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A PHARMACEUTICO-ANALYTICAL EVALUATION OF DRAKSHARISHTA AND ITS MODIFIED ARKA WITH SPECIAL EMPHASIS ON ALCOHOL PERCENTAGE

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ABSTRACT

Bhaishajya Kalpana is a vital branch of Ayurveda that primarily deals with various pharmaceutical formulations and their therapeutic applications. Among these, *Sandhana Kalpana* (fermented preparations) holds significant importance due to its extended shelf life, enhanced absorption and improved efficacy. *Arishta* is a classical self-generated alcoholic preparation obtained through the natural fermentation of herbal decoctions. One such formulation *Draksharishta*, is one among the renowned polyherbal formulation traditionally prescribed for digestive impairments, respiratory disorders and general debility. The ***Pancha Vidha Kashaya Kalpana*** serves as the foundation for Ayurvedic pharmaceutical preparations. According to Ravana Arka Prakasha, the *Panchavidha Kashaya Kalpana* includes five primary forms of preparations: *Kalka* (paste), *Churna* (powder), *Rasa* (juice), *Taila* (medicated oil), and *Arka* (distillate).[2] *Arka Kalpana* refers to the process of extracting volatile oils and active principles through distillation. *Arka* preparations are more concentrated and potent compared to *Arishta*, as the distillation process removes excess water and enhances the bioavailability of active constituents. Moreover, the distillation technique reduces the risk of microbial contamination, ensuring greater purity and stability of the final product. Hence to assess comparative efficacy based on analytical parameters, *Draksharishta* has been reformulated into an *Arka* preparation.

KEYWORDS: *Draksharishta*, *Arka*, Distillation, *Sandhana Kalpana*, Alcohol percentage.

INTRODUCTION

Ayurveda, the ancient science of life, offers a diverse array of dosage forms that reflect both the depth of traditional knowledge and the ingenuity of its pharmacological practices. Among these, ***Sandhana Kalpana***[1] stands out as a unique secondary formulation that harnesses the power of natural fermentation. The term *Sandhana* denotes union or combination, signifying the process where herbal drugs are combined and allowed to ferment over a specified period. This traditional technique results in the self-generation of alcohol, which not only enhances the extraction of active constituents but also contributes to longer shelf life, rapid absorption and superior therapeutic efficacy.

Arka Kalpana is a notable yet comparatively less explored dosage form in Ayurveda. introduced in the classical text *Arka Prakasha* by Lankapati Ravana.[2] It is categorized under the *Panchavidha Kashaya Kalpana* and involves the distillation of herbal liquids to obtain their volatile and water-soluble constituents. The preparation of ***Draksharishta Arka***, using *Draksharishta* as the base, exemplifies *Drava Arka* (liquid-liquid distillation). This procedure is recognized for its comparative sterility, faster assimilation, pleasing palatability and Attractive appearance.

Given the therapeutic potential of these formulations, the present study aims to undertake a **pharmaceutical investigation of *Draksharishta* and its modified *Arka*** and an **analytical comparison** of both formulations, with a specific focus on **alcohol content.**

AIM AND OBJECTIVES

Aim: To perform a pharmaceutico-analytical study of classical *Draksharishta* and its modified *Arka* formulation, with a specific focus on the comparative evaluation of alcohol content, prepared using both fermentation and distillation techniques.

Objectives

- To prepare *Draksharishta* as per classical reference.
- To prepare *Draksharishta Arka* as per *Arka Kalpana*.
- To do a comparative analytical study with specific focus on alcohol content in *Draksharishta* and its *Arka*

MATERIALS AND METHODS

Material required: *Khalva Yantra*, Gas stove, kora cloth, weighing machine, stainless steel vessel, Spoon, Seive, Distillation apparatus, heating mantle, Clamp holder stand and collecting jar.

METHOD OF PREPARATION

I. Pharmaceutical study of *Draksharishta*

Draksharishta was prepared according to the classical reference from *Sharangadhara Samhita, Madhyama Khanda*, verses 10/69–73.

Table No. 1: Composition of formulation.

Particulars	Drug name	Latin name	Part used	Quantity
Kwatha Dravya	*Draksha*	*Vitis vinifera* Linn.	Fruit	600g
	Water	-	-	6 L
Madhura Dravya	*Guda*	-	-	2.4kg
Prakshepaka Dravya	*Twak*	*Cinnamomum zeylanicum* BI.	Stem bark	12g
	Sukshma Ela	*Elettaria cardamomum* L.	Seeds	12g
	Tejapatra	*Elettaria cardamomum*	Leaf	12g
	Nagakeshara	*Mesua ferrea* Linn.	Stamen	12g
	Priyangu Pushpa	*Callicarpa macrophylla* Vahl.	Flower	12g
	Maricha	*Piper nigrum* Linn.	Fruit	12g
	Pippali	*Piper longum* Linn.	Fruit	12g
	Vidanga	*Embelia ribes* Burm.f.	Fruit	12g
	Dhataki	*Woodfordia fruticose* Kurz.	Flower	12g

***Pūrva Karma* (Preliminary Procedures)**

Selection and Preparation of Fermentation Vessel (*Sandhāna Pātra*):

A suitable *Sandhāna Pātra* was selected based on classical guidelines. Proper *Pātra Saṃskāra* (vessel conditioning) was performed to ensure cleanliness and sterility.

