RESEARCH PAPER

EVALUATING THE IMPACT OF VATASARA DHAUTI ON GUT MICROBIOTA AND GASTROINTESTINAL FUNCTION: A NARRATIVE REVIEW

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Abstract
Vatasara Dhauti is a classical yogic cleansing technique (Shatkarma) that involves the deliberate swallowing of air into the stomach followed by its controlled expulsion through the rectum. Traditionally extolled for alleviating bloating, constipation, and abdominal disorders, the practice has attracted scientific curiosity in the context of modern gastroenterology and the gut microbiome. However, direct experimental data on Vatasara Dhauti are virtually absent. This narrative review synthesises evidence from yogic texts, gastrointestinal physiology, intestinal gas dynamics, and microbiota-gas interactions to critically evaluate the potential impact of the technique on gut microbiota and gastrointestinal function. A systematic literature search was conducted across PubMed, Scopus, Web of Science, and Google Scholar for studies on aerophagia, intestinal gas, gut motility, microbiota, yoga, and Shatkarmas. The results are organised thematically. The available indirect evidence suggests that introducing a bolus of atmospheric air (≈21% O_2, 78% N_2) into the digestive tract may transiently alter the luminal oxygen tension, modulate gas-sensing mechanisms, stretch mechanoreceptors, and stimulate peristalsis and defaecation. Because gut microbial composition and metabolism are intimately tied to intraluminal gases (H_2, CO_2, CH_4, O_2), mechanical disturbance of the gas-liquid interface and oxygenation could temporarily reshape the microbial ecosystem, favouring facultative anaerobes while suppressing strict anaerobes. The rapid transit of air may also dislodge adherent mucus-layer biofilms and flush luminal contents, akin to a pneumatic cleanse. Nevertheless, all mechanistic hypotheses remain speculative, and no study has directly measured Vatasara Dhauti's effect on the microbiota or detailed gastrointestinal parameters. The review highlights the critical need for controlled trials integrating multi-omics, breath gas analysis, motility assessments, and safety monitoring. Until such evidence emerges, Vatasara Dhauti should be regarded as a historically rooted practice with unsubstantiated modern claims, rather than an evidence-based intervention for gut health.
Keywords: Vatasara Dhauti; Shatkarma; Gut microbiota; Gastrointestinal physiology; Intestinal gas; Gut motility

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Introduction

Yogic science encompasses a vast array of physical, respiratory, and meditative practices aimed at harmonising body and mind. Among these, the Shatkarmas, six cleansing techniques, occupy a unique niche, designed to purge the body of accumulated wastes and restore homeostasis. Dhauti, one of the six, comprises multiple sub-types targeting the upper digestive tract. Vatasara Dhauti (literally "air-essence cleansing") is a pneumatic technique in which the practitioner swallows air, retains it briefly in the stomach, and then expels it via the anus, reportedly cleansing the entire alimentary canal [1,2]. Traditional hatha yoga manuals such as the Hatha Yoga Pradipika and Gheranda Samhita describe Vatasara Dhauti as a cure for abdominal distension, sluggish digestion, constipation, and various "gastric disorders", often promising a "resplendent body" and enhanced vitality [1,2].

In recent decades, the gut microbiota has emerged as a central determinant of gastrointestinal (GI) physiology, immune function, metabolism, and even mental health. A balanced microbial ecosystem is essential for fermenting dietary fibres, producing short-chain fatty acids, maintaining the intestinal barrier, and modulating motility via neuroendocrine pathways. Dysbiosis has been implicated in functional GI disorders such as irritable bowel syndrome (IBS), inflammatory bowel disease, and obesity [3]. Crucially, gut microbes are obligate anaerobes that thrive in the uniquely oxygen-depleted environment of the large intestine, and their metabolism generates copious volumes of hydrogen (H_2), carbon dioxide (CO_2), and methane (CH_4) [4]. Thus, the chemical composition, pressure, and volume of intestinal gas are directly shaped by microbial activity, and in turn, the gas milieu influences microbial ecology and host physiology.

Given this bidirectional relationship, any practice that deliberately alters the quantity, composition, or distribution of intraluminal gas could potentially leave a measurable imprint on the gut microbiota and GI function. Vatasara Dhauti, with its intentional infusion of atmospheric air rich in oxygen (≈21% O_2) and nitrogen (≈78% N_2) followed by a forced transit, represents a unique perturbation that intersects gas dynamics, microbial ecology, and neuromuscular reflexes. Yet, despite its long history and anecdotal popularity, the scientific literature is devoid of any clinical or experimental investigation specifically examining Vatasara Dhauti. The practice remains confined to traditional yoga texts and oral transmission, while contemporary researchers have largely focused on more accessible yoga interventions like asana and pranayama. Therefore, a comprehensive review that collates indirect evidence from related domains is warranted to chart the plausible biological terrain and to identify the critical gaps that must be filled before any health claims can be entertained.

