USHIRA (*VETIVERIA ZIZANIOIDES*) — A COMPREHENSIVE DRUG REVIEW WITH SPECIAL REFERENCE TO ITS POTENTIAL IN *AMLAPITTA* AND *PARINAMASHOOLA* (GASTRITIS AND DUODENITIS)

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ABSTRACT

Introduction: Gastritis and duodenitis are among the most prevalent upper gastrointestinal disorders globally, primarily driven by *Helicobacter pylori* infection, NSAID use, dietary indiscretions, and stress. In Ayurveda, these conditions closely correspond to *Amlapitta* (acid-peptic disorder) and *Parinamashoola* (pain during digestion). *Ushira* (*Vetiveria zizanioides* (Linn.) Nash, Poaceae/Gramineae) is a classical Ayurvedic drug described in multiple *Mahakashaya* groups by Acharya Charaka, including *Chardinigrahana* (antiemetic), *Dahaprashamana* (burning-sensation alleviating), and *Tiktaskandha* (bitter group), with *Sheeta Veerya* (cold potency) and *Pitta-Kapha Shamaka* properties.

Methods: A comprehensive narrative review was conducted using classical Ayurvedic texts (*Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Bhavaprakasha Nighantu, Dhanvantari Nighantu, Kaiyadeva Nighantu, Rajanighantu*) and modern databases (PubMed, Google Scholar, ScienceDirect) for pharmacological, phytochemical, and clinical evidence on *Vetiveria zizanioides*.

Results: Classical literature attributes *Pittashamaka* (pitta-pacifying), *Stambhana* (astringent/checking), *Dahaprashamana* (cooling), *Chardinigrahana* (antiemetic), and *Deepana* (digestive stimulant) properties to *Ushira*. Modern pharmacological studies have demonstrated significant gastroprotective, anti-ulcerogenic, antioxidant, anti-inflammatory, and cytoprotective activities. The root contains over 150 sesquiterpenoid compounds including khusimol, α-vetivone, β-vetivone, vetiverol, zizaene, and prezizaene. Isolated triterpenoid glycosides have shown 56–68% ulcer inhibition in pyloric ligation, stress-induced, and indomethacin-induced ulcer models.

Discussion: The pharmacological profile of *Ushira* supports a cytoprotective and anti-secretory approach to gastritis and duodenitis management, complementing the acid-suppressive mechanism of proton pump inhibitors like rabeprazole. The *Sheeta Veerya* (cold potency) and *Tikta-Madhura Rasa* (bitter-sweet taste) directly address the *Pitta Prakopa* and *Vidagdha Ajirna* underlying *Amlapitta* pathogenesis. The *Churna Kalpana* (powder form) ensures convenient administration and adequate bioavailability. Well-designed clinical trials comparing *Ushira Churna* with standard PPI therapy are warranted to validate its adjuvant or standalone efficacy.

Keywords: *Amlapitta*, Cytoprotective, Gastritis, Gastroprotective, *Parinamashoola*, *Ushira*, *Vetiveria zizanioides*

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INTRODUCTION

Gastritis, defined as inflammation of the gastric mucosa, and duodenitis, inflammation of the duodenal mucosa, are among the most common upper gastrointestinal disorders encountered in clinical practice worldwide. They are frequently triggered by *Helicobacter pylori* infection, prolonged use of non-steroidal anti-inflammatory drugs (NSAIDs), excessive alcohol consumption, bile reflux, dietary indiscretions, and psychosomatic stress [1]. Chronic gastritis, if untreated, can progress to peptic ulcer disease, gastric atrophy, intestinal metaplasia, and even gastric malignancy [2]. The global prevalence of gastritis varies from 30–70% depending on the population studied, with developing countries bearing a disproportionate burden [3].

The standard pharmacological management relies on proton pump inhibitors (PPIs) such as rabeprazole, pantoprazole, and omeprazole,

which suppress gastric acid secretion by irreversibly inhibiting the H+/K+ ATPase pump. While PPIs are highly effective for short-term symptom relief, long-term use is associated with adverse effects including hypomagnesemia, increased risk of *Clostridium difficile* infection, osteoporotic fractures, vitamin B12 deficiency, chronic kidney disease, and rebound acid hypersecretion upon withdrawal [4,5]. These limitations underscore the need for safe, effective complementary or adjuvant therapies from traditional medicine systems.