Drākhṣā (dry grapes) – 600 g – were thoroughly cleaned and soaked in 6 L of water. The mixture was left undisturbed overnight for softening.

Pradhāna Karma (Main Procedure)

Preparation of *Kaṣhāya* (Decoction)

The soaked *Drākhṣā* were filtered and coarsely pounded using a *Khalvayantra*. The crushed material was then added to water in a large vessel and boiled over *Madhyama Agni* (moderate

heat). The decoction was reduced to one-fourth of the original volume (i.e., approximately 1.5L).

Addition of *Guda* and *Prakṣepaka Dravyas*

Guda (jaggery) was powdered and added to the warm decoction. The mixture was then filtered and transferred to a properly sanitized fermentation vessel. *Prakṣepaka Dravyas* (aromatic and digestive herbs) were added as per classical reference. The mouth of the vessel was tightly sealed using kore cloth (*Sandhi Bandhana*) and kept it for the fermentation.

Commenced on 27 march 2025

***Paścāt Karma* (Post-Procedures)**

Fermentation and Filtration

Signs of fermentation were observed during the process. Then *Sandhi Bandhan*a was carefully opened and complete fermentation was confirmed. The fermented liquid was filtered using a fine Kore cloth, yielding 2 liters of *Draksharishta* with characteristic aroma and clarity.

Commenced on 19 may 2025

Pharmaceutical results of *Draksharishta Arka*

Total quantity – *Kwatha* 1.5L, *Guda* 2.4kg

Final product – 2L

Total duration – 50 days

II. Pharmaceutical study of *Draksharishta Arka*

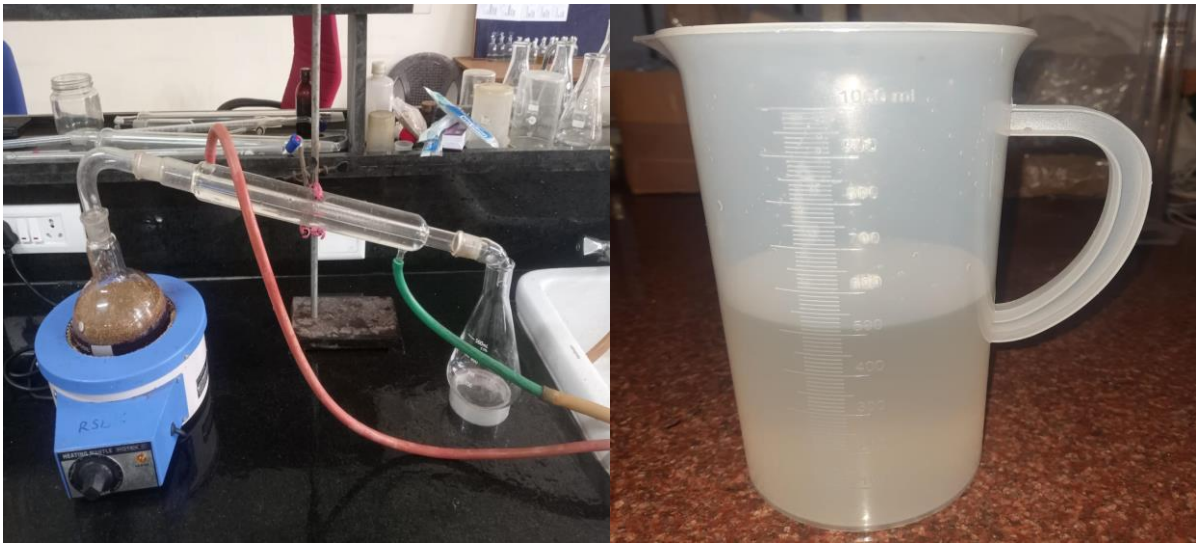
Requirements

Draksharishta – 1 L

To prepare ***Draksharishta Arka***, 1 litre of the prepared *Draksharishta* was taken in a distillation apparatus. After setting up the apparatus, heating was initiated at 70°C. Upon reaching the boiling point, the temperature was decreased to 60°C and held steady throughout the distillation process.

The initial few drops of the distillate were discarded, as they primarily consisted of steam and were unlikely to contain the essential active constituents of the formulation. Subsequently, 60% of the total volume was collected as distillate to avoid charring and degradation of the drug components.

