The Efficacy of Herbal Medicines in Gastrointestinal Diseases

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Herbal medicine has been a key component of traditional treatments, such as Ayurveda and Traditional Chinese Medicine for thousands of years. As the need for safer treatment alternatives increases, herbal medicine is slowly making its way into modern therapy. This review identified and analyzed the efficacy of three specific herbs in managing various GI diseases: ginger, oregano, and green tea. Each herb was selected for its unique properties that contribute to GI disease management. Ginger has been proven to exhibit anti-inflammatory and antimicrobial benefits, as well as enhance gastric motility. Oregano contains antimicrobial, inflammatory, and antioxidant properties, offering the potential to manage infections and inflammation in the GI tract. Green tea, rich in polyphenols, showed promise in protecting against oxidative stress and presented prebiotic effects. It was found that these herbs contain possible potential as an alternative to pharmaceutical treatments as they exhibit properties key to combating GI diseases. However, while the preliminary data is promising, the review emphasizes the need for more in-depth clinical studies to establish their efficacy as alternatives or adjuncts to conventional treatments. This paper highlights the benefits, limitations, and future directions of herbal therapies in GI health care, aiming to inform healthcare professionals, researchers, and patients about the role of herbal medicine. Additionally, this paper calls for further research and integration of herbal therapies into clinical environments, which could expand treatment options for patients and offer more holistic approaches to GI health control.

Keywords: Ayurveda, Chinese medicine, gastrointestinal treatment, gastrointestinal diseases

Introduction

The treatments for gastrointestinal (GI) diseases contain a wide range of approaches from conventional pharmaceutical therapies to lifestyle changes. Pharmaceutical treatments include proton pump inhibitors, antibiotics, antispasmodics, and biologics [1,2]. These are commonly used to treat diseases such as Irritable Bowel Syndrome (IBS), Irritable Bowel Disease (IBD), peptic ulcers, gastroesophageal reflux disease (GERD), Small Intestinal Bacterial Overgrowth (SIBO), and dysbiosis. Although these treatments are known to be effective, they are often associated with multiple side effects and long-term complications, calling for safer alternatives [2].

In recent years, although 80% of healthcare systems depend on conventional therapies, herbal medicine has been making a slow comeback and is being used in some practices as an alternative approach to GI disease treatment [3]. The global market value of phytomedicines experienced significant growth, rising from $91.64 billion in 2020 to $199.07 billion in 2023, reflecting the increasing demand for natural and alternative therapeutic solutions [3]. Herbal medicine is traditionally used across various cultures for its natural healing properties. As antibiotic resistance increases, herbal medicine is gaining a renewed interest and acceptance in modern medicine [4]. Their current reputation in the field is being strengthened by new scientific evidence of their safety and efficacy. Many patients and healthcare providers are incorporating herbal remedies into their integrative treatment plans, reflecting a trend toward holistic care [5].

The relevance of exploring herbal medicine for GI diseases lies in the search for therapies that offer fewer side effects, improve patient compliance, and provide holistic benefits. With the rise of antibiotic resistance and the chronic symptoms of many GI conditions, it is crucial to explore complementary treatments that can enhance patient outcomes. Herbal medicines offer a potential alternative with their anti-inflammatory, antimicrobial, and mucosal protective properties [6,7].

Herbal medicine is believed to alleviate symptoms, reduce inflammation, and improve gut health through gentler treatments. Phytochemicals such as flavonoids, alkaloids, and tannins, can contribute to therapeutic effects. Additionally, herbal medicines tend to be better tolerated with fewer poor reactions compared to conventional treatments [8].

The significance of this paper lies in its potential to address a critical gap in the existing literature: the lack of comprehensive research on the efficacy of herbal medicines across a broad spectrum of GI disorders. This review aims to provide a broad overview of the current scientific evidence on the efficacy of herbal medicines in treating GI diseases. It strives to illuminate potential benefits, limitations, and future directions of herbal therapies in gastroenterology to inform healthcare professionals, researchers, and patients about the potential role of herbal medicines in holistic GI disease treatments. Additionally, this

review encourages further research to possibly allow for the integration of these therapies into conventional medical practice.

