

### Review article

## “A Critical Review on *Arishta* and *Asava Kalpana*: Fermentation Science and Pharmacological Benefits”

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### ABSTRACT:

*Arishta* and *Asava* are highly sophisticated Ayurvedic fermented liquid formulations known for improving digestion, metabolism, and systemic functions. Their preparation involves controlled natural fermentation leading to the formation of self-generated ethanol, enhancing the extraction, preservation, and bioavailability of phytochemicals. This expanded review critically evaluates their classical basis, pharmaceutical principles, biochemical transformation during fermentation, pharmacokinetic advantages, therapeutic applications, and pharmacological evidence. Standardization issues and future prospects are also discussed with appropriate classical and modern reference.

**KEY WORDS:** *Arishta*, *Asava*, Ayurvedic fermentation, *Dhataki*, ethanol extraction, biotransformation, standardization.

### INTRODUCTION:

*Arishta* and *Asava* preparations represent one of the most advanced pharmaceutical contributions of Ayurveda. These formulations are detailed elaborately in *Sharangadhara Samhita*, *Bhaishajya Ratnavali*, *Charaka Samhita*, and *Sushruta Samhita* [1-4]. They are unique due to the presence of naturally generated alcohol, which acts both as a solvent and therapeutic component [5]. With the rising global interest in fermented nutraceuticals, *Arishta-Asava* are gaining attention due to their: [6]

- Rapid absorption
- longer shelf-life
- deeper tissue penetration
- Palatability
- wide therapeutic spectrum

Their underlying fermentation science aligns with modern microbial and pharmaceutical concepts, demonstrating the scientific insight of ancient Ayurvedic pharmaceuticals.

### 1. Classical View of *Arishta* and *Asava Kalpana*

#### 1.1 Definitions (*Sharangadhara*) [1]

- ***Asava*:** Prepared from fresh juice (*Swarasa*) or cold infusions without boiling.
- ***Arishta*:** Prepared from decoctions (*Kvatha*) by boiling and concentrating herbs. Both are fermented in airtight vessels for a prescribed time.

#### 1.2 Classical Rationale

Ayurveda states that fermentation enhances potency

(*Veerya*), improves absorption (*Grahi*), and preserves the formulation, highlighting the intelligent use of natural biotechnology.

### 1.3 Ingredients and their Classical Roles-

- 1) Primary Herbs** – Provide the main therapeutic action.
- 2) Jaggery/Sugar/Honey** – Serves as *Paka Dravya*, essential for fermentation.
- 3) *Dhataki* Flowers (*Woodfordia fruticosa*)** – Natural fermenter with yeast & lactobacilli [7].
- 4) *Prakshepa Dravya*** – Aromatics added post-decoction to enhance potency and flavor.
- 5) Water or Herb Juice** – Extraction medium.

### 1.4 Classical Ratio [1]

*Sharangadhara* prescribes drug: water: sugar ratio as **1: 16: 4** for standard formulations.

### 1.5 Fermentation Vessels

Classically, earthen pots (*Mridbhanda*) are recommended, lined with ghee or other substances to maintain temperature and promote microbial activity.

### 2. Pharmaceutical Principles Behind Fermentation

#### 2.1 Microbiology of *Dhataki Pushpa* [7]

Research shows that *Dhataki* flowers contain:

- *Saccharomyces cerevisiae* (yeast)
- Lactic acid bacteria
- Natural enzymes facilitating fermentation and breakdown of plant metabolites.

## 2.2 Modern Understanding of Fermentation in *Arishta-Asava* <sup>[8]</sup> Fermentation includes:

- **Glycolysis** → conversion of sugars to ethanol
- **Decarboxylation** → CO<sub>2</sub> release
- **Ester formation** → aroma & therapeutic compounds
- **Biotransformation** of inactive constituents into active forms

## 2.3 Biochemical Changes during Fermentation

- Increased levels of **phenolics, flavonoids, alkaloids, terpenoids**
- Formation of **esters & organic acids** improving taste & absorption
- Breakdown of glycosides → aglycones (more active)
- Reduction in microbial contamination due to ethanol generation (5–12%)

## 2.4 Factors Controlling Fermentation [9]

- **Temperature** (ideal 25–30°C)
- **Sugar** concentration
- **pH** (slightly acidic)
- **Seasonal variation** (winter requires longer fermentation)
- **Hygiene** and cleanliness

## 3. Pharmacokinetic Advantages

### Self-generated Ethanol as a Bioavailability Enhancer [8]

Natural ethanol improves:

- membrane permeability
- hepatic blood flow
- solubility of lipid-soluble compounds
- Mucosal absorption

this results in faster onset of action compared to decoctions.

