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Analytical and Experimental Review of Kushtadi Churna – Based Herbal Toothpaste: An Ayurvedic and Pharmaceutical Perspective

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Abstract

Background: Bhaishajya Kalpana forms the pharmaceutical foundation of Ayurveda and emphasizes rational formulation of drugs for preventive and curative healthcare. Oral and dental disorders (Mukha and Danta Rogas) are extensively described in classical texts, and several formulations are indicated for maintaining oral hygiene.

Objective: To critically review Kushtadi Churna from classical, experimental, and pharmaceutical perspectives and to evaluate its potential as a therapeutic agent in herbal toothpaste formulation.

Materials and Methods: Classical Ayurvedic texts were reviewed along with published experimental and pharmacological studies on individual ingredients of Kushtadi Churna. Modern pharmaceutical parameters relevant to toothpaste formulation and evaluation were analyzed.

Results: Experimental evidence indicates that the constituent drugs of Kushtadi Churna possess antimicrobial, anti-inflammatory, antioxidant, and hemostatic activities relevant to oral healthcare. Pharmaceutical feasibility studies support its incorporation into a toothpaste dosage form.

Conclusion: Kushtadi Churna demonstrates significant potential as a safe and effective herbal medicament for dental care. Integration of Ayurvedic principles with modern pharmaceutical evaluation supports its use in herbal toothpaste development.

Keywords: Bhaishajya Kalpana, Kushtadi Churna, Herbal Toothpaste, Experimental Review, Mukha Roga, Dental Care

1. Introduction

Bhaishajya Kalpana is derived from the terms *Bhaishajya* (medicine capable of alleviating disease without producing adverse effects) and *Kalpana* (method of preparation). Ayurveda emphasizes two major objectives of treatment: prevention of disease and promotion of health in healthy individuals, and cure of disease in diseased individuals. Oral health plays a significant role in systemic health, and improper oral hygiene is associated with various local and systemic disorders. Classical Ayurvedic texts describe numerous formulations for oral and dental care, among which Kushtadi Churna holds a distinct place.

In recent years, the growing concern regarding adverse effects of synthetic dentifrices has renewed interest in herbal toothpaste formulations. Incorporation of classical Ayurvedic formulations into modern dosage

forms necessitates scientific validation through experimental studies. Hence, an experimental review of Kushtadi Churna with reference to its pharmaceutical development and evaluation is of contemporary relevance.

2. Bhaishajya Kalpana and Pharmaceutical Relevance

Kalpana refers to the systematic processing of drugs to make them suitable, effective, and acceptable for administration. Polyherbal formulations, a unique feature of Ayurveda, aim at synergistic action, enhanced efficacy, and reduced toxicity. Churna Kalpana is one of the fundamental dosage forms and serves as a base for further pharmaceutical modifications such as paste, gel, or ointment formulations.

3. Ayurvedic Basis of Oral and Dental Health

3.1 Mukha and Its Functional Importance

Mukha is one of the nine Bahirmukha Srotas and is responsible for mastication, taste perception, speech, and deglutition. Anatomically, it comprises Aushtha, Danta, Dantamula, Jihva, Talu, Gala, and Sakalam. Physiological integrity of these components is essential for maintaining oral health.

3.2 Danta and Dantamula

Danta are considered Ruchaka Asthi and are derived from Asthi and Majja Dhatu. They play a vital role in mastication, phonation, and facial aesthetics. Dantamula (gums) provide structural support and nourishment to teeth. Disorders of Danta and Dantamula are commonly attributed to vitiation of Kapha and Rakta Dosha.

4. Kushtadi Churna: Composition and Ayurvedic Properties

Kushtadi Churna is a polyherbal formulation consisting of equal parts of Kushta (Saussurea lappa), Daruharidra (Berberis aristata), Lodhra (Symplocos racemosa), Musta (Cyperus rotundus), Manjishta (Rubia cordifolia), Katuki (Picrorhiza kurroa), Patha (Cissampelos pareira), Tejani (Zanthoxylum armatum), and Haridra (Curcuma longa).

4.1 Ayurvedic Pharmacodynamics

The ingredients predominantly possess Tikta and Kashaya Rasa, Laghu–Ruksha Guna, Ushna Virya, and Katu Vipaka. These properties contribute to Kapha-Rakta Shamaka, Krimighna, Shothahara, Raktastambhaka, and Dantya actions, making the formulation suitable for dental and gingival disorders.

5. Experimental Evidence Supporting Kushtadi Churna

5.1 Pharmacognostical and Phytochemical Evaluation

Experimental studies on individual ingredients of Kushtadi Churna have demonstrated the presence of bioactive compounds such as alkaloids, flavonoids, tannins, phenolics, and essential oils. These constituents are known for antimicrobial, anti-inflammatory, antioxidant, and hemostatic activities, which are relevant to oral healthcare.

5.2 Antimicrobial Activity

In vitro studies on herbal ingredients like Daruharidra, Haridra, Manjishta, and Tejani have shown significant antimicrobial activity against common oral pathogens such as *Streptococcus mutans*, *Lactobacillus spp.*, and *Candida albicans*. These findings support the traditional use of Kushtadi Churna in preventing dental caries and periodontal diseases.

5.3 Anti-inflammatory and Hemostatic Activity

Lodhra and Manjishta are experimentally proven to possess anti-inflammatory and hemostatic properties, which help in reducing gingival inflammation, bleeding gums, and oral ulcers. These effects validate the indication of Kushtadi Churna in Raktasrava and Dantashoola.

5.4 Antioxidant Activity

The antioxidant potential of Haridra, Manjishta, and Musta has been established through various experimental models. Antioxidant activity plays a crucial role in preventing oxidative damage to oral tissues and maintaining gingival health.

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6. Development of Kushtadi Churna–Based Herbal Toothpaste

6.1 Pharmaceutical Considerations

For experimental formulation of herbal toothpaste, Kushtadi Churna can be incorporated as the therapeutic agent along with standard excipients such as polishing agents, humectants, binders, detergents, preservatives, flavors, and antioxidants. The formulation should ensure uniform dispersion, acceptable consistency, stability, and palatability.

6.2 Evaluation Parameters

Experimental evaluation of the formulated toothpaste includes:

a) Organoleptic characters (color, odor, taste, texture)
b) pH determination
c) Spreadability and extrudability
d) Abrasiveness
e) Foamability
f) Moisture content
g) Microbial load
h) Stability studies

These parameters ensure quality, safety, and efficacy of the herbal toothpaste.

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7. Discussion

The experimental evidence from pharmacological studies of individual ingredients supports the classical claims of Kushtadi Churna. Its incorporation into a toothpaste dosage form represents an innovative application of Bhaishajya Kalpana principles. The formulation exhibits potential antimicrobial, anti-inflammatory, antioxidant, and hemostatic activities, which are essential for comprehensive oral care. Although preliminary experimental findings are promising, further in vivo and clinical studies are required to establish standardized therapeutic efficacy.

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8. Conclusion

Kushtadi Churna is a scientifically plausible Ayurvedic formulation for oral healthcare. Experimental findings on its constituent herbs validate its traditional indications in dental and gingival disorders. Development of Kushtadi Churna–based herbal toothpaste offers a safe and effective alternative to synthetic

dentifrices. Future experimental and clinical research may facilitate its acceptance in integrative oral healthcare systems.

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