This narrative review aims to evaluate the potential impact of Vatasara Dhauti on gut microbiota and GI function by integrating knowledge from (i) traditional descriptions of the technique, (ii) physiology of aerophagia and intestinal gas, (iii) gut microbial ecology and gas metabolism, (iv) mechanical and chemical sensing in the gut, and (v) limited yoga-microbiota research. Through this synthesis, we seek to construct a mechanistic framework, assess the plausibility of claimed benefits, highlight safety concerns, and outline a roadmap for future empirical investigation.

2. Methods

A structured literature search was performed in December 2025 across four electronic databases: PubMed, Scopus, Web of Science, and Google Scholar. The search combined three conceptual blocks: (a) Vatasara Dhauti, Dhauti, Shatkarma, yogic cleansing, yoga and gastrointestinal; (b) aerophagia, air swallowing, intestinal gas, flatus, intraluminal gas; (c) gut microbiota, microbiome, oxygen, hydrogen, methane, short-chain fatty acids, gastrointestinal motility. Boolean operators (AND, OR) were used, and terms were searched in titles, abstracts, and keywords. No language or date restrictions were imposed, though priority was given to peer-reviewed English-language publications. Additionally, classical yoga texts (Hatha Yoga Pradipika, Gheranda Samhita) were consulted through available translations to extract precise descriptions of Vatasara Dhauti.

Inclusion criteria encompassed original research, systematic reviews, meta-analyses, case reports, and authoritative book chapters that addressed any aspect of the physiological handling of intraluminal gas, the effects of swallowed air, the relationship between gut gases and microbiota, or the impact of yoga practices on GI function or the microbiome. Studies examining only belching (supragastric aerophagia) without consideration of intestinal transit were included if they illuminated gas transport mechanisms. Opinion pieces, blogs, and promotional material were excluded.

3. Results

3.1 Traditional Foundation and Technique

Vatasara Dhauti is detailed in Chapter 1, Verse 14-15 of the Gheranda Samhita and referenced in the Hatha Yoga Pradipika (2.22-23) [1,2]. The practitioner, after evacuating the bowels and assuming a squatting position, extends the tongue and shapes the lips into a beak (Kaki Mudra) to sip air slowly and continuously, as if drinking water. The swallowed air is directed into the stomach with the aid of Uddiyana Bandha (abdominal lock) and held for a variable period. When the urge becomes strong, the air is allowed to pass down through the pylorus, traverse the small and large intestines, and exit through the anus while maintaining a forward-bent posture (Pavanamuktasana or similar) that facilitates peristalsis. Advanced texts caution that the practice should be learned under the guidance of a qualified instructor and is contraindicated in acute illness, pregnancy, and cardiac conditions [1]. The purported benefits include purification of the digestive tract, elimination of “wind” disorders (Vata dosha), relief from constipation and bloating, and improved digestive fire (Agni). Traditional Ayurveda and Yoga do not distinguish between atmospheric gases and endogenous fermentation gases; they collectively refer to “Vata” as the principle of movement and air, which must be balanced. From a modern perspective, the technique is a controlled form of aerophagia with a deliberate trans-intestinal transit and anal evacuation, differing markedly from supragastric belching where air is expelled orally [5]