GINGER

Ginger (Zingiber Officinale) is a member of the Zingiberaceae family and is known as a medicinal plant originating from Southeast Asia. Ginger has been a staple in several traditional medicine systems such as Ayurveda and Traditional Chinese Medicine for centuries where its wide-ranging benefits have been appreciated and utilized[9].

In Ayurveda, ginger holds a significant place as it is commonly used to aid digestion, reduce nausea, and alleviate arthritis symptoms[10]. Traditional Chinese Medicine also recognizes the therapeutic effects of ginger, referring to it as a warming herb that is valuable in treating colds, improving circulation, and promoting digestive health[11]. Additionally, ginger is used as a food preservative, demonstrating its antibacterial and antifungal properties[12].

Beyond its traditional uses, modern research continues to uncover the health benefits of ginger, including its anti-inflammatory properties. This has led to the exploration of ginger as a potential alternative treatment for various health conditions, further fueling interest in this plant[13].

Mechanism of Action

Ginger unleashes its therapeutic effects through a complex array of bioactives, mostly gingerols and shogaols. These compounds influence various biochemical pathways that contribute to the effectiveness of ginger's therapeutic effects[14].

One of ginger's primary mechanisms is its anti-inflammatory effects. These compounds prevent the production of pro-inflammatory cytokines and enzymes such as NF-κB and Cyclooxygenase-2 (COX-2) by inhibiting the degradation of IκBα, a protein that keeps NF-κB inactive in the cytoplasm. This inhibition reduces the transcription of pro-inflammatory cytokines such as TNF-α, IL-1β, and IL-6, which are increased in conditions such as IBD and IBS[15].

Furthermore, ginger's phenolic compounds and essential oils exhibit many antimicrobial effects by eliminating the growth of harmful bacteria, viruses, and fungi[16]. Its phenolic compounds and essential oils disrupt microbial cell membranes, leading to loss of cellular integrity and interference with vital metabolic processes. Antimicrobial activity is essential for conditions such as SIBO and dysbiosis where pathogenic microorganisms dominate the gut microbiota.

Lastly, ginger demonstrates the prospective ability to enhance gastrointestinal motility. Gingerols and shogaols affect the enteric nervous system by modulating serotonin receptors, particularly 5-HT3 and 5-HT4, which regulate intestinal peristalsis and gastric emptying. This interaction could promote regular bowel movements, and reduce gastrointestinal spasms[17]. This is beneficial for relieving symptoms of dyspepsia and IBS-C (constipation) as it can support regular gastric emptying and reduce discomfort associated with slow and irregular digestive processes.

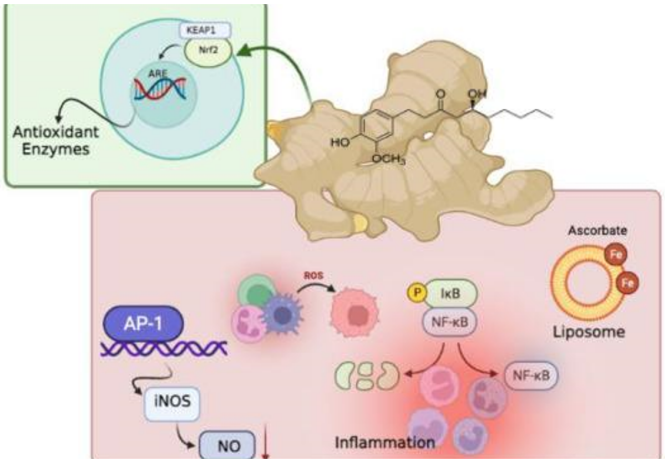

Fig. 1 *Illustrates ginger's dual role in reducing inflammation by suppressing* NF-κB and AP-1 pathways and enhancing antioxidant defence through the activation of Nrf2-KEAP1 pathway[18].

Results from Studies

In 2022, a study was conducted on Wistar rats to examine the impact of ginger on GI motility and oxidative stress. The researchers administered ginger at doses 50, 100, 200, and 300 mg/kg, with six rats per dose group and a placebo control. The study included ex vivo analysis of intestinal contractions and controls for potential confounders such as age, gender and diet. The study revealed that ginger enhances gastric transit and emptying in a dose-dependent manner. Higher doses of ginger (300 mg/kg) improved motility and reduced oxidative stress markers, revealing its potential as a natural remedy for GI disorders with irregular bowel movements such as IBS-C. Additionally, the study's mechanism of action suggests that ginger may modulate pathways like transient receptor potential vanilloid (TRPV1) channel activation and reduce oxidative damage through its antioxidant compounds such as 6-gingerol[19].

