

# Formulation and Evaluation of Polyherbal Chyawanprash

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**Abstract** - Chyawanprash is a classical Ayurvedic polyherbal Rasayana formulation renowned for its rejuvenating, antioxidant, immunomodulatory, and general health-promoting properties.

Traditionally described across multiple Ayurvedic texts, the formulation is centered on *Phyllanthus emblica* (Amla) as the principal ingredient, combined with over forty botanicals including Dashamoola, Ashtavarga, Pippali, Ashwagandha, and Guduchi, processed with ghee, sesame oil, honey, and sugar as media. Contemporary research emphasizes integrating classical knowledge with scientific standardization, phytochemical profiling, and pharmacological evaluation to ensure quality, safety, and therapeutic efficacy.

In the present review, Chyawanprash was formulated using authenticated raw materials following classical Ayurvedic procedures, and subsequently evaluated using modern analytical techniques.

Physicochemical assessment demonstrated acceptable moisture content, pH, viscosity, and low levels of inorganic impurities, while organoleptic characteristics confirmed desirable color, taste, aroma, and texture. Preliminary phytochemical screening revealed the presence of phenolics, flavonoids, tannins, glycosides, saponins, steroids, and alkaloids, which contribute to its antioxidant and immunomodulatory potential.

Stability studies showed minimal variation in pH and a slight reduction in phenolic content over six months, further supported by extended 12-month and accelerated 90-day analyses. Antioxidant activity assessed using the DPPH assay exhibited a dose-dependent response, with an  $IC_{50}$  range of approximately 60–80  $\mu\text{g/mL}$ , indicating significant free-radical scavenging potential.

Overall, the findings substantiate that when prepared with standardized ingredients and appropriate processing methods, Chyawanprash maintains stable physicochemical properties, favorable palatability, and promising therapeutic attributes. This study underscores the importance of harmonizing traditional Ayurvedic principles with contemporary scientific validation to establish a reproducible

framework for evaluating polyherbal Rasayana formulations.

**Keywords:** Chyawanprash; Rasayana; Phytochemical screening; Standardization; Amla; Ayurvedic formulation; Antioxidant

## I. INTRODUCTION

Chyawanprash is a classical Ayurvedic Rasayana formulation first described in ancient texts including the Charaka Samhita and Ashtanga Hridaya. Traditionally consumed as an Avaleha (herbal jam), it is intended to enhance vitality, longevity, cognition, immunity, and overall wellness. The formulation contains over forty medicinal herbs, with *Phyllanthus emblica* (Amla) as the principal ingredient, processed using lipid and carbohydrate media such as ghee, sesame oil, honey, and sugar.

These nutrient carriers facilitate improved delivery and bioavailability of phytoconstituents, contributing to the formulation's immunomodulatory, antioxidant, anti-inflammatory, and adaptogenic properties.

Modern pharmacological investigations support the therapeutic utility of Chyawanprash, indicating benefits in strengthening respiratory health, enhancing antioxidant defense, regulating lipid metabolism, reducing oxidative stress, and improving immune response. Its biological activity is primarily attributed to phytochemicals such as vitamin C, flavonoids, tannins, phenolic compounds, glycosides, alkaloids, and minerals that modulate cellular pathways linked to metabolism, aging, oxidative damage, and immune regulation.

With the rising global demand for herbal nutraceuticals, standardization of traditional polyherbal formulations has become essential to ensure consistent safety, efficacy, and regulatory compliance. However, commercial variants of Chyawanprash often differ in herbal composition, raw material sourcing, processing methods, and

phytochemical concentrations, leading to variability in therapeutic outcomes. Therefore, systematic standardization incorporating physicochemical evaluation, phytochemical profiling, and quality assurance parameters is crucial for ensuring product uniformity and clinical reliability.

The present research aims to develop a standardized and reproducible formulation of Chyawanprash, followed by detailed physicochemical and phytochemical evaluation using laboratory-based analytical methods. This work integrates classical Ayurvedic principles with modern pharmaceutical techniques, supporting potential therapeutic, translational, and industrial applications.

Standardization and evaluation include parameters such as:

Physicochemical analysis: moisture content, ash value, viscosity, pH

Organoleptic properties: color, taste, odour, texture

Phytochemical screening: flavonoids, tannins, glycosides, steroids, alkaloids, phenolics

By adopting an integrated approach that combines traditional knowledge with scientific validation, this review highlights the importance of establishing quality benchmarks for Chyawanprash to ensure its safety, stability, and therapeutic effectiveness.

**1. Introduction to Ayurveda and Rasayana Therapy**  
Ayurveda, the "Science of Life," is one of the world's oldest holistic healing systems, originating in India over 3,000 years ago. It is based on the belief that health and wellness depend on a delicate balance between the mind, body, and spirit. Within the vast compendium of Ayurvedic literature, the concept of Rasayana stands out as a specialized branch dedicated to rejuvenation, longevity, and the enhancement of vital energy

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**2. History and Significance of Chyawanprash**

The formulation of Chyawanprash finds its roots in the ancient Vedic period. According to the *Charaka Samhita*, the first-ever formal record of internal medicine, this "Lehya" (electuary) was specifically prepared by the twin celestial physicians, the Ashwini Kumaras, to restore youth and vitality to the aged Sage Chyavana.

Modern scientific investigations have validated these ancient claims, revealing that the consumption of such herbal foods is clearly linked with reduced risk of chronic diseases. With the increasing global awareness of nutritional importance, Chyawanprash has transitioned from a traditional remedy to a globally recognized "functional food" that provides taste, satisfaction, and disease prevention.

### 3. The Role of Polyherbal Formulations

A polyherbal formulation is a unique pharmaceutical concept where multiple herbs are combined in a specific ratio to achieve a synergistic effect. In the case of Chyawanprash, the formulation typically involves over 40-50 ingredients, with Amla (*Emblica officinalis*) serving as the base.

The significance of using a polyherbal approach includes:

**Synergy:** The bioactive compounds from various herbs like Ashwagandha, Tulsi, and Giloy work together to enhance antioxidant capacity and immunomodulatory effects.

**Toxicity Neutralization:** Certain ingredients help minimize the potential adverse effects that might arise from high doses of a single herb.

**Comprehensive Delivery:** These formulations provide a convenient delivery system for minerals, vitamins, and phytochemicals in a single dosage form.

### 4. Phytochemical and Nutritional Importance

Vegetables and fruits used in herbal formulations are the richest sources of vitamins, carbohydrates, and minerals. Most vitamins are essential organic substances required in small amounts for body functioning. For example:

**Vitamin C:** Abundant in Amla and citrus, it is vital for immune support and preventing diseases like scurvy.

**Antioxidants:** Herbs like Turmeric and Cinnamon are rich in polyphenols, flavonoids, and catechins. These compounds protect the body against free radicals that cause cell damage, aging, and heart disease.

**Minerals:** Underground herbs and ingredients like Jaggery provide calcium, magnesium, and phosphorus, which support bone health and metabolism.

## 5. Contemporary Need and Scope of the Project

In recent years, the demand for nutraceuticals has increased significantly due to rising health awareness and the limitations of synthetic supplements. Consumers are now seeking natural products that can:

**Boost Immunity:** Especially in the post-pandemic era, there is a focus on adaptogens like Ashwagandha and Tulsi that improve body resistance against diseases.

**Reduce Oxidative Stress:** Modern lifestyles lead to high levels of oxidative stress, which is a major cause of fatigue and chronic disorders.

**Improve Patient Compliance:** While tablets and capsules may be disliked, a palatable herbal paste (Lehya) like Chyawanprash offers ease of administration for all age groups, including children and the elderly.

## 6. Significance of the Project:

This project focuses on the formulation and evaluation of a Polyherbal Chyawanprash to provide a safe, natural alternative to synthetic multivitamin supplements. By evaluating parameters such as pH, stability, and antioxidant activity, we aim to ensure a high-quality nutraceutical product that contributes to improved immunity and overall energy levels.

