)⁵.

Considering the above factors, *Gunja - Ashwagandha* dental gel is prepared, and its pharmaceutical-analytical studies are conducted.

Methodology:

This includes two steps.

1. Preparation of Gel with *Gunja* and *Ashwagandha* Roots.
2. Pharmaceutico-analytical study of the gel for its standardisation.

1. Preparation of the gel⁶.

The Raw drugs were collected and authenticated by the experts. Shodhana of the *Gunja* roots was done by doing Shoshana with *Musta Kwatha* as per the reference of Arogyaraksha Kalpadruma⁷. 200gm of *Gunja* roots were cleaned for physical impurities. They were immersed in 200ml of *Musta Kwatha* and kept under Sunlight for two days. Once the roots were completely dried, they were collected and used for the following procedure.

Preparation of Kashaya (decoction) of *Gunja* and *Ashwagandha*:

As per AFI, *Kashaya* is prepared with 100 grams each of *Shodhita Gunja* and *Ashwagandha*. 400ml of *Kashaya* is obtained.

Preparation of Gel:

The gel is prepared in 2 trials.

Carbopol 940 is mixed with the distilled water/*Kashaya*, stirred adequately, and swelled for 5 minutes. Propylene glycol is added to this mixture and mixed well. Triethylamine is added to adjust the pH to the pH of the oral cavity.

Trial 1

Sl no	Ingredients	Quantity
1	Carbopol 940	20gm
2	<i>Gunja Ashwagandha Kashaya</i>	25ml
3	Propylene glycol	80ml
4	Triethyl amine	15ml
5	Distilled water	200ml

Table 1: Ingredients of Trial 1

Trial 2		
1	Carbopol 940	20gm
2	<i>Gunja ashwagandha Kashaya</i>	200ml
3	Propylene glycol	80 ml
4	Triethyl amine	3 ml

Table 2: Ingredients of Trial 2

2. Analytical Study:

The analytical studies are conducted on parameters like Colour, Odour, pH, Density, Consistency, spreadability and Homogeneity to standardize the preparation.

pH: pH is determined with a digital pH meter. The gel's pH measurement is carried out using a digital pH meter by dipping the glass electrode completely into the gel to cover the electrode. The measurement is carried out in triplicate, and the average of the three readings is recorded.

Spreadability⁸: The spreadability of the gel is measured by spreading 0.5 g of the gel on a circle of 2 cm diameter pre-marked on a glass plate, and then a second glass plate is employed. Half a kilogram of weight is permitted to rest on the upper glass plate for 5 min. The circle's diameter after spreading the gel is determined by taking the average of 3 such trials.

Density⁹: The density of gel is measured by the mass of a certain amount of gel divided by the corresponding volume. 20 ml of water is taken in a glass measuring jar. 5 gm of gel is placed carefully. An increase in Volume is noted. The density of the gel is determined by mass per volume.

Results:

1) Pharmaceutical Study

Organoleptic Characteristics

Sl No	Parameters	Results
1	Appearance	Gel
2	Colour	Brown
3	Odour	Characteristic
4	Homogeneity	Homogenous
5	Consistency	Smooth and soft

Table 3: Results of organoleptic studies

2) Analytical Study

Sl No	Parameters	Results
1	pH	6.8
2	Spreadability	35 mm
3	Density	0.5gm/ml

Table 4: Results of the Analytical Study

DISCUSSION

Dental caries, which can be correlated to *Krimi Danta*, are common health problems of the oral cavity. Haremekhala is one of the ancient Ayurvedic classical texts that explains simple solutions to everyday problems.

Gunja has *Krimighna* action. Hence, it helps to cure and prevent dental caries. The *Balya* action of *Ashwagandha* will strengthen the tooth. In combination, it helps in curing and preventing dental caries.

Chewing the roots of *Gunja* and *Ashwagandha* is not convenient for regular usage. Hence, it is modified into gel form.

Gels are becoming popular nowadays. Due to their stability, they can offer a controlled release of the active ingredients compared to semisolid preparations like ointments, creams, pastes, etc. The gels can show enhanced absorption and enhance the therapeutic drug's bioavailability. These stability characteristics of gels over a prolonged duration offer scope for the benefit of the patients¹⁰.

Among the two trials, second trial is considered for the analytical study as the proportion of herbal ingredients is higher, and the physical parameters adhere to the gels. The prepared gel fulfils the analytical parameters of the herb-based dental gel. The product's antibacterial actions will help reveal the gel's action on dental caries. Once proved to be antimicrobial, it can be subjected to clinical studies.

CONCLUSION

The present study has explored a classical drug for dental diseases mentioned in Haremekhala. As the drugs are used in *Kashaya* form in the gel, this modified formulation adheres to Ayurvedic principles. The controlled release of the active principles in the gel will enhance the drug's bioavailability, which will

help in promising results in dental caries and associated complaints.

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PHOTOGRAPHS



Must have Kwatha



Shoshana of Gunja Roots



Ashwagandha roots



Prepared Gel



pH of the gel



Spreadability