However, the study's reliance on animal models limits its direct applicability to humans. The dose equivalence and metabolic differences between rats and humans remain as critical gaps. Additionally, the small sample size reduces accuracy, and no long-term effects were evaluated. Future research should focus on human clinical trials to validate these findings, focusing on diverse populations and assessing ginger's safety, bioavailability, and interaction with other treatments. Exploring combination therapies with other natural or pharmaceutical agents

could also broaden ginger's applicability in GI care. Such studies would provide stronger evidence for integrating ginger into clinical settings for conditions involving motility dysfunction and oxidative stress.

Additionally, a study published in 2020 evaluated the efficacy of ginger, metoclopramide, haloperidol, and dexmedetomidine in preventing postoperative nausea and vomiting (PONV) following laparoscopic cholecystectomy. Participants were randomly assigned to receive either ginger (four capsules preoperatively), metoclopramide (10 mg administered 30 minutes before surgery), haloperidol (5 mg intraoperatively), or dexmedetomidine (25 μg intraoperatively). The study found that all four treatments reduced the severity of PONV compared to placebo, with no statistically significant differences in efficacy among the treatments. Notably, ginger was as effective as metoclopramide in reducing PONV, while also maintaining more stable hemodynamic parameters. Unlike metoclopramide, which carries a risk of side effects such as sedation and extrapyramidal symptoms, ginger was well-tolerated with minimal risks[20]. These findings highlight ginger as a possible natural alternative to metoclopramide for PONV prevention, offering comparable efficacy and improved safety, particularly for patients who are at risk of side effects from pharmacological agents. This study underscores the potential of ginger as an option for managing GI-related disorders.

While the study provides valuable insights into the efficacy of ginger compared to pharmacological treatments for PONV, several gaps limit its scope. First off, it primarily focuses on PONV prevention without addressing secondary outcomes like long-term effects or optimized dosing. The lack of diverse patient representation and standardized ginger preparations raises concerns about generalizability and reproducibility. The mechanism insights into ginger's effects and its potential interactions are also missing. Furthermore, the study overlooks the possibility of combining ginger with pharmacological agents for synergistic benefits.

Analysis

The studies highlight ginger's potential as a treatment for various GI disorders, including motility dysfunction, oxidative stress-related conditions, and PONV. Research on Wistar rats demonstrated that ginger enhances gastric motility and reduces oxidative stress in a dose-dependent manner, potentially mediated by TRPV1 channel activation and antioxidant compounds like 6-gingerol. These findings suggest that ginger could be effective for conditions like IBS-C. However, limitations such as reliance on animal models, small sample sizes, and lack of long-term evaluation highlight the need for human clinical trials to confirm these benefits and refine safe, effective dosing strategies for diverse populations. Similarly, a study on PONV management found that ginger is as effective as pharmacological treatments like metoclopramide while offering additional safety benefits and fewer side effects, making it a possible natural alternative for patients who may not tolerate conventional medications. Despite these promising findings, the study's focus on short-term outcomes, limited patient diversity, and absence of mechanized insights suggest areas for improvement.

The therapeutic versatility of ginger, from improving GI motility to reducing oxidative stress and managing nausea, make it a choice to consider for integrative GI care, particularly given its minimal side effects compared to pharmacological agents. To fully unveil ginger's clinical potential, future research should focus on conducting large-scale, well-controlled human clinical trials to validate preclinical results and address gaps in dosing, safety, and bioavailability. Mechanistic studies are also essential to better understand the molecular pathways underlying ginger's effects on motility, oxidative stress, and nausea. Additionally, exploring the effects of ginger in combination with pharmacological agents could broaden its possible therapeutic applications. Developing standardized preparations of ginger to improve reproducibility and evaluating its long-term effects on chronic conditions will further support its possible integration into clinical practice. By addressing these gaps, future studies could establish the stance of ginger in GI health.