## II. FUNCTIONS

### 1. Immune-Strengthening Function

Chyawanprash enhances immune competence by modulating both innate and adaptive immune mechanisms. It activates macrophages, improves phagocytic activity, and promotes antibody synthesis, thereby strengthening immunological memory and resistance to infections. The

formulation regulates immune signaling by down-modulating pro-inflammatory cytokines such as  $\text{TNF-}\alpha$ ,  $\text{IL-1}\beta$ , and  $\text{IL-6}$  while enhancing anti-inflammatory mediators like  $\text{IL-10}$ , contributing to a balanced host defense. Additionally, the antioxidant-rich herbal components safeguard immune cells from oxidative damage, ultimately reducing the risk of seasonal and recurrent infections.

### 2. Respiratory System Support

The formulation acts as an effective respiratory tonic due to its bronchodilatory, mucolytic, and expectorant properties. It improves mucociliary clearance, reduces airway inflammation, and provides relief from cough, congestion, and allergic respiratory conditions. Its antioxidant constituents protect pulmonary tissues from pollution- and toxin-induced oxidative stress while improving oxygen utilization and respiratory efficiency. Collectively, these actions support enhanced lung function and respiratory endurance.

### 3. Antioxidant and Anti-Aging Function

Chyawanprash is rich in antioxidants such as vitamin C, polyphenols, flavonoids, and tannins, which help neutralize free radicals and mitigate oxidative damage. It enhances the activity of endogenous antioxidant enzymes—including superoxide dismutase, catalase, and glutathione—thereby preserving cellular integrity and promoting tissue repair. By reducing molecular degradation and oxidative stress, the formulation slows age-associated decline, protects DNA and vital organs, and supports long-term rejuvenation and vitality.

### 4. Metabolic and Anti-Diabetic Function

The formulation contributes to metabolic regulation by improving insulin sensitivity, enhancing glucose uptake, and stabilizing post-prandial blood sugar levels. Its antioxidant properties protect pancreatic  $\beta$ -cells from oxidative and inflammatory damage, reducing metabolic stress and glycation. These functions help prevent and manage lifestyle-related disorders such as diabetes, obesity, and metabolic syndrome. Furthermore, modified low-glycemic or sugar-free formulations increase suitability for diabetic populations.

#### 5. Cardioprotective and Lipid-Regulating Effects

Chyawanprash contributes to cardiovascular health by reducing LDL cholesterol and triglycerides while helping to elevate HDL levels. It strengthens endothelial function and supports efficient blood circulation, thereby enhancing overall heart performance. The formulation also protects myocardial tissues from ischemic and oxidative damage and lowers the risk of atherosclerosis by preventing plaque formation. Additionally, it contains naturally cardiogenic compounds derived from Terminalia species and aromatic spices, which further support heart health.

#### 6. Neuroprotective, Cognitive, and Adaptogenic Benefits

Chyawanprash helps modulate the HPA axis, reducing stress-induced hormonal imbalances and limiting excessive cortisol levels. It enhances memory, mental clarity, learning ability, and overall cognitive processing. The formulation also supports mitochondrial function and protects neurons from oxidative degeneration, contributing to long-term brain health. Additionally, it promotes restful sleep while combating both physical and mental fatigue. Through these combined neuroprotective actions, Chyawanprash may help reduce the risk or slow the progression of neurodegenerative disorders.

#### 7. Digestive and Hepatic Health Advantages

Chyawanprash enhances digestive enzyme secretion, improves nutrient assimilation, and supports healthy gastrointestinal motility. Its natural prebiotic constituents positively influence gut microbiota, contributing to better digestive balance. The formulation also protects liver cells from chemical, alcohol-induced, and oxidative damage while promoting bile secretion and supporting the body's natural detoxification pathways. By strengthening *agni* (digestive capacity), it helps reduce the formation of toxic metabolic by-products (*ama*), thereby promoting overall digestive and metabolic health.

#### 8. Anti-Inflammatory and Antimicrobial Properties

Chyawanprash helps reduce chronic inflammation by inhibiting key pathways such as NF- $\kappa$ B and COX-2. It also exhibits broad-spectrum antimicrobial activity, including antiviral,

antibacterial, and antifungal effects. The formulation inhibits microbial biofilm formation and prevents pathogen colonization, enhancing overall host defense.

Additionally, by controlling inflammatory responses, it helps lower the risk of lifestyle-related inflammatory disorders such as arthritis, metabolic syndrome, and diabetes.

#### 9. Reproductive and Endocrine Advantages

Chyawanprash supports fertility, reproductive vitality, and overall hormonal balance. Its adaptogenic herbs, such as Shatavari and Ashwagandha, help regulate endocrine function and maintain physiological harmony. The formulation protects reproductive tissues from oxidative and inflammatory stress while improving circulation, stamina, libido, and general reproductive wellness in both males and females.

### III. ADVANTAGES

#### 1. Immune-Strengthening Advantages

Chyawanprash enhances overall immunity by strengthening both innate and adaptive immune responses. It stimulates macrophage activity, thereby increasing phagocytic efficiency, and promotes the synthesis of key antibodies such as IgG and IgM, which support long-term immunological memory. The formulation also helps regulate cytokine balance by suppressing pro-inflammatory mediators like TNF- $\alpha$ , IL-1 $\beta$ , and IL-6 while boosting anti-inflammatory cytokines such as IL-10. As a result, it reduces susceptibility to recurrent seasonal and respiratory infections. Additionally, Chyawanprash protects immune cells from oxidative stress, improving their resilience and supporting optimal immune function.

#### 2. Respiratory and Pulmonary Health Benefits

Chyawanprash exhibits bronchodilatory, expectorant, and mucolytic properties that help ease breathing and clear respiratory passages. It enhances mucociliary activity while reducing airway inflammation, thereby supporting smoother respiratory function. The formulation effectively mitigates chronic cough, allergic reactions, and irritation of the respiratory tract. It also offers protection against lung damage caused by pollutants and toxins. Additionally, Chyawanprash strengthens pulmonary tissues and improves oxygen uptake and utilization, contributing to overall

respiratory health.

### 3. Antioxidant and Anti-Aging Benefits

Chyawanprash is a rich source of natural antioxidants such as flavonoids, tannins, polyphenols, and vitamin C, which work together to neutralize free radicals and reduce oxidative stress. It enhances the body's own antioxidant defenses, including superoxide dismutase, catalase, and glutathione systems, thereby supporting cellular protection. These actions promote cellular regeneration and help delay age-related physiological decline. Additionally, Chyawanprash prevents oxidative damage to vital biomolecules, organs, and genetic material, contributing to overall health and longevity.

### 4. Metabolic and Anti-Diabetic Advantages

Chyawanprash helps improve insulin sensitivity and enhances peripheral glucose uptake, contributing to better metabolic balance. It supports the regulation of post-prandial glycemic response and protects pancreatic  $\beta$ -cells from oxidative and inflammatory damage.

Additionally, it reduces glycation stress and metabolic inflammation, promoting healthier glucose metabolism. Sugar-controlled or low-glycemic formulations of Chyawanprash are also available, making them suitable for individuals with diabetes.

### 5. Cardiovascular and Lipid-Regulating Function

Chyawanprash supports cardiovascular health by reducing low-density lipoproteins and triglycerides while elevating high-density lipoproteins. It enhances endothelial integrity, improves circulation, and protects myocardial tissue from oxidative and ischemic injury. By preventing lipid peroxidation and plaque formation, it reduces the risk of atherosclerosis and related cardiovascular diseases. Natural cardiogenic constituents from Terminalia species and aromatic botanicals further reinforce vascular strength and cardiac performance.

### 6. Neurocognitive and Adaptogenic Function

The formulation exhibits notable adaptogenic and neuroprotective effects through modulation of the hypothalamic-pituitary-adrenal axis, thereby reducing cortisol levels and enhancing stress resilience. It improves memory, concentration,

and cognitive performance while antioxidants protect neural cells from oxidative degeneration.

Enhanced mitochondrial function contributes to reduced fatigue and improved mental stability. These cumulative effects may help prevent or delay neurodegenerative conditions and cognitive decline.

### 7. Digestive and Hepatic Function

Chyawanprash supports gastrointestinal health by stimulating digestive secretions, enhancing nutrient absorption, and regulating intestinal motility. Its natural prebiotic components help maintain a balanced gut microbiota, which is essential for immunity and metabolic homeostasis. The presence of hepatoprotective herbs shields liver tissue from oxidative, chemical, and drug-induced injury while promoting bile secretion and detoxification processes. These actions strengthen digestive fire (agni) and help prevent toxin accumulation (ama) within the system.

