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AYURVEDA AND GUT HEALTH: AN INTEGRATIVE REVIEW OF CLASSICAL CONCEPTS AND THERAPEUTIC APPROACHES

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ABSTRACT

Background: In Ayurveda, *Agni* is considered fundamental to digestion, metabolism, nourishment, and the maintenance of health, while impaired digestive function is associated with the formation of *Ama*, which contributes to the pathogenesis of various disorders. Classical Ayurvedic texts describe the importance of *Agni*, *Ama*, and *Doṣa* in maintaining physiological equilibrium and gastrointestinal health. These concepts provide a traditional framework for understanding digestive function and its relationship with overall well-being. **Objectives**: To explore the Ayurvedic understanding of gut health through the concepts of *Agni*, *Ama*, *Deepana-Pachana*, *Grahi*, and *Rasayana*, with particular emphasis on the therapeutic relevance of selected medicinal plants (*Dravyas*) and their potential associations with contemporary gastrointestinal science. **Methods**: Relevant concepts were examined through classical Ayurvedic treatises, including the *Charaka Saṃhita*, *Sushruta Samhita*, and *Aṣṭhanga Hridaya*, alongside contemporary scientific literature retrieved from PubMed and Scopus. The discussion focused on digestive physiology, gut microbiota, intestinal barrier function, short-chain fatty acids, inflammation, and the pharmacological properties of selected medicinal plants. **Discussion**: Ayurveda emphasizes the maintenance of *Samagni* for effective digestion and metabolic balance, whereas *Mandagni* is associated with impaired digestion and the formation of *Ama*. *Deepana* and *Pachana* are important therapeutic approaches directed towards improving digestive function and addressing *Ama*, while *Grahi* and *Rasayana* have distinct roles in traditional gastrointestinal care and health maintenance. Selected *Dravyas*, including *Jiraka*, *Methika*, *Pippali*, *Musta*, *Bilva*, *Sunthi*, *Dadima*, *Shatavari*, *Guduchi*, and *Amalaki*, possess traditional digestive indications, with varying degrees of contemporary evidence for their effects on gastrointestinal function, inflammation, and microbial activity. These findings offer opportunities to investigate potential relationships between Ayurvedic principles and modern concepts of intestinal homeostasis, while recognizing that direct equivalence between traditional concepts and biomedical mechanisms remains unestablished. **Conclusion**: Ayurvedic principles of *Agni*, *Ama*, and *Deepana-Pachana* provide a valuable framework for understanding digestive health and exploring traditional therapeutic approaches. Their systematic evaluation alongside contemporary scientific evidence may support further pharmacological, clinical, and translational research in gastrointestinal health.

KEYWORDS: Ayurveda, Agni, Ama, Deepana-Pachana, Gut Health, Gastrointestinal Health.

INTRODUCTION

In Ayurveda, the state of digestion is not viewed as an isolated gastrointestinal event; it is closely connected with nourishment, tissue formation, strength and the maintenance of health. The concepts of Agni (digestive and metabolic capacity), Ama (a classical description of incompletely processed material associated with impaired digestion), Doṣa, Srotas and Grahani provide a framework for explaining digestive function and its disturbance. Classical discussions of Agni and Grahani are particularly elaborated in the Caraka Samhita, including Cikitsasthana 15, which describes the relationship between digestive capacity and the proper processing of food.[1]

Ayurvedic texts also emphasize that food quality, quantity, timing, combinations, and the individual's capacity to digest a meal influence digestive health. The principles of appropriate diet (*Ahara*), daily routine (*Dinacharya*), seasonal routine (*Rutucharya*), and attention to natural urges are therefore relevant to a broader discussion of gut health. These concepts should be interpreted within their classical framework rather than translated directly into modern physiological terms.[1,2]

Contemporary research describes the gut as a dynamic ecosystem in which the intestinal epithelium, immune system, diet and resident microorganisms interact. Gut microbial communities contribute to the metabolism of dietary components and to immune and metabolic homeostasis, while changes in microbial composition have been associated with several disorders.[3,4] Recent reviews have begun to explore possible links between Ayurvedic diet, lifestyle and therapeutic approaches and the gut microbiome; however, the available evidence remains limited and does not establish one-to-one equivalence between Ayurvedic constructs and biomedical mechanisms.[5,6]

This integrative review therefore places Ayurvedic concepts and therapeutic reasoning at the centre of the discussion, using contemporary gastrointestinal research as a complementary evidence stream. It outlines *Agni*, *Ama* and *Grahani*; discusses *Deepana*, *Pachana*, *Grahi* and *Rasayana*; and reviews selected Dravyas traditionally used in digestive care. Similarities with modern findings are presented as research hypotheses or pharmacological observations, not as proof that a classical concept corresponds to a specific microbiome feature or biomarker.