### 3.2 Longer Shelf-Life

The alcohol and acidic pH inhibit pathogens, extending shelf-life up to several years [9].

### 3.3 Reduced Dose Requirement

Due to concentration and enhanced potency, *Arishta-Asava* require comparatively lower doses (12–24 ml) [1]

## 4. Therapeutic and Pharmacological Benefits

### 4.1 Gastrointestinal System

- **Abhayarishta**: Regulates bowel movement through mild laxative effects.
- **Pippalyasava**: Enhances digestion and appetite; used in malabsorption syndrome.
- **Drakshasava**: Excellent digestive and hepatoprotective action.

### 4.2 Metabolic & Hepatic Benefits

- **Punarnavasava**: Diuretic, hepatoprotective, anti-inflammatory; modern studies show nephroprotective properties [11].

- Improves liver enzymes and reduces fluid retention.

### 4.3 Postpartum & Gynaecology

- **Dashmoolarishta**: Restores strength, improves uterine involution, and balances *Vata dosha*.

### 4.4 Respiratory Health

- **Kumaryasava & Kanakasava**: Useful in asthma, chronic cough, and respiratory weakness.

### 4.5 Cardiovascular Benefits

Mild alcohol + antioxidants improve microcirculation and reduce oxidative stress [10].

### 4.6 Antioxidant & Immunomodulatory Activity

Modern studies show fermented products contain stronger antioxidant capacity due to enhanced polyphenols and organic acids [10, 12].

### 4.7 Microbiome Modulation

Recent research indicates that fermented herbal preparations may support gut microbiota balance, enhancing digestion and immunity [13].

## 5. Standardization and Quality Control Challenges

### 5.1 Alcohol Content Variability

Alcohol percentage varies based on sugar type, climatic conditions, and yeast viability [7,9].

### 5.2 Risk of Spoilage

If sanitation is poor, contaminants like fungi may develop; hence GMP certification is crucial [12].

### 5.3 Analytical Standardization

Modern tools recommended:

- HPLC for phytochemicals
- GC-MS for volatile constituents
- HPTLC fingerprinting
- Microbial load testing
- Alcohol estimation
- Organoleptic evaluation [14]

### 5.4 Regulatory Guidelines

AYUSH and WHO have clearly defined guidelines for the manufacturing, storage, packaging, and labeling of fermented formulations [14].

## 6. Safety Profile

These formulations are generally safe when used in prescribed doses.

### Use with caution in:

- children
- pregnancy
- liver disease
- Alcohol-intolerant patients possible mild adverse effects: gastritis, bloating if overdosed [5].

**DISCUSSION:**

The formulation principles of *Arishta–Asava* represent a remarkable example of Ayurvedic biotechnology, where natural fermentation improves extraction, potency, and stability of herbal drugs. The scientific basis of fermentation described in Ayurveda aligns with modern microbiological understanding.

However, standardization challenges remain, particularly variability of alcohol content and quality of traditional fermenters like *Dhataki*. Future research should focus on:

- microbial profiling of fermenters
- metabolomic analysis of fermentation products
- clinical trials for major formulations
- developing modern hygienic fermentation chambers

With these improvements, *Arishta–Asava* have strong potential to become globally recognized fermented medicinal products.

**CONCLUSION:**

*Arishta* and *Asava Kalpana* reflect the scientific brilliance of classical Ayurveda, combining traditional wisdom with natural biochemical processes. Their fermentation mechanism, pharmacokinetic advantages, and proven therapeutic benefits make them superior dosage forms in Ayurveda. Strengthening quality control, standardization, and clinical evidence will further enhance their global acceptance.

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