In Ayurveda, gastritis and duodenitis find close correlation with the concepts of *Amlapitta* (acid-peptic disorder) and *Parinamashoola* (pain during the process of digestion). *Amlapitta* is described in detail by Acharya Kashyapa and later by Madhavakara in *Madhava Nidana*, and is characterized by *Amlodgara* (sour eructation), *Hrit-Kantha Daha* (burning in chest and throat), *Aruchi* (anorexia), *Avipaka* (indigestion), *Tikta-Amla Chardi* (bitter or sour vomiting), *Utklesha* (nausea), and *Gaurava* (heaviness) [6,7]. The etiopathogenesis centres on *Pitta Prakopa* (vitiation of *Pitta Dosha*) due to *Vidahi* (acid-producing), *Amla* (sour), *Ushna* (hot), and *Tikshna* (sharp) dietary factors combined with *Viruddha Ahara* (incompatible food) and *Adhyashana* (eating before the previous meal is digested) [8]. *Parinamashoola* is described by Acharya Sushruta and Vagbhata as epigastric pain occurring during the digestive process, caused predominantly by vitiated *Pitta Dosha*, corresponding to duodenitis and duodenal ulcer pathology [9,10].

The management principles for *Amlapitta* in Ayurveda include *Pitta Shamana* (pacification of *Pitta*), *Sheeta Virya Dravya* (cold-potency drugs), drugs with *Tikta Rasa* (bitter taste) and *Madhura Rasa* (sweet taste), and *Deepana-Pachana* (enhancing digestive fire without aggravating *Pitta*) [11]. Among the classical drugs fulfilling these criteria, *Ushira* (*Vetiveria zizanioides* (Linn.) Nash) occupies a prominent position.

Ushira is a densely tufted perennial aromatic grass belonging to the family Poaceae (Gramineae), distributed throughout the plains of India up to an elevation of 1200 m. The root is the principal part used medicinally. Acharya Charaka has classified *Ushira* in multiple *Mahakashaya* groups: *Varnya* (complexion-promoting), *Stanyajanana* (lactation-promoting), *Chardinigrahana* (antiemetic), *Dahaprashamana* (burning-sensation alleviating), *Angamardaprashamana* (body-ache alleviating), *Shukrashodhana* (semen-purifying), and *Tiktaskandha* (bitter group) [12]. Acharya Sushruta has mentioned it under *Sarivadi Gana*, *Eladi Gana*, and *Pittashamana Gana* [13]. *Bhavaprakasha Nighantu* describes *Ushira* as *Pachana* (digestive), *Sheeta Veerya* (cold potency), *Raktasthambhaka* (haemostatic), *Laghu* (light), with *Tikta* (bitter) and *Madhura Rasa* (sweet taste), and useful in *Jwara* (fever), *Chardi* (vomiting), *Daha* (burning sensation), *Pitta-Kapha* disorders, *Rakta Dushti* (blood impurities), *Visha* (toxins), *Kushtha* (skin diseases), *Mutrakricchra* (dysuria), and *Vrana* (wounds) [14].

The present review aims to compile and critically analyse the classical Ayurvedic literature, phytochemical profile, and modern pharmacological evidence for *Ushira* (*Vetiveria zizanioides*), with special emphasis on its potential in the management of *Amlapitta* (gastritis) and *Parinamashoola* (duodenitis), providing a scientific rationale for its clinical use and identifying directions for future research.

MATERIALS AND METHODS

A comprehensive narrative review was conducted by searching classical Ayurvedic texts including *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, *Ashtanga Sangraha*, *Kashyapa Samhita*, *Madhava Nidana*, *Sharangdhara Samhita*, *Bhavaprakasha Nighantu*, *Dhanvantari Nighantu*, *Kaiyadeva Nighantu*, *Rajanighantu*, and the Ayurvedic Pharmacopoeia of India (API). Modern pharmacological and phytochemical data were searched using PubMed, Google Scholar, ScienceDirect, and ResearchGate with the search terms: *Vetiveria zizanioides*, *Chrysopogon zizanioides*, vetiver, *Ushira*, gastroprotective, antiulcer, antioxidant, anti-inflammatory, gastritis, duodenitis, *Amlapitta*, and *Parinamashoola*. Published articles in English and Hindi up to 2025 were included. The compiled data were analysed and discussed to evaluate the potential of *Ushira Churna* in the management of gastritis and duodenitis.

DRUG REVIEW

Nomenclature and Synonyms

Botanical Name: *Vetiveria zizanioides* (Linn.) Nash; Syn. *Chrysopogon zizanioides* (Linn.) Roberty; *Andropogon muricatus* Retz.