OREGANO

Oregano (Origanum Vulgare) is a reliable herb native to the Mediterranean region, known for both its culinary and medicinal applications. In ancient Greece, oregano was respected for its ability to assist issues such as indigestion and bloating[21]. Oregano can possibly combat GI diseases due to its antimicrobial, antioxidant, and anti-inflammatory properties[22]. Today, modern research continues to explore and validate traditional uses of oregano.

Mechanism of Action

Essential oils found in Oregano, particularly carvacrol, and thymol, have been recognized for their ability to inhibit harmful bacteria and support healthy digestion[23]. These compounds can support a healthy balance in the gut microbiome, potentially alleviating symptoms such as bloating and indigestion.

Carvacrol and thymol hold strong antimicrobial properties, interfering with the growth of fungi, pathogens, and viruses. At the cellular level, carvacrol and thymol disrupt the integrity of microbial cell membranes by altering their fluidity and permeability, leading to ion leakage and microbial death[24]. Such antimicrobial activity can be valuable for conditions like SIBO and dysbiosis where maintaining a balanced gut microbiota is essential[25].

Oregano can also reduce the production of pro-inflammatory cytokines such as TNF-α, IL-1β, and IL-6[26]. Carvacrol and

thymol achieve this by blocking the nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB) pathway, a central regulator of inflammation-related gene expression. Specifically, these compounds inhibit the phosphorylation and degradation of IκBα, preventing NF-κB translocation to the nucleus and cytokine production[27]. This anti-inflammatory effect possibly helps reduce inflammation in the gastrointestinal tract, which would be beneficial in conditions such as IBS and IBD.

Additionally, oregano contains high levels of antioxidants, specifically rosmarinic acid. Rosmarinic acid can reduce oxidative stress by neutralizing free radical species including hydroxyl radicals and superoxide anions, by donating electrons or hydrogen atoms[28]. This action can prevent the worsening of inflammation and damage to the gastrointestinal lining by preventing oxidative damage to lipids, proteins, and DNA. Protecting the gastrointestinal lining could be particularly beneficial in GI issues such as gastric ulcers, where free radicals contribute to mucosal erosion and delayed healing[29].

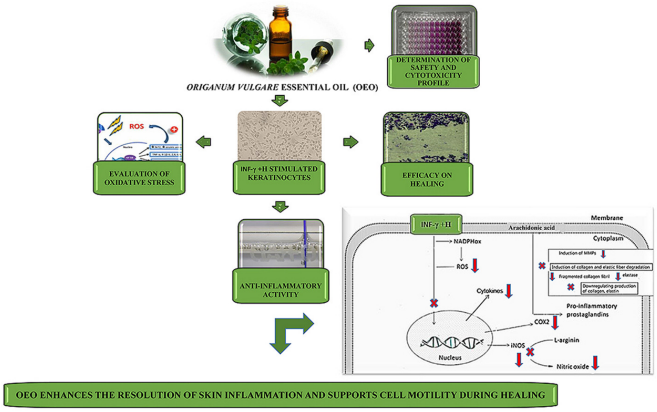

Fig. 2 Illustrates the mechanism by which oregano essential oil influences gut health[30].

Results from Studies

In a mouse model study with 60 subjects, researchers examined carvacrol's potential in preventing and treating Clostridium Difficile Infection (CDI) and associated dysbiosis. The mice were divided into three groups: one received carvacrol supplementation, another received antibiotics, and a control group had no intervention. The study carefully controlled for factors by selecting mice of the same age and genetic background, ensuring baseline microbiome similarities. The findings presented that carvacrol can reduce diarrhea and significantly influence the gut microbiome by increasing the population of beneficial bacteria, such as Lactobacillus and Bifidobacterium species[31].

Carvacrol's mechanism of action is believed to involve its antimicrobial activity, targeting pathogenic bacteria while saving beneficial microbes. This selective mechanism may be linked to its ability to disrupt bacterial cell membranes.

While these findings are promising, the study's limitations must be acknowledged. The use of a mouse model, although valuable for initial insight, limits direct applicability to humans due to differences in the gut microbiota and metabolism. The short duration of intervention also leaves concerns regarding its long-term efficacy and safety untouched. Additionally, while the increase in beneficial bacteria was significant, the study did not evaluate whether these results also apply to the protection against recurrent CDI.