### 8. Anti-Inflammatory and Antimicrobial Function

The formulation demonstrates broad-spectrum antimicrobial properties against bacterial, viral, fungal, and parasitic pathogens due to its diverse phytoconstituents. Concurrently, it reduces chronic inflammation through inhibition of pathways such as NF- $\kappa$ B and COX-2, preventing tissue degeneration and inflammatory disease progression. These combined effects help reduce risks associated with arthritis, metabolic disorders, autoimmune imbalance, and persistent infections.

### 9. Reproductive and Endocrine Support

Chyawanprash enhances reproductive health by improving circulation, hormonal balance, and cellular defense within reproductive tissues. Adaptogenic herbs such as Shatavari and Ashwagandha regulate endocrine activity, supporting fertility, libido, stamina, and overall reproductive wellness in both males and females.

## IV. LITERATURE REVIEW

### 1. Pharmacological and Nutritional Evaluation of Chyawanprash (2019)

A study published in the Journal of Ayurveda & Integrative Medicine reported significant antioxidant and immunomodulatory properties of Chyawanprash. Regular consumption demonstrated

improvements in haemoglobin levels, appetite, and overall physiological wellbeing among human volunteers, reinforcing its role as a nutritional and therapeutic supplement.

## 2. Standardization Techniques for Herbal Avaleha Preparations (2021)

A review published in the International Journal of Herbal Medicine emphasized essential standardization parameters for herbal Avaleha formulations, including pH, viscosity, moisture content, sugar concentration, and microbial load. The authors proposed analytical methods and acceptable limits that are directly applicable to ensuring quality and consistency in Chyawanprash preparations.

## 3. Role of Phyllanthus emblica in Rasayana Therapy (2018)

An article in the Asian Pacific Journal of Tropical Biomedicine highlighted the immunomodulatory, antioxidant, and hepatoprotective properties of Phyllanthus emblica (Amla), the principal ingredient of Chyawanprash. Key bioactive constituents such as vitamin C, gallic acid, and ellagic acid were identified as major contributors to its Rasayana activity.

## 4. Synergistic Effects of Polyherbal Rejuvenative Formulations (2020)

A review published in the Journal of Ethnopharmacology discussed the synergistic pharmacological effects of combining Rasayana herbs such as Amla, Ashwagandha, and Pippali. The study found that polyherbal combinations often exhibit enhanced antioxidant and adaptogenic activity compared to individual herbs administered separately.

## 5. Evaluation of Classical Avaleha Preparations Using Modern Parameters (2017)

Research comparing traditional and modified processing techniques for herbal Avaleha formulations demonstrated that controlled heating practices and careful post-processing addition of honey preserve thermolabile constituents, particularly vitamin C. These findings support evidence-based optimization of Chyawanprash preparation techniques.

## 6. Clinical Significance of Chyawanprash in Respiratory Immunity (2022)

A clinical investigation published in the Journal of Herbal Therapeutics showed that daily intake of Chyawanprash enhanced pulmonary function and decreased the occurrence of recurrent respiratory infections. The findings validate traditional claims regarding its role in strengthening respiratory immunity.

## 7. Stability Studies of Polyherbal Rasayana Formulations (2019)

A study in the Indian Journal of Pharmaceutical Sciences examined the influence of storage conditions on the stability of Rasayana formulations. Variables such as moisture content, microbial load, and active constituent degradation were evaluated, highlighting the need for controlled environmental conditions to maintain product efficacy and safety.

## 8. Comparative Study of Marketed Chyawanprash Formulations (2021)

This comparative analysis of commercial Chyawanprash brands reported significant variability in vitamin C content, sweetness levels, herbal concentration, and viscosity. Products with higher Amla content exhibited stronger antioxidant activity, underscoring the importance of ingredient proportion in determining therapeutic potency.

## V. AIM AND OBJECTIVE

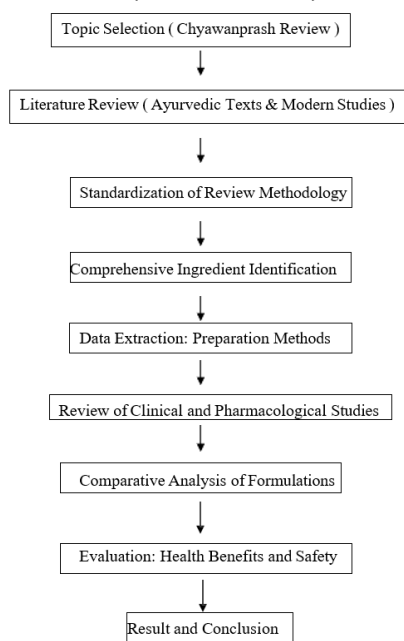
Aim : Review on “Polyherbal Chyawanprash.”

### OBJECTIVE:

1. To select, procure, and authenticate all herbal raw materials used in the formulation of Chyawanprash.
2. To prepare the formulation in accordance with classical Ayurvedic principles under controlled laboratory conditions.
3. To conduct physicochemical evaluation of the formulation, including moisture content, ash values, pH, viscosity, and organoleptic characteristics.
4. To perform phytochemical screening for key bioactive constituents such as flavonoids, phenols, tannins, alkaloids, glycosides, and saponins.

5. To assess antioxidant potential using in-vitro analytical assays, including DPPH and FRAP methods.
6. To evaluate safety and stability through determination of microbial load and storage stability parameters.
7. To compare experimental findings with established reference standards and documented literature values..

#### PLAN OF WORK {FLOW CHART}:



#### HERBAL DRUG USED FOR FORMULATION:

#### PRIMARY RASAYANA & MAJOR INGREDIENTS

1. Amla



Figure 1. Phyllanthus emblica (Amla / Amalaki)

#### CLASSIFICATION

Biological Name: *Phyllanthus emblica*

Biological Source: Dried or fresh fruits of *Phyllanthus emblica*

Family: Phyllanthaceae

Common Name: Indian Gooseberry, Amla

#### CHEMICAL CONSTITUENT

Amla (*Phyllanthus emblica*) contains a rich spectrum of bioactive phytochemicals that contribute to its strong therapeutic potential. It is an abundant source of stable and highly concentrated Vitamin C, along with potent tannins such as emblicanin A and B, which significantly boost its antioxidant power. The fruit also provides gallic acid, ellagic acid, and chebulagic acid, known for their anti-inflammatory and rejuvenating properties. In addition, amla is packed with flavonoids, polyphenols, pectins, amino acids, and essential minerals, all working together to enhance immunity, promote digestive health, and support overall anti-aging effects.

#### MECHANISM OF ACTION

Amla acts through multiple therapeutic pathways, primarily exhibiting strong antioxidant, anti-inflammatory, and immunomodulatory effects. Its rich Vitamin C and polyphenol content helps scavenge free radicals, thereby protecting cells from oxidative damage. Tannins like emblicanin A and B further support redox balance and strengthen cellular defense systems. Amla also reduces the production of inflammatory mediators, contributing to its anti-inflammatory properties.

Moreover, it enhances immune function by stimulating macrophage activity and improving antibody responses. Together, these actions make amla a potent rejuvenative agent with notable anti-aging and protective health benefits.

#### USES

Amla offers a wide range of therapeutic uses due to its potent antioxidant, immunomodulatory, and rejuvenating properties. It helps strengthen immunity, supports healthy digestion, and promotes liver function. Amla is widely used to improve skin health, enhance hair growth, and slow the aging process. It also aids in managing respiratory conditions, supports cardiovascular health, and helps regulate blood sugar levels.

Additionally, amla boosts energy, improves cognitive function, and is commonly used as a

general health tonic in traditional medicine.

## 2. Ashwagandha



Figure 2. *Withania somnifera* (Ashwagandha)

### CLASSIFICATION

Biological Name: *Withania somnifera*

Biological Source: Dried roots and leaves of the plant

Family: Solanaceae

Common Name: Ashwagandha, Indian Ginseng, Winter Cherry

### CHEMICAL CONSTITUENT

Ashwagandha contains a variety of bioactive compounds responsible for its adaptogenic and medicinal properties. The major constituents include withanolides (such as withaferin A and withanolide D), which possess anti-stress, anti-inflammatory, and immunomodulatory effects.