Family: Poaceae (Gramineae)

Sanskrit Synonyms: *Ushira, Nalada, Veerana, Virani, Veeratara, Amrunala, Sevya, Samagandhika, Sugandhimula, Jalvasa, Abhaya, Lamajja, Ishtakapathya* [14,15,16].

Vernacular Names: Hindi – Khas, Khus; Marathi – Vala; Gujarati – Valo; Tamil – Vettiver; Telugu – Vattivellu; Kannada – Lavancha; Bengali –

Khaskhas; Malayalam – Ramacham; English – Vetiver, Khas Khas grass [15].

Rasa Panchaka (Ayurvedic Pharmacological Properties)

Property	Description
Rasa (Taste)	*Tikta (Bitter), Madhura (Sweet)*
Guna (Quality)	*Laghu (Light), Snigdha (Unctuous)*
Veerya (Potency)	*Sheeta (Cold)*
Vipaka (Post-digestive effect)	*Katu (Pungent)*
Dosha Karma	*Pitta Shamaka, Kapha Shamaka*
Prabhava (Special action)	*Dahaprashamana (Burning-sensation alleviating)*

Classical Groupings (Gana/Varga)

In *Charaka Samhita*: *Varnya, Stanyajanana, Chardinigrahana, Dahaprashamana, Angamardaprashamana, Shukrashodhana, Tiktaskandha* [12].

In *Sushruta Samhita*: *Sarivadi Gana, Eladi Gana, Pittashamana Gana* [13].

In *Ashtanga Hridaya*: *Sarivadi Gana* [17].

In *Bhavaprakasha Nighantu*: *Karpooradi Varga* [14].

In *Dhanvantari Nighantu*: *Chandanadi Varga* [15].

In *Kaiyadeva Nighantu*: *Oushadhi Varga* [16].

In *Rajanighantu*: *Chandanadi Varga* [18].

Karma (Pharmacological Actions per Ayurveda)

The principal *Karma* (actions) of *Ushira* relevant to gastrointestinal disorders include: *Pittashamaka* (*Pitta*-pacifying), *Dahaprashamana* (alleviates burning sensation), *Chardinigrahana* (antiemetic), *Deepana* (appetizer), *Pachana* (digestive), *Stambhana* (checking/astringent), *Raktasthambhaka* (haemostatic), *Trishnanigrahana* (thirst-alleviating), and *Jwarahara* (antipyretic) [12,14,19]. The combination of *Sheeta Veerya* with *Deepana-Pachana* action is a distinctive pharmacological attribute of *Ushira* — it enhances digestion without aggravating *Pitta*, making it uniquely suitable for *Amlapitta* management where conventional *Deepana* drugs with *Ushna Veerya* may worsen the condition [20].

Phytochemistry

The roots of *Vetiveria zizanioides* yield a complex essential oil containing over 150 identified sesquiterpenoid compounds. The major phytoconstituents include khusimol (the principal sesquiterpene alcohol), α-vetivone, β-vetivone, vetiverol, vetivene, khusimone, zizaene, prezizaene, isovalencenol, epizizanal, khusitone, and vetivenyl vetivenate [21,22]. Non-volatile constituents include triterpenoid glycosides, phenolic acids, flavonoids, tannins, saponins, alkaloids, steroids (β-sitosterol), and benzoic acid [23,24]. HPLC quantification has confirmed significant levels of gallic acid, protocatechuic acid, and other phenolic compounds [25]. The GC-MS analysis of ethanolic extract has revealed the presence of macromolecules (carbohydrates, proteins) and micromolecules (Vitamin C, Vitamin E) along with secondary metabolites (phenols, tannins, flavonoids) [24].

Pharmacological Activities Relevant to Gastritis and Duodenitis

Gastroprotective and Anti-ulcerogenic Activity: The gastroprotective potential of *Vetiveria zizanioides* has been demonstrated in multiple experimental ulcer models. Triterpenoid glycosides isolated from the roots showed significant antiulcer activity with 56.6%, 68.5%, and 62.6% ulcer inhibition in pyloric ligation, water-immersion stress-induced, and indomethacin-induced ulcer models respectively, at 300 µg/mL, compared with ranitidine as standard [26]. The mechanism involves both antioxidant-mediated cytoprotection and probable enhancement of gastric mucosal defence through prostaglandin synthesis and mucus secretion. Traditionally, the roots have been extensively used for treating ulcers in Indian folk medicine [27,28].