REVIEW METHODOLOGY

This integrative review draws on classical Ayurvedic sources, particularly the *Charaka Samhita* and *Ashtanga Hridaya*, for descriptions of *Agni*, *Ama*, *Grahaṇi*, dietary conduct and therapeutic actions. Contemporary literature was identified through targeted searches of PubMed and other scholarly databases using combinations of terms such as Ayurveda, *Agni*, *Ama*, *Grahani*, *Deepana*, *Pachana*, *Grahi*, *Rasayana*, gut microbiota, intestinal barrier and medicinal plants. Relevant review articles and experimental or clinical studies were considered according to their relevance to the concepts discussed. Classical interpretations and modern experimental findings are discussed separately, and preclinical results are not treated as proof of clinical efficacy.

AYURVEDIC UNDERSTANDING OF DIGESTIVE HEALTH

1. *Agni* and its functional importance

Agni is a foundational Ayurvedic concept associated with the transformation and utilization of ingested food. Classical descriptions distinguish *Jatharagni*, *Bhutagni* and *Dhatvagni*, relating respectively to the processing of food and subsequent transformations described at elemental and tissue levels. *Samagni* denotes balanced digestive functioning, while the traditional categories of *Mandagni*, *Tikṣṇagni* and *Viṣamagni* describe different patterns of impaired or irregular digestive capacity. These categories are clinical concepts within Ayurveda and should not be reduced to a single modern measure such as gastric emptying, enzyme activity, or basal metabolic rate.[1,2]

2. *Ama* and the process of disease

Ama is described in Ayurvedic pathophysiology in association with impaired *Agni* and inadequate processing. Its significance varies with context and may be discussed alongside altered appetite, heaviness, coating, discomfort and other clinical features described in the classical literature. *Ama* is not an established biomedical substance and should not be equated literally with endotoxins, intestinal permeability, dysbiosis or any single laboratory marker. Modern research on microbial products and inflammation may offer testable areas of comparison, but these remain conceptual parallels rather than validated equivalences.[1,5,7]

3. *Grahaṇi* and gastrointestinal function

Grahaṇi is described in Ayurveda in close association with the support and retention of food until digestion has progressed appropriately. Classical discussions of *Grahaṇi* dosha connect disturbed digestive function with altered bowel habits and inadequately processed food. This provides an Ayurvedic clinical framework for considering digestion and stool patterns together, but it should not be assumed to be synonymous with a specific modern diagnosis such as irritable bowel syndrome, inflammatory bowel disease, or malabsorption. Appropriate clinical assessment remains necessary when symptoms are persistent or severe.[1]

4. *Ahara*, routine and individualized care

Ayurvedic approaches to digestive health extend beyond medicines. Attention to food suitability, quantity, timing, eating according to digestive capacity, daily routine, and seasonal adaptation is integral to classical health guidance. The practical implication is that dietary and lifestyle advice should be individualized rather than presented as a single regimen for every person. Modern studies also identify diet as an important influence on gut microbial composition, but this broad overlap does not validate every traditional dietary rule through microbiome science.[2,3,5]

THERAPEUTIC PRINCIPLES IN AYURVEDA

1. *Deepana* and *Pachana*

Deepana refers to measures or substances traditionally used to kindle or support *Agni*, whereas *Pachana* refers to the processing of Ama within the Ayurvedic therapeutic framework. Their use depends on the patient's presentation, digestive status, Dosha and other clinical considerations; they are not interchangeable terms, and neither should automatically be interpreted as

stimulation of a particular digestive enzyme. Experimental studies of spices have reported effects on digestive enzyme activity, providing pharmacological observations relevant to selected ingredients but not direct proof of the complete Ayurvedic actions of *Deepana* or *Pachana*.[8,9]

2. *Grahi*

Grahi is a traditional functional description applied to substances understood to support appropriate absorption and stool consistency, especially in clinical contexts involving loose stools. Its interpretation should remain grounded in Ayurvedic descriptions and the specific *Dravya* being discussed. Astringency, fibre content, or anti-diarrhoeal activity may be investigated experimentally, but no single pharmacological property fully defines *Grahi*.

3. *Rasayana*

Rasayana is a broad Ayurvedic therapeutic concept concerned with sustaining and promoting health and nourishment. Some *Dravyas* described as *Rasayana* have been investigated for antioxidant, gastroprotective, or immunomodulatory properties. These findings are preliminary or indication-specific, and they should not be generalized to prove that *Rasayana* as a whole improves the gut microbiome or treats gastrointestinal disease.

4. Selection and safety of *Dravyas*

A *Dravya* should be discussed with its botanical identity, plant part, preparation, traditional indication, and available level of evidence clearly specified. Evidence from an isolated compound, an animal model, or an in-vitro assay cannot automatically be extrapolated to a household preparation or a clinical dose. Product quality, interactions, contraindications and individual patient factors also matter; persistent gastrointestinal symptoms require appropriate medical evaluation.

SELECTED AYURVEDIC DRAVYAS RELEVANT TO DIGESTIVE HEALTH

The examples below illustrate how classical therapeutic descriptions can be considered alongside selected contemporary findings. The evidence column deliberately distinguishes experimental or preliminary observations from established clinical effects.