Future research should include human clinical trials with diverse cohorts to validate these findings. Trials should focus on understanding dose-response relationships, long-term safety, and carvacrol's integration with existing treatments for CDI. Furthermore, a comparative analysis of carvacrol and conventional antibiotics, assessing both efficacy and side effect profiles, could provide critical insights into its clinical utility.

Another study investigated the in vitro efficacy of oregano hydroalcoholic extract against Giardia lamblia cysts, comparing its effects to metronidazole. The study exposed Giardia lamblia cysts to different concentrations of oregano extract (10, 100, and 200 mg/mL) and metronidazole (125 mg/kg) and assessed cyst viability at 30, 60, and 120 minutes. The findings revealed that the oregano extract exhibited dose-dependent anti-Giardia activity, with its highest concentration achieving efficacy comparable to metronidazole. Both oregano and metronidazole showed time-dependent effects, with the most effective cysticidal activity observed at 120 minutes. While metronidazole acts by disrupting protozoal DNA synthesis, oregano's antimicrobial effects are attributed to its phenolic compounds. Importantly, oregano extract may offer a more favorable treatment than metronidazole, as metronidazole is associated with side effects like nausea, headache, and neurotoxicity. Thus, oregano could serve as an alternative or adjunct therapy, particularly for addressing metronidazole-resistant Giardia strains[32].

While the study demonstrates the potential of oregano extract as an alternative treatment for Giardia lamblia, several gaps limit its clinical applicability. The research is restricted to in vitro experiments, lacking in vivo studies or clinical trials to confirm its efficacy, safety, and metabolism in living organisms. Additionally, the safety of high concentrations of oregano extract remains unexplored, and the absence of phytochemical standardization makes replication and consistency challenging. The study does not compare oregano extract to variable or lower doses of metronidazole, nor does it examine its potential for combination therapy to enhance efficacy or reduce metronidazole-associated side effects. Furthermore, the short assessment duration and lack of investigation into resistance mechanisms, delivery methods, and drug interactions limit its clinical relevance.

Analysis

The studies reviewed oregano's potential as an herbal therapeutic option for various GI disorders, particularly through the antimicrobial activity of its key compound, carvacrol. In a mouse model, carvacrol demonstrated efficacy in reducing diarrhea and improving gut microbiota composition by increasing beneficial bacteria such as Lactobacillus and Bifidobacterium species. This action, likely resulting from its ability to disrupt pathogenic bacterial cell membranes, suggests a promising role in managing CDI. Similarly, in vitro research found oregano hydroalcoholic extract to exhibit dose-dependent activity against Giardia lamblia cysts, with its highest concentration achieving efficacy comparable to metronidazole. The extract's phenolic compounds, such as carvacrol and thymol, showed antimicrobial effects while potentially offering a safer alternative to metronidazole, which is associated with side effects like nausea and neurotoxicity.

Despite these results, limitations remain. The reliance on in vitro and animal studies restricts clinical applicability due to differences in metabolism and microbiota between species. Additionally, the safety and efficacy of long-term carvacrol use and high oregano extract concentrations remain unexplored. Gaps in research also include the lack of clinical trials, the absence of phytochemical standardization, and limited insights into resistance mechanisms or drug interactions. Future research should prioritize human clinical trials to validate oregano's efficacy and safety, focusing on dose-response relationships, long-term effects, and its integration with existing therapies. Comparative studies assessing oregano against conventional antibiotics could provide critical insights into its clinical utility and side effect profile. Additionally, exploring combination therapies and standardized preparations could enhance reproducibility and broaden oregano's therapeutic applications. Addressing these gaps will help establish oregano as a reliable and effective option for managing a variety of GI disorders.

GREEN TEA

Green tea, rooted in Camellia Sinensis, has been used for thousands of years, especially in East Asia[33]. Known for its delicate flavor and numerous health benefits, green tea has been used as a traditional medicine across China, Japan, and other parts of Asia[34].

In Traditional Chinese Medicine, green tea is frequently used to aid digestion and ease digestive discomfort such as bloating and cramps[35]. Its mild astringent properties are considered to be the culprit of these effects[36].