Antioxidant Activity: Multiple studies have confirmed potent antioxidant activity of *Vetiveria zizanioides* root extracts. Subhadradevi et al. (2010) demonstrated significant free radical scavenging activity of ethanolic extract using DPPH, hydrogen peroxide, superoxide, and nitric oxide scavenging assays in a dose-dependent

manner [29]. Kim et al. (2005) reported that the root extract showed strong FRAP (Ferric Reducing Antioxidant Power) values and DPPH inhibition, and provided significant protection to erythrocytes against oxidative damage measured by reduced glutathione (GSH) and malondialdehyde (MDA) concentrations [30]. Since oxidative stress is a key mediator of gastric mucosal injury in gastritis, this antioxidant activity is directly relevant to the gastroprotective mechanism [26].

Anti-inflammatory Activity: Grover et al. (2021) provided a comprehensive review of the anti-inflammatory potential of *Chrysopogon zizanioides* (vetiver), reporting inhibition of pro-inflammatory mediators. The essential oil and root extracts have demonstrated suppression of inflammatory pathways relevant to mucosal inflammation [31]. Karan et al. (2013) confirmed analgesic and anti-inflammatory activity of *Vetiveria zizanioides* extracts in carrageenan-induced paw oedema and acetic acid-induced writhing models [32]. This anti-inflammatory property is significant in the context of gastritis and duodenitis where mucosal inflammation is the primary pathology.

Antimicrobial Activity: The essential oil and root extracts of *Vetiveria zizanioides* have shown antibacterial activity against various pathogens including gram-positive and gram-negative organisms [22,33]. Although direct anti-*Helicobacter pylori* activity has not been specifically reported for vetiver, the broad-spectrum antimicrobial activity of the sesquiterpenoid-rich essential oil suggests potential utility in *H. pylori*-associated gastritis, which warrants future investigation.

Anxiolytic and Sedative Activity: Nirwane et al. (2015) published in the Journal of Ayurveda and Integrative Medicine that *Vetiveria zizanioides* root extract exhibited significant anxiolytic and nootropic activity in mice models [34]. This property is clinically relevant as psychosomatic stress is a recognized aggravating factor in functional dyspepsia, gastritis, and duodenitis [35].

Hepatoprotective Activity: The essential oil of vetiver has been reported to possess hepatoprotective and nephroprotective properties [36]. Since the liver plays a central role in *Pitta* metabolism (*Ranjaka Pitta*) and bile acid homeostasis, hepatoprotective activity is indirectly supportive of gastric mucosal health, particularly in bile-reflux gastritis.

Safety and Toxicity Profile

Acute toxicity studies in animal models have demonstrated no toxic effects at oral doses up to 2000 mg/kg body weight, indicating a high margin of safety [37]. Reproductive toxicity studies involving *Ushira Churna* in male Wistar rats conducted under OECD guidelines reported no adverse effects on general health or reproductive parameters [37]. The long history of traditional use in Ayurvedic clinical practice further supports its safety profile. The Ayurvedic Pharmacopoeia of India recommends a dose of 3–6 g of the drug in powder form [19].

RATIONALE FOR USE IN AMLAPITTA AND PARINAMASHOOLA

The pathogenesis of *Amlapitta* involves *Pitta Prakopa* (vitiation of *Pitta Dosha*) — particularly *Pachaka Pitta* (the digestive component of *Pitta* located in the stomach and duodenum) — leading to excessive production of *Amla Guna* (sour quality) and *Drava Guna* (liquid quality) of *Pitta*, resulting in hyperacidity, mucosal inflammation, and erosion. In modern terms, this corresponds to increased gastric acid secretion, mucosal barrier disruption, and inflammatory infiltration of the gastric and duodenal mucosa [6,7,8].

Ushira addresses this pathogenesis at multiple levels:

1. *Pitta Shamana* through *Sheeta Veerya*: The cold potency directly counteracts the *Ushna* (hot) and *Tikshna* (sharp) attributes of vitiated *Pitta*, providing a physiological cooling effect on the gastric and duodenal mucosa. This correlates with cytoprotective action at the mucosal level [12,14].

2. *Tikta Rasa* (bitter taste): Acharya Charaka describes *Tikta Rasa* as *Deepana* (appetizer), *Pachana* (digestive), *Lekhana* (scraping), and *Kleda-Meda-Vasa-Shoshana* (drying excessive moisture and fat). The bitter taste corrects *Agnimandya* (diminished digestive fire) without aggravating *Pitta*, a critical requirement in *Amlapitta* management [11,20].