Dravya (botanical name)	Ayurvedic context	Selected contemporary evidence and limitations
Jiraka (*Cuminum cyminum* L.)	Traditionally described as *Deepana* and *Pachana*.	Experimental work reported effects of cumin on digestive enzyme activity; this does not by itself establish clinical benefit for a gastrointestinal disorder.[8]
Methika (*Trigonella foenum-graecum* L.)	Dietary seed; traditionally used in digestive and other formulations.	Fenugreek galactomannan has been studied as a fermentable substrate/prebiotic-related ingredient. Findings depend on preparation and study design.[10]
Pippali (*Piper longum* L.)	Traditionally used in digestive formulations; described in relevant contexts as *Deepana / Pachana*.	Piperine and spices have been investigated for effects on digestive enzyme activity. Clinical gut-health claims require direct evidence.[9]
Musta (*Cyperus rotundus* L.)	Traditionally used in digestive complaints and formulations with *Grahi*-related indications.	Experimental and ethnopharmacological reports exist, but evidence is not sufficient to infer efficacy for all digestive conditions.[11]
Bilva (*Aegle marmelos* (L.))	Unripe fruit is traditionally used in bowel-related complaints and described as *Grahi*.	An aqueous extract of unripe fruit was studied in an experimental inflammatory bowel disease model; this is preclinical evidence, not proof of human efficacy.[12]
Sunthi (*Zingiber officinale* Roscoe)	Traditionally used as a digestive-supporting ingredient and described as *Deepana / Pachana*..	A systematic review examined ginger in gastrointestinal disorders; the strength of evidence varies by condition, and a small IBS pilot trial did not establish definitive benefit.[13,14]
Dadima (*Punica granatum* L.)	Traditionally included in digestive preparations; described in certain contexts as *Grahi*.	Pomegranate peel extract has been investigated in an animal model of diarrhoea-predominant IBS. Such findings should not be presented as demonstrated clinical efficacy.[15]
Satavari (*Asparagus racemosus* Willd.)	Used in Ayurveda in broader restorative contexts, including Rasayana-related descriptions.	Animal studies have reported gastroprotective and antioxidant effects; translation to human gut-health outcomes remains uncertain.[16]
Guduci (*Tinospora cordifolia*	Traditionally used in *Rasayana*	An In vitro study has explored the prebiotic

(Willd.) Hook.f. & Thomson)	and other formulations.	potential of its starch fraction. This does not establish a clinical microbiome benefit.[17]
Amalaki (*Phyllanthus emblica* L.)	Traditionally used as a *Rasayana* and in digestive formulations.	A purified fruit fraction has been investigated in vitro for gastric H+/K+-ATPase, anti-H. pylori and antioxidant activities; clinical relevance requires further study.[18]

CONCEPTUAL RELATIONSHIPS WITH CONTEMPORARY GUT SCIENCE

The gut microbiota contributes to dietary-fibre fermentation, production of short-chain fatty acids and interactions with intestinal and immune function.[3,4] These findings can help formulate research questions about how Ayurvedic dietary practices and selected formulations may influence digestion or microbial ecology. For example, studies could examine whether a defined dietary intervention changes symptoms, stool characteristics, microbial composition, or metabolite profiles. Such questions should be tested directly rather than inferred from terminology alone.

Samagni and eubiosis should not be treated as equivalent concepts, just as *Mandagni* and dysbiosis should not be considered interchangeable. *Agni* is a broad Ayurvedic construct embedded in clinical reasoning, while dysbiosis is a modern descriptive term for changes in microbial communities whose meaning depends on context. Likewise, *Ama* is not synonymous with lipopolysaccharide or metabolic endotoxaemia, although research on gut barrier function and microbial products may provide one possible area for carefully designed comparative investigation.[5-7]

CLINICAL IMPLICATIONS AND FUTURE RESEARCH

Future research should define the Ayurvedic intervention precisely, including diagnostic criteria, the rationale for selecting a *Dravya* or formulation, plant part, processing method, dose, and duration. Studies should use appropriate comparators, prespecified outcomes and transparent reporting of adverse events. Relevant outcomes may include validated symptom scores, stool frequency and consistency, quality of life and condition-appropriate clinical measures. Microbiome sequencing, short-chain fatty acid analysis or barrier-related biomarkers may be useful exploratory endpoints, but should not replace meaningful clinical outcomes or be interpreted as direct measurements of Agni or Āma. Trials should also account for diet, concurrent medication, and individual variability.[5,6]

CONCLUSION

Ayurveda offers a comprehensive traditional framework for digestive health through *Agni*, *Ama*, *Grahani* appropriate *Ahara* and individualized therapeutic principles such as *Deepana*, *Pachana*, *Grahi* and *Rasayana*. Selected *Dravyas* have also been examined in contemporary experimental and clinical research, but the quantity and quality of evidence vary substantially. Ayurvedic constructs should not be equated directly with microbiome states or individual biomarkers. A balanced integrative approach respects the classical context while testing specific interventions with rigorous methods, clinically meaningful outcomes and transparent reporting.

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