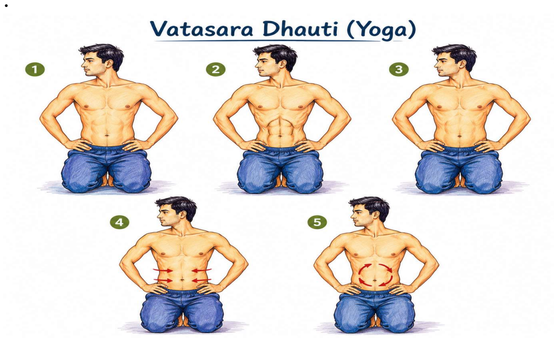

Figure 01: Steps of Vatasara Dhouti

3.2 Physiological Handling of Intraluminal Gas

Under normal conditions, the GI tract contains about 100–200 mL of gas, primarily nitrogen, oxygen, carbon dioxide, hydrogen, and methane. Gas enters the gut through two routes: aerophagia (swallowed air) and microbial fermentation. Swallowed air contributes the bulk of stomach gas and is composed of atmospheric O_2 and N_2. As the air moves distally, O_2 is absorbed across the mucosa or consumed by facultative bacteria, while N_2, being inert and poorly absorbed, accumulates. In the colon, fermentation by anaerobic bacteria produces large volumes of H_2, CO_2, and, in approximately 30–50% of the population, CH_4 (via methanogenic archaea) [6]. A classic study by Levitt et al. determined that flatus is composed of N_2 (11–90%), H_2 (0–50%), CO_2 (5–30%), CH_4 (0–30%), and O_2 (0–2%), with the proportions varying depending on diet and microbiota [6].

The deliberate swallowing of air in Vatasara Dhauti would initially introduce a large bolus of atmospheric gas into the stomach, potentially 1–2 litres according to anecdotal reports. The subsequent retention and distal migration would expose the small bowel and colon to abnormally high oxygen tensions. Since the colon is a profoundly anaerobic environment (pO_2 <1 mmHg), this oxygen "tsunami" could be a potent redox stressor for strict anaerobes, while providing a transient competitive advantage for oxygen-tolerant microbes [7]. The inert nitrogen fraction would traverse largely unabsorbed, contributing to distension and triggering stretch reflexes.

3.3 Impact of Intraluminal Gas on GI Motility and Sensation

Intestinal gas is not an inert space-occupier; it actively modulates motor function. Gut distension activates low- and high-threshold mechanosensitive afferents that relay information to the enteric nervous system and central nervous system, initiating peristaltic reflexes (the "law of the intestine") that propel contents aborally [8]. In healthy individuals, rapid infusion of gas into the small bowel (e.g., during lactulose breath tests) accelerates transit and elicits a strong defaecatory urge. The classical description of Vatasara Dhauti feeling the air pass sequentially through the intestine and the eventual expulsion concords with a massive distension-induced peristaltic wave. Moreover, stretching of the colon stimulates the release of serotonin and motilin, hormones that further enhance motility and secretion [8]. Consequently, the mechanical action of the air bolus could serve as a powerful prokinetic stimulus, potentially clearing luminal contents more completely than a normal bowel movement. However, excessive or repeated distension can lead to visceral hypersensitivity and pain, particularly in individuals with functional disorders like IBS, where gas transit may already be impaired [9].

3.4 Gut Microbiota and Intestinal Gases: A Bidirectional Relationship

The intestinal microbiota both produces and responds to gases. Saccharolytic fermentation by Bacteroidetes, Firmicutes, and other anaerobes generates H_2 and CO_2, which are substrates for cross-feeding organisms. Methanogenic archaea such as Methanobrevibacter smithii consume H_2 and CO_2 to produce CH_4, a gas known to slow intestinal transit by directly acting on smooth muscle [10,11]. Elevated methane levels are associated with constipation-predominant IBS, while hydrogen sulphide (H_2S), produced by sulphate-reducing bacteria, has been linked to diarrhoea and colonic inflammation [12]. Crucially, the oxygen gradient from the submucosa to the lumen structures the microbial communities: the epithelium supports a thin layer of facultative anaerobes that scavenge incoming O_2, allowing strict anaerobes to dominate the lumen [7]. The abrupt introduction of atmospheric oxygen via Vatasara Dhauti would likely disrupt this gradient. Experiments by Albenberg et al. demonstrated that even brief increases in intraluminal oxygenation, whether from vascular perfusion changes or dietary composition, can reshape the microbiota, expanding Proteobacteria (many of which are facultative anaerobes) at the expense of obligate anaerobes [7]. A similar transient bloom of oxygen-tolerant taxa following the air flush, followed by re-establishment of anaerobiosis, could alter metabolic output and inter-species interactions, with potential downstream effects on short-chain fatty acid production, vitamin synthesis, and immune signalling.