In Japan, green tea is not only consumed for its refreshing taste but also for its medicinal properties. It was commonly used to promote gut health and to cleanse the digestive system. The polyphenols of green tea, particularly the catechins, are believed to help reduce the inflammation in the gastrointestinal tract and protect the gut lining from damage caused by infections or poor diet[35]. As modern research expands its knowledge of green tea, its traditional uses have been validated and further explored.

Mechanism of Action

Research has shown that catechins found in green tea provide antioxidants, anti-inflammatory, and antimicrobial properties which contribute to its efficacy in managing various GI diseases[37].

Green tea catechins, especially epigallocatechin-3-gallate (EGCG), have potent anti-inflammatory properties. They inhibit NF-B signaling and the production of pro-inflammatory cytokines such as TNF-, IL-6, and IL-1. This is done by preventing the phosphorylation and subsequent degradation of IB, a protein that sequesters NF-B in the cytoplasm[38]. These cytokines are central to the inflammation found in conditions such as IBD. Downregulating these pathways, green tea can reduce inflammation in the GI tract, which is crucial for managing conditions like IBD[39].

Additionally, the catechins found in green tea are considered to be powerful antioxidants that can neutralize the reactive oxidative species (ROS) and prevent oxidative damage at the cellular level[40]. EGCG interacts directly with ROS, including hydroxyl radicals and superoxide anions, by donating electrons or hydrogen atoms, effectively neutralizing their reactivity. This in turn can reduce oxidative stress, which is valuable in treating GI conditions like gastritis, peptic ulcers, and IBD[29]. Furthermore, the potential ability of the catechins to protect the gut lining from oxidative stress can improve the healing process and maintenance of the gut mucosa[41].

Green tea catechins also hold prebiotic-like effects, promoting the growth of beneficial bacteria such as Lactobacillus, Bifidobacterium, and Enterococcus, while suppressing the growth of unwanted bacteria such as Escherichia coli and Clostridium difficile[42]. Catechins interact with bacterial membranes, disrupting the lipid bilayer and interfering with essential metabolic processes. This can help maintain a healthy gut microbiome which is key in managing Dysbiosis-related conditions such as IBS and SIBO.

Results from Studies

A randomized, double-blinded clinical study[44] was conducted to evaluate the results of matcha green tea on fecal microbiota. The study included 50 healthy participants who were randomly assigned to a group that consumed 2 grams of matcha daily for two weeks or a placebo group. Then, the researchers collected the fecal samples of the participants to analyze the changes in the gut microbiome composition. The primary focus was

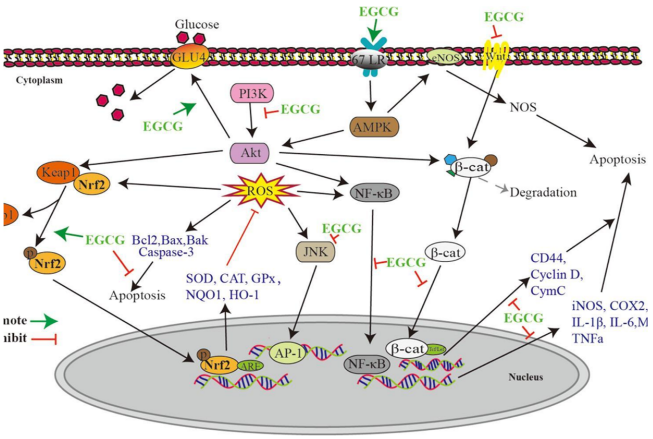

Fig. 3 Demonstrates how EGCG in green tea reduces oxidative stress, inflammation, and apoptosis by modulating key cellular pathways [43].

on determining if matcha green tea consumption could lead to beneficial changes to the diversity of the gut microbiome.

The findings revealed that regular consumption of matcha had a positive effect on the gut microbiome. The study specifically reported an increase in the population of beneficial bacteria such as Lactobacillus and Bifidobacterium. Furthermore, there was a reduction in the presence of harmful bacteria, indicating that matcha may help maintain or restore the balance in the gut microbiome.