Preparation of *Draksharishta*



Preparation of *Draksharishta Arka*

OBSERVATION AND RESULTS

Table No. 2: Organoleptic Characters of *Draksharishta* and its *Arka.*

Particulars	***Draksharishta***	***Draksharishta Arka***
Colour	Dark reddish liquid	Transparent
Consistency	Liquid	Liquid
Taste	Sweet Sharp Taste	Pungent Sharp taste
Odour	Alcoholic	Strong alcoholic

Pharmaceutical results of *Draksharishta Arka*

Total quantity taken – 1 litre

Quantity obtained – 600 ml

Total Duration – 6 hours

(Commenced on 19 May 2025)

ANALYTICAL STUDY

Table No. 3: The physico-chemical parameters of both the formulations.[3]

Parameter	*Draksharishta*	*Draksharishta Arka*
Clearance test	Particle seen	Clear
pH	3.9	3.26
Total soluble solids	32^0 Brix	4^0 Brix
Reducing sugar	242.11 ug/g	110.53 ug/g
Alcohol percentage	3.8%	21%

Determination of pH

DISCUSSION

The comparative analytical evaluation of *Draksharishta* and *Draksharishta Arka* revealed significant differences in their physicochemical profiles, notably in pH, total soluble solids (TSS), reducing sugar content and alcohol percentage.

Draksharishta has a pH of 3.9, while its modified *Arka* shows a more acidic pH of 3.26, suggesting a potential variation in therapeutic action. The moderate acidity of *Draksharishta* may support better gastrointestinal tolerance and digestive stimulation. In contrast, the increased acidity of *Arka* could enhance its antimicrobial and preservative effects. Such differences in pH may influence their suitability for specific clinical conditions, especially those involving digestion and microbial imbalance.

The Total Soluble Solids (TSS) of *Draksharishta* was observed to be 32° Brix, while that of *Draksharishta Arka* was significantly lower at 4° Brix. This marked difference is indicative of the rich presence of non-volatile phytoconstituents—including sugars, organic acids, tannins, and polyphenols—in the parent formulation. The low TSS in the *Arka* confirms the absence of most high-molecular-weight or non-volatile compounds, which are typically not transferred during steam distillation. This reflects the fundamental compositional distinction between fermented and distilled Ayurvedic preparations.

In terms of reducing sugar content, *Draksharishta* contained 242.11µg/g, whereas *Draksharishta Arka* showed 110.53 µg/g. The higher sugar content in *Draksharishta* may be attributed to the residual unfermented sugars and sugar-derived metabolites present after the natural fermentation process. Reducing sugars play a dual role: they contribute to the nutritive and tonic value of the formulation and also act as carriers enhancing the bioavailability of active phytoconstituents. The lower sugar content in the *Arka* aligns with its distillate nature, which concentrates only volatile principles while excluding heavier sugar molecules.

Interestingly, the alcohol content showed a reverse trend. While *Draksharishta* exhibited 3.8 % alcohol—a level consistent with natural fermentation—*Draksharishta Arka* showed a higher alcohol content of 21%. This increase can be attributed to the co-distillation and concentration of ethanol and other volatile alcohols from the parent formulation. During steam distillation, ethanol being volatile is distilled out and can accumulate in higher concentration in the *Arka*. However, such elevated alcohol levels may limit the suitability of *Arka* in certain populations such as pediatric, geriatric, or alcohol-sensitive individuals, despite its enhanced volatility-driven pharmacodynamics.

Collectively, these findings highlight that *Draksharishta* retains a broader spectrum of phytoconstituents, including both volatile and non-volatile components, making it more suited for general therapeutic use, especially where tonic, digestive, and rejuvenative effects are desired. In contrast, *Draksharishta Arka*, due to its higher alcohol content and lower solids and sugar, may be reserved for targeted applications requiring lighter, aromatic, and faster-acting interventions.

CONCLUSION

This comparative analysis of *Draksharishta* and its *Arka* reveals distinct physicochemical variations stemming from their respective preparation methods—fermentation and distillation. *Draksharishta* exhibits a milder acidity (pH 3.9), which may enhance its digestive properties, while the lower pH of *Draksharishta Arka* (3.26) suggests a stronger antimicrobial potential. These pH differences indicate varied therapeutic applicability. *Draksharishta*, with its higher Total Soluble Solids (32° Brix) and reducing sugar content (242.11 µg/g), retains a broad spectrum of non-volatile phytoconstituents, contributing to its nutritive, tonic, and therapeutic profile. In contrast, *Draksharishta Arka*, showing significantly lower TSS (4° Brix) and reducing sugars (110.53 µg/g), reflects the absence of

heavier constituents and a composition dominated by volatile components. Notably, its higher alcohol content (21%) results from the ethanol concentration achieved through distillation, which contributes to its preservative and pharmacological potency.

These findings establish the pharmaceutical divergence between *Arishta* and *Arka*, supporting their differential clinical applications. *Draksharishta* is preferable for general therapeutic use, especially where nutritive and restorative actions are desired, while ***Draksharishta Arka*** **may be better suited for individuals requiring sugar-restricted or lighter formulations.**

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