3.5 Evidence from Yoga and Related Practices on Gut Microbiota and GI Function

While no study has assessed Vatasara Dhauti, a modest body of literature investigates the influence of general yoga practice on the gut microbiome. A systematic review by Pascoe et al. (2021) identified nine studies that examined yoga, meditation, or breathing exercises in relation to gut microbiota [13]. Most were small pilot studies or opportunistic comparisons, with significant heterogeneity in interventions and outcomes. Notably, a randomised controlled trial in IBS patients reported that a 12-week yoga intervention, comprising asanas and pranayama, resulted in significant improvements in symptoms and quality of life, accompanied by increases in beneficial bacterial taxa (e.g., Bifidobacterium) and reductions in pro-inflammatory markers [14]. Another study observed that long-term meditation practitioners had a distinct microbial profile enriched in Prevotella and Megasphaera, although causation cannot be inferred [15]. Mechanistically, yoga-induced changes in vagal tone, stress hormone levels, and intestinal transit time are hypothesised to mediate these effects. However, such interventions are multimodal (movement, breathing, relaxation) and do not directly mimic the acute pneumatic perturbation of Vatasara Dhauti.

Research on yogic cleansing techniques (Shatkarmas) is even scarcer. A small pilot on Laghu Shankhaprakshalana (a saline-water cleansing technique) suggested alterations in colonic transit and electrolyte balance but did not include microbiota analysis [16]. Vamana Dhauti (induced vomiting) has been investigated for its potential in balancing gastric pH, with no microbiome data. Therefore, any extrapolation from general yoga to Vatasara Dhauti must be made with extreme caution.

3.6 Hypothetical Mechanisms of Vatasara Dhauti on Gut Microbiota and Function

Based on the above physiology, we propose several convergent mechanisms through which Vatasara Dhauti could theoretically influence the gut ecosystem:

Pneumatic Mechanical "Cleansing": The rapid, high-volume transit of air may physically dislodge loosely adherent mucus, food residues, and bacteria-laden biofilms from the intestinal wall, akin to the flushing action of a large-volume enema but using gas instead of fluid. This could reduce the total microbial load transiently and provide a niche for recolonisation by a different consortium.

Oxygenation and Redox Perturbation: Atmospheric air contains 21% oxygen. Exposure of the colon to such concentrations even transiently would elevate the local redox potential, potentially inhibiting obligate anaerobes (e.g., Faecalibacterium prausnitzii, Roseburia) while promoting facultative anaerobes (e.g., Enterobacteriaceae). This shift might break the colonisation resistance provided by a stable anaerobic community, a phenomenon exploited in faecal microbiota transplantation where exposure to ambient air reduces viability of strict anaerobes. The subsequent return to hypoxia could favour a different successional trajectory, possibly beneficial or detrimental.

Motility-Driven Transit Time Reduction: By powerfully stimulating peristalsis and defaecation, Vatasara Dhauti reduces whole-gut transit time. Transit time is a master regulator of microbial composition: faster transit favours rapidly growing taxa (e.g., Bacteroides) and reduces methanogen activity, while slow transit encourages slow-growing specialists and archaeal methane production [17]. A single profound evacuation could abruptly alter substrate availability and wash out dividing cells, resetting the ecosystem.

Barometric Stimulation of Enteroendocrine Cells: Distension and stretch activate enterochromaffin cells to release serotonin (5-HT), which, beyond its prokinetic effects, can modulate mucosal immune responses and even influence bacterial gene expression through quorum-sensing interference [18]. Gut-derived serotonin has been shown to promote the growth of certain pathogens like Citrobacter rodentium while inhibiting others, though human data are lacking.

Vagal and Autonomic Modulation: The intense abdominal manipulation and bandhas (locks) involved in Vatasara Dhauti likely increase vagal parasympathetic outflow, which exerts an anti-inflammatory effect on the gut and can modulate epithelial permeability. The cholinergic anti-inflammatory pathway is known to shape the microbial niche by controlling mucus secretion and antimicrobial peptide production [19].

Gas Scavenging and Detoxification: Some proponents claim Vatasara Dhauti helps remove "toxic gases." While the term is vague, it is conceivable that expelling fermentation gases (CH_4, H_2S) reduces their local concentration. Methane slows transit; its rapid elimination could temporarily lift methanogen-induced ileus. Similarly, H_2S is toxic to colonocytes at high concentrations; a flush-out might protect the epithelium.

All these mechanisms are speculative and require direct testing.

3.7 Safety Considerations

Vatasara Dhauti is not without risk. Acute gastric distension can trigger vasovagal syncope, severe cramping, or even gastric volvulus in predisposed individuals. Forcing air through the pylorus while performing Uddiyana Bandha may increase intra-abdominal pressure acutely, a concern for those with hernias, hypertension, or glaucoma. The practice could exacerbate gastro-oesophageal reflux or cause aspiration if the air is inadvertently released orally against a closed glottis. In individuals with slow transit or anatomical abnormalities (adhesions, strictures), trapped air might cause intestinal obstruction or perforation, a life-threatening emergency. Furthermore, from a microbiota perspective, repeated large-volume oxygenation might favour pathogenic aerobic bacteria, increasing the risk of low-grade inflammation. No clinical trial has systematically monitored adverse events. Therefore, the risk-benefit profile remains completely undefined, and unsupervised practice must be discouraged.