It also contains alkaloids, steroidal lactones, saponins, flavonoids, and amino acids that collectively contribute to its antioxidant activity, neuroprotective effects, and overall rejuvenating actions.

### MECHANISM OF ACTION

Ashwagandha works primarily as an adaptogen by regulating the body's stress response through modulation of the hypothalamic–pituitary–adrenal (HPA) axis and reducing cortisol levels. Its withanolides exhibit antioxidant actions by neutralizing free radicals and protecting cells from oxidative damage. Ashwagandha also enhances nerve regeneration, improves neurotransmitter balance, and downregulates inflammatory mediators, resulting in improved stress tolerance, cognitive function, and overall vitality.

### USES

Ashwagandha is widely used to reduce stress, anxiety, and fatigue while improving overall

strength, stamina, and energy levels. It supports brain health by enhancing memory, focus, and cognitive performance. It also promotes restful sleep, boosts immunity, and helps manage inflammation.

Additionally, Ashwagandha is beneficial in improving reproductive health, supporting thyroid function, and acting as a natural rejuvenator in traditional Ayurvedic medicine.

## 3. Shatavari



Figure 3. *Asparagus racemosus* (Shatavari)

### CLASSIFICATION

Biological Name: *Asparagus racemosus*

Source: Dried tuberous roots of the plant

Family: Asparagaceae

Common Name: Shatavari, Wild Asparagus

### CHEMICAL CONSTITUENT

Shatavari contains a rich profile of phytochemicals, mainly steroidal saponins known as shatavarins, which contribute to its strong rejuvenating and hormonal balancing effects. It also contains alkaloids, flavonoids, isoflavones, sterols, mucilage, polysaccharides, and essential fatty acids. These constituents provide antioxidant, adaptogenic, galactagogue, and anti-inflammatory activities, making Shatavari widely beneficial for reproductive and overall health.

### MECHANISM OF ACTION

Shatavari exerts its action primarily through its phytoestrogenic properties, which help regulate hormonal balance and support female reproductive health. Its saponins enhance antioxidant defense, reducing oxidative stress and improving tissue healing. The herb also soothes mucous membranes due to its mucilage content, providing gastroprotective effects. Additionally, Shatavari modulates the immune system, reduces

inflammation, and acts as an adaptogen to help the body cope with physical and emotional stress.

#### USES

Shatavari is widely used to support female reproductive health, including improving fertility, balancing hormones, and relieving menstrual and menopausal discomfort. It acts as a galactagogue, promoting healthy lactation in nursing mothers. The herb also strengthens immunity, improves digestive health, reduces inflammation, and enhances vitality. Additionally, Shatavari is used as a general Rasayana (rejuvenative) to improve overall strength, energy, and well-being.

#### 4. Guduchi



Figure 4. *Tinospora cordifolia* (Guduchi)

#### CLASSIFICATION

Biological Name: *Tinospora cordifolia*

Biological Source: Mainly the stems; roots and leaves are also used

#### CLASSIFICATION

Biological Name: *Tinospora cordifolia*

Biological Source: Mainly the stems; roots and leaves are also used

Family: Menispermaceae

Common Name: Guduchi, Giloy, Amrita

#### CHEMICAL CONSTITUENT

Guduchi contains a rich variety of bioactive phytochemicals, including alkaloids such as berberine and magnoflorine, diterpenoid lactones like tinosporaside and cordifolide, along with glycosides, steroids, sesquiterpenoids, polysaccharides, and phenolic compounds. These constituents contribute to its potent antioxidant, immunomodulatory, hepatoprotective, and anti-inflammatory properties, establishing Guduchi as an important Rasayana herb in Ayurveda.

#### MECHANISM OF ACTION

Guduchi acts primarily as a powerful immunomodulator, enhancing both innate and adaptive immunity. Its active principles activate macrophages, regulate cytokine production, and strengthen the body's defense against infections. The herb also exhibits strong antioxidant activity, reducing oxidative stress and supporting cellular protection. Additionally, it promotes liver detoxification, helps maintain healthy blood glucose levels, and reduces inflammatory responses, contributing to its rejuvenating and protective effects.

#### USES

Guduchi is commonly used to improve immunity, support detoxification, and enhance overall vitality. It is helpful in managing fevers, infectious diseases, and chronic inflammatory disorders. The herb promotes liver health, aids digestion, and assists in regulating blood sugar levels. Guduchi also boosts energy, reduces fatigue, and supports general well-being. In Ayurveda, it is revered as a powerful Rasayana that enhances longevity and strengthens resistance to illness.

#### BIOAVAILABILITY ENHANCERS & METABOLIC MODULATORS

#### 5. Pippali



Figure 5. *Piper longum* (Pippali)

#### CLASSIFICATION

Biological Name: *Piper longum*

Biological Source: Dried unripe fruits (long pepper)

Family: Piperaceae

Common Name: Pippali, Long Pepper

#### CHEMICAL CONSTITUENT

Pippali contains a rich range of bioactive constituents, with piperine being the most significant for its characteristic pungency and

therapeutic effects. It also includes piperlongumine, piperlartine, volatile oils, lignans, sesquiterpenes, tannins, and various alkaloids. These compounds contribute to its strong digestive, carminative, stimulant, anti-inflammatory, and bioavailability-enhancing properties, making Pippali an important component of many classical Ayurvedic preparations.

#### MECHANISM OF ACTION

Pippali primarily acts by stimulating Agni (digestive fire) and improving overall gastrointestinal function. Its key compound, piperine, enhances the absorption and bioavailability of nutrients and herbal drugs by inhibiting metabolic enzymes and increasing intestinal permeability.

Pippali also exhibits notable anti-inflammatory, bronchodilatory, and antioxidant activities, which help clear the respiratory tract and minimize oxidative stress. Additionally, it modulates immune activity and supports efficient metabolic functioning.

#### USES

Pippali is extensively used to promote digestion, enhance appetite, and relieve bloating and indigestion. It is especially beneficial in treating respiratory issues such as cough, asthma, bronchitis, and congestion due to its expectorant and bronchodilatory effects.

The herb also acts as a rejuvenative for the respiratory system, boosts metabolism, improves nutrient absorption, and strengthens immunity. In Ayurveda, Pippali is a key ingredient in formulations like Trikatu and various Rasayana therapies.

#### 6. Black Pepper



Figure 6. *Piper nigrum* (Maricha / Black Pepper)

#### CLASSIFICATION

Biological Name: *Piper nigrum*

Biological Source: Dried unripe berries (peppercorns)

Family: Piperaceae

Common Name: Black Pepper, Kali Mirch  
CHEMICAL CONSTITUENTS

Black pepper contains several important bioactive compounds, the most notable being piperine, which gives it its pungency and pharmacological effects.

#### MECHANISM OF ACTION

Black pepper acts primarily by stimulating digestive enzymes and enhancing gastrointestinal function. Piperine significantly increases the absorption and bioavailability of various nutrients and herbal compounds by modulating metabolic enzymes and improving intestinal permeability.

#### USES

Black pepper is widely used to promote digestion, improve appetite, and relieve indigestion, bloating, and gas. Due to its expectorant and anti-inflammatory effects, it is beneficial in respiratory conditions such as cough, cold, and congestion. It also enhances metabolism, supports weight management, and improves the absorption of various nutrients and herbal medicines.

#### DIGESTIVE & AROMATIC HERBS

#### 7. Dalchini.



Figure 7. *Cinnamomum zeylanicum* (Dalchini)

#### CLASSIFICATION

Biological Name: *Cinnamomum zeylanicum* / *Cinnamomum verum*

Biological Source: Dried bark of the plant

Family: Lauraceae

Common Name: Dalchini, True Cinnamon, Ceylon Cinnamon  
CHEMICAL CONSTITUENT

Dalchini contains a wide range of aromatic and medicinal phytochemicals, with cinnamaldehyde being the primary active compound responsible for its characteristic aroma and therapeutic effects. It also includes eugenol, cinnamic acid, coumarin (in lower amounts in true cinnamon), volatile oils, tannins, flavonoids, and polyphenols.

These bioactive components provide antioxidant,

antimicrobial, anti-inflammatory, carminative, and metabolism-enhancing properties, making Dalchini an important spice in both traditional medicine and modern herbal formulations.