The study's mechanisms suggest that matcha's effects are likely attributed to its high polyphenol and catechin content, particularly epigallocatechin gallate (EGCG), which has known prebiotic and antimicrobial properties. These compounds may promote the growth of beneficial bacteria while inhibiting pathogens. However, the study has some limitations, such as a short intervention period and a relatively small sample size, which may reduce the generalizability of the results. Furthermore, while the study showed significant changes in microbial composition, it did not investigate whether these changes translated to improved clinical outcomes, such as reduced inflammation or enhanced digestive function.

Additionally, a double-blind, placebo-controlled, randomized trial evaluated the effects of green tea extract and metformin on glycemic control and lipid profiles in overweight women. Participants were divided into three groups: green tea extract, metformin, and placebo. The study measured fasting blood glucose, insulin levels, and lipid profiles (total cholesterol, LDL, HDL) over a specific intervention period. Both green tea extract and metform improved glycemic control compared to the placebo, with the green tea extract showing a more noticeable reduction in fasting blood glucose and insulin levels. Additionally, green tea extract demonstrated effect on lipid profiles, including greater reductions in total cholesterol, LDL, and triglycerides, and an increase in HDL cholesterol, compared to metformin. Both interventions were well-tolerated, with no severe effects reported. In a GI context, metformin primarily exerts its effects by reducing glucose absorption in the intestine and improving insulin sensitivity. Hoverver, it is often associated with GI side effects such as nausea, diarrhea, and abdominal discomfort. In contrast, green tea extract, while also influencing glucose absorption and lipid metabolism, appears to have a gentler impact on the GI tract and may enhance lipid digestion and metabolism without the adverse effects seen with metformin [45]. These findings suggest that green tea extract could serve as a complementary or alternative treatment to metformin, particularly for individuals who experience GI side effects.

Analysis

Clinical trials have demonstrated that green tea can improve glycemic control and lipid profiles, suggesting benefits for metabolic conditions often linked to GI health. Its anti-inflammatory effects, through the inhibition of pathways like NF-B, may also offer protective benefits in managing GI inflammation and oxidative stress. Furthermore, green tea's antioxidant properties may also assist in reducing the risk of GI-related cancers and alleviating symptoms in conditions like IBS and IBD. Comparisons with conventional treatments, such as anti-inflammatory drugs, highlight green tea's ability to provide similar therapeutic effects while avoiding side effects like GI mucosal damage.

However, much of the evidence is from preclinical studies or clinical trials with small sample sizes and short durations, leaving questions about long-term efficacy and safety unanswered. The variability in green tea formulations and catechin concentrations also poses challenges for standardization and reproducibility. Additionally, while green tea has shown potential as an adjunct or alternative to conventional therapies, further studies are needed to explore its effects when combined with pharmaceutical treatments. Future research should focus on large-scale, well-controlled human clinical trials to validate its benefits, refine dosing strategies, and assess bioavailability and long-term safety. Mechanistic studies exploring the molecular pathways underlying green tea's effects on GI health could further support its integration into clinical practice. Addressing these gaps will help establish whether green tea is a safe, effective, and accessible option for managing a range of GI disorders.

Discussion/Conclusion

The importance of this paper comes from the need for a comprehensive review that evaluates herbal medicine across a diverse range of GI diseases. While studies have explored the impact

Table 1 Summary of Studies and Research Outcomes on Ginger, Oregano, and Green Tea

Herb	Author (year)	Associated Data/Outcomes	Key Findings
Ginger	(Gura et al., 2024)[43]	Reduced dyslipidemia markers, improved gastric motility, and reduced nausea symptoms.	Ginger is effective in treating dyslipidemia and GI conditions.
Green Tea	(Craig, 1999)[46]	Reduction in intestinal disturbances, prevention of gastric ulcers, and anti-inflammatory effects.	Green tea catechins reduce intestinal disturbances and may prevent ulcers.
Oregano	(Malongane et al., 2017)[47]	Enhanced antioxidant activity, decreased GI inflammation, and improved gut microbiota diversity.	Oregano shows hypoglycemic and gastrointestinal benefits when combined with other herbs.
Oregano and Ginger	(Matera et al., 2023)[48]	Gastritis symptom reduction, improved gut health, and antimicrobial activity.	Oregano and ginger treat gastritis and gastric disorders effectively.
Ginger and Green Tea	(Melaku Tafese Awulachew, 2024)[49]	Reduced transit time in the GI tract, enhanced gut flora, and antimicrobial effects.	Green tea supports GI health, and ginger reduces transit time in the GI tract.
Oregano, Ginger, and Green Tea	(Irshad et al., 2023)[50]	Modulation of gut microbiota, reduced GI inflammation, and support for digestive health.	All three herbs modulate gut microflora to enhance digestive health.
Oregano	(Vázquez-Fresno et al., 2019)[51]	Increased phenolic content biomarkers linked to reduced GI inflammation and oxidative stress.	Oregano demonstrates high phenolic content beneficial for GI diseases.