3. *Chardinigrahana Karma* (antiemetic action): *Ushira* is classified in *Chardinigrahana Mahakashaya* by Charaka, directly addressing *Tikta-Amla Chardi* (bitter or sour vomiting) — a cardinal symptom of *Amlapitta* [12].

4. *Dahaprashamana Karma* (burning-sensation alleviating): *Ushira* is included in *Dahaprashamana Mahakashaya*, directly targeting *Hrit-Kantha Daha* (epigastric and retrosternal burning) — the most distressing symptom of gastritis [12].

5. Antioxidant-mediated gastroprotection: The free radical scavenging activity documented in multiple studies [26,29,30] supports mucosal protection against reactive oxygen species (ROS)-

mediated injury, which is a key mechanism in NSAID-induced and stress-induced gastritis.

6. Anti-inflammatory mucosal protection: The anti-inflammatory activity [31,32] addresses the inflammatory component of gastritis and duodenitis at the molecular level, complementing the acid-suppressive mechanism of PPIs like rabeprazole.

DISCUSSION

The review of classical Ayurvedic literature and modern pharmacological evidence reveals a compelling rationale for *Ushira* (*Vetiveria zizanioides*) in the management of *Amlapitta* and *Parinamashoola*. The drug occupies a unique pharmacological niche among Ayurvedic gastroprotective agents — it is simultaneously *Sheeta Veerya* (cold potency) for *Pitta Shamana* yet *Deepana-Pachana* (appetite and digestion enhancing) without being *Ushna* (hot). This dual property is rare and makes *Ushira* particularly suitable for *Amlapitta* where many conventional *Deepana* drugs (like *Shunthi*, *Pippali*, *Chitraka*) are *Ushna Veerya* and may worsen the condition [20].

From the modern pharmacological perspective, the gastroprotective activity of isolated triterpenoid glycosides from *Vetiveria zizanioides* showing 56–68% ulcer inhibition across three different ulcer models [26] is particularly significant. These findings suggest that the mechanism of action goes beyond simple acid neutralization and involves true mucosal cytoprotection — likely through enhancement of endogenous prostaglandin synthesis, mucus secretion, and antioxidant defence [26,29]. This cytoprotective mechanism is complementary to the acid-suppressive mechanism of PPIs like rabeprazole, suggesting that *Ushira Churna* may serve as a valuable adjuvant therapy.

The *Churna Kalpana* (powder dosage form) for *Ushira* as described in *Sharangdhara Samhita* is appropriate for this indication. The recommended dose of 3–6 g in churna form ensures adequate delivery of both volatile (essential oil) and non-volatile (phenolic, flavonoid, triterpenoid) active principles. *Sharangdhara Samhita* prescribes a shelf life of two months for *Churna*, though airtight storage can extend this to six months [38]. The formulation *Ushiradi Churna* and *Ushiradi Kwatha* are classical preparations mentioned for *Pitta*-predominant conditions [14,19].

Certain limitations must be acknowledged. While individual pharmacological activities have been demonstrated in pre-clinical models, comprehensive clinical trials evaluating *Ushira Churna* specifically in gastritis and duodenitis are limited. The gastroprotective studies have used crude extracts and isolated glycosides, and the direct clinical correlation with the traditional *Churna* form needs validation. Furthermore, the anti-*Helicobacter pylori* activity has not been specifically investigated, which is an important gap given the role of *H. pylori* in chronic gastritis. Well-designed randomized controlled trials comparing *Ushira Churna* with standard PPI therapy (rabeprazole) and evaluating combination therapy are urgently warranted.

CONCLUSION

Ushira (*Vetiveria zizanioides*) is a well-documented Ayurvedic drug with strong classical credentials for *Pitta Shamana* and gastrointestinal disorders. Its inclusion in multiple *Mahakashaya* groups by Acharya Charaka — including *Chardinigrahana*, *Dahaprashamana*, and *Tiktaskandha* — provides a robust classical rationale for its use in *Amlapitta* and *Parinamashoola*. Modern pharmacological studies have confirmed gastroprotective, anti-ulcerogenic, antioxidant, anti-inflammatory, anxiolytic, and hepatoprotective activities, supporting the traditional claims. The unique combination of *Sheeta Veerya* with *Deepana-Pachana* action makes *Ushira* an ideal drug for conditions where *Pitta* is vitiated but *Agni* also needs correction. The *Churna Kalpana* offers convenient, standardizable dosing. However, rigorous clinical trials are needed to validate the efficacy and safety of *Ushira Churna* in gastritis and duodenitis management, particularly in comparison and combination with proton pump inhibitors like rabeprazole.

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