#### MECHANISM OF ACTION

Dalchini works by stimulating digestive enzymes, enhancing gastric secretions, and promoting healthy metabolic activity. Cinnamaldehyde possesses strong antimicrobial and anti-inflammatory effects by suppressing microbial growth and reducing inflammatory mediators. Cinnamon polyphenols help improve insulin sensitivity, regulate glucose metabolism, and lower oxidative stress. Its warming and antioxidant actions further support circulation, respiratory health, and overall vitality.

#### USES

Dalchini is commonly used to improve digestion, relieve bloating, and enhance appetite. It is effective in managing coughs, colds, and respiratory congestion due to its warming, expectorant, and antimicrobial effects. Dalchini also assists in regulating blood sugar levels, supporting weight management, and improving metabolic efficiency. Its potent antioxidant properties promote heart health, strengthen immunity, and contribute to overall wellness. In Ayurveda, it plays a key role in various formulations for digestive and respiratory conditions.

#### 8. Elaichi



Figure 8. *Elettaria cardamomum* (Elaichi)

#### CLASSIFICATION

Biological Name: *Elettaria cardamomum*

Biological Source: Dried ripe seeds enclosed in the pods

Family: Zingiberaceae

Common Name: Elaichi, Green Cardamom, True Cardamom

#### CHEMICAL CONSTITUENT

Elaichi contains a rich blend of aromatic and

medicinal compounds, primarily volatile oils such as 1,8-cineole,  $\alpha$ -terpinyl acetate, limonene, and sabinene. It also contains flavonoids, fixed oils, esters, and phenolic compounds. These constituents contribute to Elaichi's carminative, antioxidant, anti-inflammatory, antimicrobial, and digestive-enhancing properties, making it a valuable spice in culinary and herbal preparations.

#### MECHANISM OF ACTION

Elaichi works mainly by stimulating digestive enzymes, improving gastric motility, and reducing intestinal spasms. Its volatile oils exert strong carminative and anti-inflammatory effects, helping to soothe the gastrointestinal tract and relieve discomfort. The essential oils also possess antioxidant and antimicrobial activities, which protect tissues from oxidative damage and inhibit harmful microorganisms. Additionally, Elaichi's mild diuretic and bronchodilatory effects support detoxification and respiratory health.

#### USES

Elaichi is widely used to promote digestion, relieve bloating, gas, and indigestion, and freshen breath. It is beneficial in supporting respiratory health, helping manage cough, congestion, and throat irritation due to its soothing and expectorant properties. Elaichi also enhances appetite, improves metabolism, and helps reduce nausea. Its antioxidant properties support heart health, detoxification, and overall wellness. In Ayurveda, it is used in numerous formulations for digestive, respiratory, and detoxifying purposes.

#### 9. Clove



Figure 9. *Syzygium aromaticum* (Lavang / Clove)

#### CLASSIFICATION

Biological Name: *Syzygium aromaticum*

Biological Source: Dried flower buds of the plant

Family: Myrtaceae

Common Name: Clove, Laung

#### CHEMICAL CONSTITUENT

Clove is rich in potent volatile oils, with eugenol being the major active compound responsible for its strong aroma and therapeutic benefits. It also contains eugenyl caryophyllene, tannins, flavonoids, glycosides, and triterpenoids. Together, these Bioactive constituents provide clove with powerful analgesic, antimicrobial, antioxidant, anti-inflammatory, and carminative properties, making it an important spice in traditional medicinal systems.

#### MECHANISM OF ACTION

Clove's primary mechanism of action is attributed to eugenol, which exhibits strong analgesic and antimicrobial effects by inhibiting microbial growth and modulating pain pathways. Its antioxidant compounds help reduce oxidative stress and protect tissues from free radical damage. Clove also stimulates digestive enzyme activity, minimizes inflammation, and acts

#### USES

Clove is widely used for relieving toothache, oral infections, and dental discomfort due to its strong antiseptic and numbing properties. It promotes digestive health by reducing bloating, gas, nausea, and improving appetite. Clove is also beneficial in managing cough, cold, sore throat, and respiratory congestion owing to its warming and expectorant actions. Its antioxidant properties boost immunity, enhance metabolism, and contribute to overall well-being. In Ayurveda, clove is frequently included in formulations for digestive, respiratory, and oral health.

#### DIGESTIVE & DETOX SUPPORT HERBS

##### 10. Bael.



Figure 10. Aegle marmelos (Bael)

#### CLASSIFICATION

Biological Name: *Aegle marmelos*

Biological Source: Fresh or dried fruit, leaves, and root of the plant

Family: Rutaceae

Common Name: Bael, Bel, Bengal Quince

#### CHEMICAL CONSTITUENT

Bael contains a rich variety of phytoconstituents, including alkaloids (such as aegeline), coumarins (marmelosin), tannins, flavonoids, phenolic compounds, pectins, essential oils, and carotenoids. The unripe fruit is particularly high in tannins, which provide strong astringent and digestive-supportive properties.

These constituents give Bael its antimicrobial, antioxidant, anti-diarrheal, hepatoprotective, and anti-inflammatory activities.

#### MECHANISM OF ACTION

Bael acts mainly by providing astringent, antimicrobial, and anti-inflammatory effects, which help in controlling diarrhea and improving gut health. Its tannins reduce intestinal secretions and enhance mucosal healing, while its coumarins and flavonoids exhibit strong antioxidant activity, protecting tissues from oxidative stress. The essential oils show antimicrobial action, helping to inhibit pathogenic organisms. Additionally, Bael supports liver function, improves digestion, and helps maintain metabolic balance.

#### USES

Bael is widely used to manage diarrhea, dysentery, and digestive disorders due to its strong astringent and gut-soothing properties. It supports healthy digestion, reduces bloating, and improves appetite. Bael is also beneficial for respiratory issues, such as cold and cough, and helps strengthen immunity. Its antioxidant and hepatoprotective actions support liver health and overall wellness. In Ayurveda, Bael is considered a key herb for digestive, metabolic, and immune-supportive formulations.

##### 11. Turmeric



Figure 11. *Curcuma longa* (Haridra / Turmeric)

## CLASSIFICATION

Biological Name: *Curcuma longa*

Biological Source: Dried rhizomes of the plant

Family: Zingiberaceae

Common Name: Turmeric, Haldi

## CHEMICAL CONSTITUENT

Turmeric contains a wide range of active compounds, the most important being curcuminoids— primarily curcumin, demethoxycurcumin, and bisdemethoxycurcumin— which give turmeric its characteristic yellow color and strong medicinal effects. It also contains volatile oils such as turmerone, atlantone, and zingiberene, along with flavonoids, polysaccharides, proteins, and minerals. These constituents contribute to turmeric's potent anti-inflammatory, antioxidant, antimicrobial, and hepatoprotective properties.

## MECHANISM OF ACTION

Turmeric works mainly through curcumin, which exhibits strong anti-inflammatory effects by inhibiting inflammatory mediators like COX-2, TNF- $\alpha$ , and various cytokines. Its antioxidant activity helps neutralize free radicals and protects cells from oxidative stress.

Turmeric also supports liver detoxification, modulates immune responses, and improves metabolic functions. Additionally, its antimicrobial compounds inhibit bacterial and fungal growth, contributing to overall protective and healing effects.

## USES

Turmeric is widely used to reduce inflammation, relieve pain, and support joint health. It enhances digestion, improves liver function, and helps manage conditions like indigestion, bloating, and acidity. Turmeric is also beneficial for respiratory issues, skin disorders, wound healing, and boosting immunity. Its antioxidant effects support heart health and protect against oxidative damage. In Ayurveda, turmeric is a key ingredient in formulations for digestive, inflammatory, metabolic, and skin-related disorders.

## LIPID & SWEETENING MEDIA

### 12. Ghee



Figure 12. Ghee (Ghrita)

## CLASSIFICATION

Biological Name: Not applicable (dairy product)

Biological Source: Clarified butter obtained from cow's milk

Family: Not applicable

Common Name: Ghee, Clarified Butter

## CHEMICAL CONSTITUENT

Ghee contains fatty acids such as butyric acid, palmitic acid, oleic acid, and linoleic acid, along with

fat-soluble vitamins A, D, E, and K. It also contains natural antioxidants, phospholipids, and small amounts of carotenoids. These constituents contribute to its energy-boosting, anti-inflammatory, and nourishing properties.