of a specific herb on certain GI conditions, there is a lack of cohesive research that explores the impact of multiple herbal therapies across multiple GI conditions in a way that provides a holistic understanding of their therapeutic potential. By analyzing existing studies, examining the traditional use of herbs, and understanding their effects on various GI conditions, this paper aims to bridge the gap through an integrated perspective. This could be useful for both clinical practitioners and future research efforts.

Additionally, the review indicates that herbal medicine may have some benefits in treating GI diseases without the side effects of conventional pharmaceutical treatments. Some herbs that have shown promise in this regard include ginger, oregano, and green tea. These plants were found to contain certain properties that demonstrate anti-inflammatory, antioxidant, and antimicrobial effects.

Studies present the potential of herbal medicines in managing gastrointestinal diseases, validating their traditional use in promoting gut health. By demonstrating the ability of herbs like green tea to regulate the gut microbiota, these studies support the integration of herbal remedies into modern treatments for conditions such as IBS, IBD, Dysbiosis, and SIBO.

This review highlights the value of herbal medicine not only as a possible treatment but also as a preventive approach, encouraging further exploration of natural remedies in gastrointestinal health management. Recognizing the ability of herbal supplements to both treat and prevent GI diseases opens the door to a broader area of understanding how these herbs can be integrated with everyday wellness. The regular use of therapeutic herbs in diets or as supplements could be a realistic strategy for maintaining a healthy gut, hence, promoting long-term health and resistance against various GI diseases.

The findings of the studies provide strong evidence for the effectiveness of herbs in treating gastrointestinal diseases. However, applying these conclusions to human health requires further investigation in a clinical setting. Furthermore, additional scientific research is needed to analyze the properties of these herbs thoroughly.

To overcome these limitations, future research should prioritize validating these findings through large-scale, high-quality clinical trials. Specifically, randomized controlled trials (RCTs) should be designed to compare the efficacy of specific herbal treatments against standard pharmaceuticals for common GI conditions. These studies should include double-blind protocols, placebo controls, and diverse population samples to ensure generalizability. Additionally, longitudinal studies can explore the preventative effects of regular herbal use on gut health and disease progression in at-risk populations, while mechanistic studies should investigate how herbs exert their effects at molecular and cellular levels.

Looking ahead, the potential for herbal medicine to become an alternative to conventional treatment in GI care is possi-

ble, especially when patients and healthcare providers increasingly seek out more natural and holistic options. Integrating herbal remedies requires a careful, evidence-based approach. Healthcare providers could consider using herbal therapies as adjunctive treatments alongside pharmaceuticals, closely monitoring for potential herb-drug interactions. Patient education will be essential to ensure safe and effective use, highlighting evidence-based herbs, recommended dosages, and possible side effects. The shift towards integrative medicine could lead to the development of more personalized, patient-centered care strategies that leverage the best of both traditional and modern medicine. This can potentially improve patient responses and reduce the reliance on pharmaceutical treatments with unwanted side effects.

Recognizing the ability of herbal supplements to both treat and prevent GI diseases opens the door to a broader understanding of how these therapies can be integrated into everyday wellness and clinical care. The regular use of therapeutic herbs could potentially promote long-term gut health and resilience against various GI conditions. As the demand for natural and holistic treatment options grows, these findings emphasize the need for integrative medicine that combines the strengths of traditional and modern approaches. By prioritizing robust clinical studies and practical implementation strategies, the potential for herbal medicine to complement certain pharmaceutical treatments could increase. This shift can enhance patient outcomes, reduce reliance on treatments with unwanted side effects, and advance the field of gastrointestinal care.

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