4. Discussion

This review set out to evaluate the impact of Vatasara Dhauti on gut microbiota and GI function despite the absence of direct empirical data. By triangulating evidence from traditional texts, gas physiology, and microbial ecology, we have constructed a mechanistic scaffold that renders some of the traditional claims scientifically plausible but far from proven. The cardinal message is that while the human gut is exquisitely sensitive to changes in intraluminal gas composition, volume, and flow, the specific signature of Vatasara Dhauti, a bolus of atmospheric air traversing the entire bowel has never been characterised.

The strengths of this review include its comprehensive, cross-disciplinary synthesis and the generation of testable hypotheses. The major limitation is the heavy reliance on indirect evidence. Most studies on intestinal gas used small insufflation volumes, steady-state measurements, or pathological aerophagia, whereas Vatasara Dhauti involves a single, large, voluntary air infusion. Aerophagia research has focused almost exclusively on belching disorders, not trans-colonic passage. Similarly, microbiota-gas studies primarily examine endogenously produced gases, not exogenous atmospheric gases. Extrapolating from these domains carries a high degree of uncertainty. Additionally, many of the cited yoga-microbiota studies are underpowered, non-blinded, and confounded by lifestyle factors.

The review underscores glaring research gaps. Foremost, a controlled, sequential study is needed: healthy volunteers, optimally trained in Vatasara Dhauti, would undergo baseline assessments of gut transit (e.g., wireless motility capsule or radiopaque markers), intestinal gas profiles via room-air calibrated breath analysis, and faecal/sigmoid mucosal microbiota analysis (16S rRNA sequencing, metagenomics). After a standardised Vatasara Dhauti session, all parameters would be remeasured acutely and after a recovery period (e.g., 24 h, 7 days). Key outcomes would include changes in microbial diversity, relative abundance of strict vs. facultative anaerobes, breath H_2/CH_4 levels, whole-gut transit time, and symptom scores. Blinding is impossible for the participant, but objective biomarkers reduce bias. Parallel experiments in animal models (e.g., gnotobiotic mice colonised with human microbiota) could isolate the oxygen effect by exposing the bowel to air while controlling for stress and mechanical stretch. Moreover, comparison with a control intervention (e.g., a single deep pranayama session that does not involve air swallowing) would help separate the pneumatic effect from general yoga-mediated autonomic modulation.

From a clinical standpoint, if future trials demonstrate that Vatasara Dhauti reliably accelerates transit and transiently reduces methanogen burden, it might hold promise as an adjunctive therapy for chronic constipation or methane-associated IBS. Conversely, if it disrupts the mucosa-associated anaerobic barrier or promotes Enterobacteriaceae blooms, the practice could be detrimental, especially in inflammatory bowel disease. Until such data are available, any recommendation of Vatasara Dhauti as a "microbiota-friendly" detox is premature and potentially unsafe.

In the broader context of integrative medicine, this review highlights the need to subject traditional cleansing practices to the same rigorous scientific scrutiny applied to pharmacological or dietary interventions. The gut microbiome is dynamic, responsive, and clinically relevant; yoga practices that intentionally perturb luminal chemistry deserve a dedicated research programme. Collaborations between yoga practitioners, gastroenterologists, and microbial ecologists will be essential to navigate the epistemological divide between ancient experiential knowledge and modern evidence-based medicine.

Conclusion

Vatasara Dhauti is a unique yogic technique that deliberately introduces a large volume of atmospheric air into the gastrointestinal tract, purportedly to cleanse and restore digestive health. Despite its enduring popularity in traditional circles, direct evidence regarding its effects on gut microbiota and GI function is nonexistent. This review has brought together disparate strands of physiological and microbial research to propose plausible mechanisms mechanical flushing, oxygen-mediated microbial selection, prokinetic distension, and autonomic modulation by which the practice could theoretically influence the gut ecosystem. However, these mechanisms remain entirely hypothetical, and the safety profile is unknown. Well-designed translational studies employing modern multi-omics and motility assessments are urgently needed before any claims of benefit can be substantiated. For now, Vatasara Dhauti must be regarded as an intriguing but unvalidated historical practice, demanding a cautious and evidence-driven approach.

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