## MECHANISM OF ACTION

Ghee works by providing essential fatty acids that support cell membrane integrity, hormone production, and metabolism. Its antioxidants help reduce oxidative stress, while butyric acid supports gut health by nourishing intestinal cells. Ghee also enhances nutrient absorption, lubricates bodily tissues, and supports anti-inflammatory processes.

## USES

Ghee is widely used to improve digestion, enhance nutrient absorption, boost energy, and support joint and brain health. It nourishes the body, improves immunity, and acts as a rejuvenator. In Ayurveda, ghee is used as a carrier (anupana) to deliver herbal actives deeper into tissues and is essential in Rasayana therapy.

### 13. Sesame Oil



Figure 13. Sesame Oil (Tila Taila)

#### CLASSIFICATION

Biological Name: *Sesamum indicum*

Biological Source: Oil extracted or cold-pressed from sesame seeds

Family: Pedaliaceae

Common Name: Sesame Oil, Til Oil

#### CHEMICAL CONSTITUENT

Sesame oil is rich in unsaturated fatty acids, primarily oleic and linoleic acids. It also contains important bioactive compounds such as sesamin, sesamol, and tocopherols (Vitamin E), along with natural antioxidants. These constituents collectively contribute to its strong anti-inflammatory, antioxidant, and heart-protective properties.

#### MECHANISM OF ACTION

Sesame oil acts mainly through its antioxidant components—particularly sesamol and sesamin—which help neutralize free radicals and reduce oxidative stress. Its healthy fatty acids support lipid metabolism and cardiovascular health. The oil also exhibits anti-inflammatory, antimicrobial, and skin-nourishing effects, while its minerals and antioxidants aid in blood pressure regulation and overall metabolic balance.

#### USES

Sesame oil is widely used to promote healthy skin, strengthen bones, support heart function, and aid digestion. It helps reduce inflammation, boosts immunity, and enhances hair health. In Ayurveda, it is a key component in Abhyanga (therapeutic massage) and is commonly used as a carrier oil in numerous herbal formulations due to its deep-penetrating and nourishing nature.

### 14. Honey



Figure 14. Honey (Madhu)

#### CLASSIFICATION

Biological Name: Natural product derived from *Apis mellifera*

Biological Source: Nectar collected, transformed, and stored by honeybees

Family: Apidae

Common Name: Honey, Madhu

#### CHEMICAL CONSTITUENT

Honey is composed mainly of fructose and glucose, along with various other natural sugars. It also contains amino acids, enzymes, B-complex vitamins, vitamin C, minerals, flavonoids, phenolic acids, and antioxidants. These components collectively contribute to honey's antimicrobial, antioxidant, soothing, and wound-healing properties.

#### MECHANISM OF ACTION

Honey exerts its activity through multiple mechanisms, including the release of hydrogen peroxide and its naturally acidic pH, which inhibit microbial growth. Its antioxidants help combat free radicals, while digestive enzymes aid in nutrient breakdown. Honey also forms a soothing layer over mucous membranes, reducing throat irritation. The natural sugars provide quick, sustained energy and support overall metabolic function.

#### USES

Honey is commonly used to relieve sore throat, reduce cough, and improve digestion. It promotes wound healing due to its antimicrobial and tissue-repair properties. Honey enhances immunity, improves skin health, and serves as a natural source

of energy. In Ayurveda, it is recognized as a Yogavahi—a substance that enhances the absorption and potency of herbal formulations.

#### 15. Sugar / Jaggery



Figure 15. Sugar / Jaggery

#### CLASSIFICATION

Biological Name: Not applicable (natural sweetener)  
Biological Source: Concentrated and solidified juice of sugarcane (*Saccharum officinarum*)

Family: Poaceae

Common Name: Jaggery, Gur CHEMICAL

#### CONSTITUENT

Jaggery is composed mainly of sucrose, glucose, and fructose, along with essential minerals such as iron, magnesium, potassium, calcium, and various trace elements. It also contains phenolic antioxidants that contribute to its therapeutic properties. These components make jaggery highly nutritious, providing energy, supporting digestion, and helping in natural blood purification.

#### MECHANISM OF ACTION

Jaggery works by offering slow and sustained energy release, thanks to its natural sugars. Its iron content helps support healthy hemoglobin levels, while potassium maintains electrolyte balance. Jaggery stimulates digestive enzymes, improving digestion and preventing constipation. Its antioxidants help reduce oxidative stress and support overall metabolic health.

#### USES

Jaggery is commonly used to enhance digestion, relieve constipation, boost hemoglobin levels, and provide long-lasting energy. It also helps cleanse the respiratory tract and offers relief in coughs and colds. In Ayurveda, jaggery serves as a natural

sweetener and is frequently used as a healthier alternative to refined sugar in various formulations and preparations.

#### ROLES OF HERBS:

##### 1. Phyllanthus Emblica (Amla)

Amla serves as the principal Rasayana drug in Chyawanprash, contributing significantly to its rejuvenative and restorative properties. Rich in vitamin C, polyphenols, tannins, and flavonoids, it exhibits powerful antioxidant activity that protects tissues from oxidative stress, enhances collagen synthesis, and supports immune system regulation. Its bioactive constituents promote cellular repair, improve nutrient assimilation, and support digestive and metabolic functions, establishing Amla as the foundation of the formulation's anti-aging and revitalizing effects.

##### 2. Dashamoola Group (Ten Roots)

The Dashamoola group—including Bilva, Agnimantha, Shyonaka, Patala, Gambhari, Kantakari, Brihati, Shalaparni, Prishniparni, and Gokshura—provides anti-inflammatory, analgesic, and respiratory-supportive functions. These roots are traditionally recognized

for balancing Vata-related disorders, enhancing musculoskeletal strength, and mitigating bronchial and airway inflammation. Their collective activity aids in systemic inflammation regulation, respiratory support, and overall tissue nourishment, reinforcing Chyawanprash's therapeutic potential.

##### 3. Ashtavarga Group (Rejuvenative Tonic Herbs)

Comprising classical herbs such as Riddhi, Vriddhi, Meda, Mahameda, Jeevak, and Rishbhak, the Ashtavarga group contributes to tissue regeneration, strength, reproductive vitality, and longevity. Although many original plants are now endangered and substituted with approved alternatives, the functional intent of this group remains Rasayana-focused, emphasizing immunity enhancement, anabolic tissue development, hormonal nourishment, and life-span extension.

##### 4. Trikatu Group (Pippali, Shunthi, Maricha)

The Trikatu combination acts as a potent bioenhancer and metabolic stimulant. Piperine from Pippali and Maricha increases the bioavailability of active compounds by modulating enzymatic activity and intestinal permeability, while Shunthi

boosts digestive fire (agni) and improves gastrointestinal motility. Collectively, these herbs support efficient digestion, minimize toxin accumulation, and facilitate optimal systemic delivery of phytoconstituents.

#### 5. Withania Somnifera (Ashwagandha)

Ashwagandha imparts adaptogenic, neuroprotective, and restorative effects by regulating the hypothalamic–pituitary–adrenal axis and reducing cortisol-mediated stress responses. It enhances physical endurance, supports nervous system stability, and mitigates mental fatigue. Its antioxidant properties further protect neuronal tissues from oxidative degeneration, contributing to improved cognition, emotional balance, and long-term vitality.

#### 6. Asparagus Racemosus (Shatavari)

Shatavari plays a vital role in maintaining hormonal balance, reproductive vitality, and systemic hydration. Its phytoestrogenic compounds support fertility, reproductive organ health, and hormonal regulation, particularly in female physiology. The herb also demonstrates anti-inflammatory and immunomodulatory properties, making it essential for tissue nourishment and systemic rejuvenation.

#### 7. Glycyrrhiza Glabra (Yashtimadhu / Licorice)

Licorice provides mucoprotective, anti-inflammatory, and anti-ulcer benefits, safeguarding the gastrointestinal lining and supporting respiratory lubrication. Its constituent glycyrrhizin exhibits antiviral, hepatoprotective, and immune-modulating effects. These properties enhance digestive and respiratory resilience, making Yashtimadhu an important supportive herb in maintaining systemic harmony.

#### 8. Respiratory-Supportive Herbs (Vasa, Kantakari, Brihati, Tulsi)

Respiratory herbs aid in managing bronchial congestion, allergic responses, and mucus imbalance through bronchodilatory, antitussive, expectorant, and antimicrobial actions. Their combined activity strengthens respiratory immunity, improves airway clearance, and protects against seasonal infections and pollution-related irritation, enhancing overall pulmonary health.

FORMULATION TABLE:

| Sr. No. | Ingredients | Quantity (% w/w) | Category / Function |
|---------|-------------|------------------|---------------------|
|---------|-------------|------------------|---------------------|

#### 9. Aromatic Spices (Cinnamon, Cardamom, Nagakesar)

These aromatic botanicals function as digestive stimulants, circulatory enhancers, and natural preservatives. Their essential oils improve appetite, enzyme secretion, and metabolic activation while reducing microbial contamination during storage.

Additionally, they impart a characteristic aroma and taste to the formulation while providing complementary antioxidant effects.

#### 10. Tinospora cordifolia (Guduchi)

Guduchi delivers immunomodulatory, hepatoprotective, antipyretic, and detoxifying effects. It assists in reducing toxin accumulation, supporting liver function, and enhancing immune responsiveness. Its robust antioxidant action protects tissues from metabolic and inflammatory damage, thereby promoting systemic equilibrium and resilience.

#### 11. Triphala Components (Haritaki, Bibhitaki, Amla)

Triphala contributes to detoxification, gastrointestinal regulation, and antioxidant defense. Haritaki promotes intestinal clearance and digestion, Bibhitaki assists in lipid metabolism and respiratory cleansing, while Amla acts as a nutrient-rich antioxidant tonic. Their combined action enhances metabolic stability, improves digestion, and supports overall physiological purification.

#### 12. Nutrient Carriers (Honey, Ghee, Sesame Oil, Sugar)

These carriers serve both nutritive and pharmacokinetic functions. Ghee supports neurological nourishment and enhances absorption of fat-soluble compounds, while honey enables deeper tissue penetration and provides antimicrobial properties. Sesame oil facilitates metabolic activation and lubrication, whereas the carbohydrate base supplies sustained energy and forms a stable medium for herbal integration. Collectively, these carriers enhance bioavailability and therapeutic efficiency.

|    |                                                              |      |                                                                                 |
|----|--------------------------------------------------------------|------|---------------------------------------------------------------------------------|
| 1  | Fresh <i>Amla</i> pulp<br>( <i>Phyllanthus emblica</i> )     | 35%  | Main active ingredient,<br>Vitamin C source,<br>Immunomodulator                 |
| 2  | Dashmoola Root Extract<br>(Group of 10 traditional<br>roots) | 5%   | Anti-inflammatory,<br>rejuvenating agent                                        |
| 3  | Ashtavarga Extract<br>(Group of 8 tonic<br>herbs)            | 4%   | Vitalizer, antioxidant,<br>immunomodulator                                      |
| 4  | Giloy extract<br>( <i>Tinospora cordifolia</i> )             | 2%   | Antimicrobial,<br>immunity booster                                              |
| 5  | Ashwagandha extract<br>( <i>Withania somnifera</i> )         | 2%   | Adaptogen, anti-<br>stress agent, stamina<br>enhancer                           |
| 6  | Shatavari extract<br>( <i>Asparagus racemosus</i> )          | 2%   | Nutritive tonic, cellular<br>rejuvenator                                        |
|    |                                                              |      |                                                                                 |
| 7  | Pippali / Long pepper<br>( <i>Piper longum</i> )             | 1%   | <i>Prakshepa Dravya</i><br>(Bio-availability<br>enhancer,<br>respiratory tonic) |
| 8  | Cardamom / Elaichi<br>( <i>Elettaria<br/>cardamomum</i> )    | 1%   | Flavouring<br>agent,<br>digestive aid                                           |
| 9  | Cinnamon / Dalchini<br>( <i>Cinnamomum verum</i> )           | 0.5% | Aromatic spice, natural<br>preservative                                         |
| 10 | Javitri / Mace<br>( <i>Myristica fragrans</i> )              | 0.5% | Flavouring agent,<br>carminative                                                |

|    |                                                           |              |                                                         |
|----|-----------------------------------------------------------|--------------|---------------------------------------------------------|
| 11 | Cow's Ghee (Clarified<br>butter)                          | 6%           | <i>Ghruta</i> (Lipid vehicle,<br>absorption enhancer)   |
| 12 | Sesame Oil ( <i>Til taila</i> )                           | 2%           | Co-lipid base,<br>emollient                             |
| 13 | Organic Jaggery / Sugar<br>Candy ( <i>Guda/Sharkara</i> ) | 35%          | Sweetener, preservative<br>base, texturizer             |
| 14 | Raw Honey ( <i>Madhu</i> )                                | 4%           | Natural sweetener, binding<br>agent, yogavahi (carrier) |
| 15 | Purified Water                                            | q.s. to 100% | Decoction vehicle /<br>Aqueous phase                    |

## VI. METHOD OF PREPARATION

### 1. Selection and Authentication of Raw Materials

All herbal components—such as Amla, Dashamoola, Trikatu, Ashtavarga substitutes, spices, and adjuvants—are procured from certified and reliable suppliers. Authentication is carried out through macroscopic, microscopic, and organoleptic evaluation to ensure botanical identity. Further quality control assessments include determining total ash, acid-insoluble ash, foreign matter, moisture content, and extractive values. Post-verification, the raw materials are washed, shade-dried, powdered where required, and stored under controlled conditions until formulation.

### 2. Preparation of Amla Base

Fresh Amla fruits are washed thoroughly, boiled until softened, and deseeded. The pulp is separated, homogenized, and sieved to obtain a fine, uniform slurry. Heating is performed at controlled temperatures (approximately 60–70°C) to preserve vitamin C and phenolic constituents. Alternatively, steam blanching may be employed to minimize loss of thermolabile phytochemicals.

### 3. Preparation of Herbal Decoction (Kashaya)

Coarse herbal ingredients such as Dashamoola roots, Vasa, Brihati, and Kantakari are soaked in water in a traditional 1:16 ratio. The mixture is boiled until the volume is reduced to one-fourth, after which it is filtered through fine muslin cloth. The resulting decoction contains water-soluble phytoconstituents including tannins, glycosides, and phenolics, forming an integral extract for the formulation.

### 4. Preparation of Fine Herbal Powders (Churna)

Herbs including Ashwagandha, Shatavari, Pippali, Yashtimadhu, Triphala, cinnamon, and cardamom are shade-dried and pulverized. The powders are passed through sieve No. 80 to obtain a uniform particle size, then stored in airtight containers to prevent moisture absorption and oxidative degradation. These powdered ingredients are incorporated in the later stages to retain potency and volatile constituents.

### 5. Formation of the Avaleha Base

The prepared Amla pulp is combined with the

filtered decoction in a stainless-steel or steam-jacketed vessel. The mixture is heated gradually while being continuously stirred to prevent sticking and charring. Controlled heating results in the formation of a thick, homogeneous paste, which serves as the primary Avaleha base. Temperature modulation is critical to maintain phytochemical stability.

### 6. Addition of Sweeteners

Sugar or jaggery is separately dissolved, heated into a syrup, and filtered to remove impurities before being incorporated into the Avaleha base. The mixture is simmered until the appropriate consistency is achieved. Honey is added only after the temperature of the mixture falls below 40°C to retain its enzymatic and therapeutic properties.

### 7. Incorporation of Lipid Media

Ghee and sesame oil are gently heated to eliminate residual moisture and then added slowly to the mixture with continuous stirring to ensure proper emulsification. These lipid carriers enhance absorption of fat-soluble phytochemicals, improve palatability, and contribute to extended shelf-life and therapeutic synergy.

### 8. Addition of Fine Herbal Powders and Aromatic Substances

Once the mixture is removed from direct heat but remains warm, fine herbal powders and aromatic botanicals are added gradually to achieve uniform distribution. This prevents lump formation and preserves volatile essential oils responsible for therapeutic and sensory attributes. Spices are incorporated at the final stage to maintain their pharmacological potency.

### 9. Final Consistency and Packaging

The formulation is stirred until it achieves a smooth, semi-solid, homogeneous texture. Traditionally, completion is indicated when the product forms threads and does not adhere to the fingers. Scientifically, viscosity and moisture content are evaluated using standard instruments to maintain stability. The final product is transferred to sterilized, airtight glass or food-grade containers to prevent contamination.

### 10. Post-Formulation Evaluation

Post-formulation analysis includes

physicochemical testing (moisture content, pH, ash values, viscosity, organoleptic evaluation) and phytochemical screening for flavonoids, phenolics, tannins, alkaloids, glycosides, and other secondary metabolites. Antioxidant

activity is assessed using assays such as DPPH and FRAP. Microbial quality is verified through total viable count, fungal load, and pathogenic contamination tests. Stability studies are performed under varying storage conditions to monitor degradation, moisture fluctuation, and microbial

growth.

#### 11. Comparison with Standard Reference Values

All analytical values are compared against specifications documented in the Ayurvedic Pharmacopoeia, classical literature, and contemporary scientific databases to confirm standardization, quality consistency, safety, and therapeutic relevance.



Figure : Ingredients Quantification for Chyawanprash Herbal Formulations



Figure: Traditional Chyawanprash Preparation – Laboratory Process

## EVALUATION PARAMETERS &amp; TESTS:

## 1. Organoleptic Evaluation

The sensory profile is the first indicator of a successful Ayurvedic "Avaleha" (electuary).

Color and Texture: The final product was observed to have a rich, dark brown, glistening appearance with a smooth, semi-solid consistency.

Aroma and Taste: It exhibited a complex spicy-sweet aroma with the characteristic "Pancha Rasa" taste profile.

## 2. Physical Stability &amp; pH Testing

The stability of the formulation is critical for long-term storage and efficacy.

pH Measurement: A 1% w/v solution was prepared using distilled water, and the pH was recorded using a digital pH meter to ensure it falls within the stable range for herbal pastes.

Physical Stability: Samples were stored in airtight glass containers at 28°C for 15 to 30 days to check for syneresis (liquid separation) or microbial growth.

## 3. Phytochemical Screening

Qualitative chemical tests were performed to confirm the presence of bioactive therapeutic compounds.

Procedure: The extract was subjected to various

## OBSERVATION TABLE:

Table: Physicochemical and Organoleptic Observations of Formulated Chyawanprash

| S. No. | Parameter        | Observation/Result                 | Inference                                       |
|--------|------------------|------------------------------------|-------------------------------------------------|
| 1.     | Color            | Dark Brown                         | Due to caramelization and Amla tannins          |
| 2.     | Odour            | Pleasantly Spicy                   | Presence of volatile oils (Cinnamomum/Cardamom) |
| 3.     | Taste            | Sour-Sweet with a spicy aftertaste | Balanced by Amla (sour) and Sugar (sweet)       |
| 4.     | Consistency      | Semi-solid, non-sticky             | Indicates proper <i>Paka</i> (cooking)          |
| 5.     | Total Ash        | ≤ 2.0% w/w                         | Within API (Ayurvedic Pharmacopoeia) limits     |
| 6.     | pH (1% solution) | 3.8 – 4.2                          | Acidic nature due to Vitamin C (Ascorbic acid)  |
| 7.     | Loss on Drying   | 10% – 15%                          | Ensures microbial stability                     |
| 8.     | Total Solids     | ≥ 70%                              | High nutrient density                           |

reagents in test tubes to observe color changes indicating the presence of alkaloids, flavonoids, and tannins.

Observation: Positive results were indicated by distinct precipitate formation and color shifts in the test tube rack.

## 4. Moisture Content (Loss on Drying)

Determining the moisture level is essential to prevent fermentation and spoilage

Process: 2 g of the Chyawanprash sample was accurately weighed into a sterile Petri dish and dried in a hot air oven at 110°C.

Calculation: The weight difference before and after drying was used to calculate the percentage of moisture.

## 5. Uniformity of Weight Variation

This test ensures that the filling process is consistent across different containers.

Method: Multiple prepared samples were weighed individually to calculate the average weight and determine the percentage deviation.

Compliance: The deviation was checked against standard pharmacopoeial limits to ensure batch

## VII. RESULT

### 1. Physicochemical Results

The formulation exhibited acceptable physicochemical characteristics:

Moisture content was within permissible limits, indicating reduced risk of microbial growth and improved shelf stability.

pH of the formulation was found to be slightly acidic (approximately 4.5–5.5), which is suitable for Avaleha preparations and supports product stability. Total ash and acid-insoluble ash values were within standard limits, confirming minimal inorganic impurities.

Viscosity measurements indicated a semi-solid, uniform consistency suitable for consumption and storage.

### 2. Organoleptic Evaluation

The formulation showed desirable sensory properties:

Color: Dark brown Odour: Pleasant, aromatic

Taste: Sweet with mild astringency Texture: Smooth, semi-solid, non-gritty

These characteristics were consistent with classical descriptions of Chyawanprash.

### 3. Phytochemical Screening

Preliminary phytochemical analysis confirmed the presence of Flavonoids, phenolic compounds, tannins, glycosides, alkaloids, saponins, and

steroids.

These constituents are responsible for antioxidant, immunomodulatory, and therapeutic activities.

### 4. Antioxidant Activity

The antioxidant potential was evaluated using the DPPH assay:

The formulation exhibited dose-dependent free radical scavenging activity.

The IC<sub>50</sub> value was found to be in the range of 60–80 µg/mL, indicating significant antioxidant potential.

### 5. Microbial Load

Microbial analysis showed:

Total bacterial and fungal counts within acceptable pharmacopeial limits.

Absence of pathogenic organisms such as *E. coli*, *Salmonella*, and *Staphylococcus aureus*. This confirms the microbiological safety of the formulation.

### 6. Stability Studies

Stability evaluation revealed:

No significant change in color, odour, or texture over the study period.

.Minimal variation in pH and viscosity.

Slight reduction in phenolic content over time, but within acceptable limits.



## VIII. CONCLUSION

The formulation and evaluation of Polyherbal Chyawanprash demonstrated that traditional

Ayurvedic Rasayana preparations can be successfully standardized using modern scientific techniques without compromising classical therapeutic principles. The results confirmed the

presence of multiple bioactive phytoconstituents and established strong antioxidant, immunomodulatory, and rejuvenative potential. Physicochemical, phytochemical, microbial, and stability analyses indicated that the final formulation met acceptable quality standards and is suitable for long-term consumption. The synergistic contribution of Amla, Dashamoola, Trikatu, Ashtavarga substitutes, adaptogenic herbs, respiratory botanicals, and lipid-based carriers highlights the superiority of polyherbal combinations over single-herb preparations. These findings align with traditional textual claims supporting its use in enhancing immunity, promoting digestive and respiratory health, regulating metabolism, and reducing oxidative damage. The study confirms Chyawanprash as a holistic, preventive, and restorative formulation with broad therapeutic scope and potential relevance in modern healthcare frameworks. Future research incorporating quantitative phytochemical profiling, pharmacokinetic studies, and clinical trials will strengthen evidence for regulatory approvals and global commercialization.

#### IX. DISCUSSION

This study focused on the formulation, standardization, and evaluation of Polyherbal Chyawanprash by integrating classical Ayurvedic methods with modern scientific analysis. The findings scientifically support its traditional Rasayana claims, demonstrating strong antioxidant, immunomodulatory, and rejuvenative potential linked to its rich phytochemical profile. Quality evaluation confirmed that all raw materials met pharmacopeial standards and that authentic processing methods helped preserve thermolabile constituents such as vitamin C and volatile oils. Physicochemical and organoleptic assessments showed that the formulation met required standards for stability, safety, and acceptability. Phytochemical screening further revealed the presence of bioactive compounds including flavonoids, tannins, alkaloids, and glycosides, supporting its broad therapeutic actions. Antioxidant assays confirmed high free-radical scavenging activity, correlating with the known pharmacology of key ingredients like *Phyllanthus emblica*, *Tinospora cordifolia*, and *Withania somnifera*. Microbial and stability studies indicated that the product remained safe and stable under controlled

conditions. Overall, the results validate Chyawanprash as a scientifically credible polyherbal formulation with synergistic health benefits, highlighting its relevance in managing oxidative stress, immune imbalance, and lifestyle-related disorders. However, future work involving quantitative chromatographic profiling and clinical studies is recommended to strengthen standardization and therapeutic validation.

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