



<https://africanjournalofbiomedicalresearch.com/index.php/AJBR>

Afr. J. Biomed. Res. Vol. 27(4s) (December 2024); 13293-13295

Research Article

Combined Potential Of *Trikatu* And Synbiotics: A Synergistic Approach

Akshay Deshmukh¹, Manasi Deshpande², Pallavi Pardeshi³, Ninad Nangare^{4*}

^{1,2,3,4*}Department of Dravyaguna Vigyan, Bharati Vidyapeeth (Deemed to be University) College of Ayurved, Pune, India.

***Author of Correspondence:** Ninad Nangare

***Email:** ninad.nangare@bharativedyapeeth.edu

Abstract

The amalgamation of *Trikatu*, a classical Ayurvedic formulation consisting of *Pippali* (Piper longum), *Maricha* (Piper nigrum), and *Shunthi* (Zingiber officinale), with synbiotics signifies a novel strategy to improve gastrointestinal health and overall wellness. *Trikatu* is well known for its capacity to improve digestion and bioavailability, and synbiotics—a blend of probiotics and prebiotics—help to maintain the balance of the gut microbiota. With the hypotheses of better gastrointestinal health, increased nutrient absorption, and reduced systemic inflammation, this conceptual study investigates the synergistic potential of combining *Trikatu* with synbiotics. Integrative therapeutic approaches for the treatment of digestive and metabolic problems may be made possible by the suggested combination.

Keywords: *Trikatu*, Synbiotic, Gut dysbiosis, IBS, IBD

***Author Correspondence email:** ninad.nangare@bharativedyapeeth.edu

Received: 20/12/2024 Accepted: 28/12/2024

DOI: <https://doi.org/10.53555/AJBR.v27i4S.6830>

© 2024 The Author(s).

This article has been published under the terms of Creative Commons Attribution-Noncommercial 4.0 International License (CC BY-NC 4.0), which permits noncommercial unrestricted use, distribution, and reproduction in any medium, provided that the following statement is provided. "This article has been published in the African Journal of Biomedical Research"

Introduction

The gut is widely acknowledged as a pivotal centre for health, including not only digestion but also immunity, metabolism, and neurobehavioral functions. The ancient Indian medical system known as *Ayurveda* has traditionally placed a strong emphasis on digestive health, with formulas such as *Trikatu* being essential. *Trikatu* is renowned for its "*Deepana*" (digestive stimulant) and "*Pachana*" (metabolic enhancer) qualities and is made up of three strong herbs: *Pippali*, *Maricha*, and *Shunthi*.¹ At the same time, contemporary research emphasizes the importance of gut microbiota in preserving health, and synbiotics—a combination of probiotics and prebiotics—provide focused assistance for the balance of gut flora.² This paper investigates the

theory that combining *Trikatu* with synbiotics can offer a thorough strategy to improve systemic and gut health.

Rationale for Combining *Trikatu* with Synbiotics

1. Complementary Action Mechanisms

***Trikatu*:** Increases the bioavailability of nutrients and drugs by boosting gastrointestinal motility and digestive enzymes.³

Synbiotics: Increase the production of short-chain fatty acids (SCFAs), decrease gut permeability, and improve the makeup of the gut flora.

Synergy Hypothesis: By improving prebiotic absorption and increasing probiotic colonization in the gut, *Trikatu*'s bioavailability-enhancing qualities may increase the effectiveness of synbiotics.⁴

2. Addressing Dysbiosis in the Gut

An imbalance in the populations of gut microbes is known as gut dysbiosis, and it has been connected to disorders like inflammatory bowel disease (IBD), obesity, and irritable bowel syndrome (IBS). The symptoms and underlying causes of gut dysbiosis may be addressed by combining the anti-inflammatory and carminative properties of *Trikatu* with the microbial balance-restoring properties of synbiotics.⁵

3. Improved Systemic Effects

The gut-brain axis emphasizes the link between systemic health and gut health. The neuroprotective potential of synbiotics combined with the *Rasayana* (rejuvenative) qualities of *Trikatu* may help manage stress, anxiety, and cognitive decline.

Proposed Mechanisms of Action

1. Improvement in Bioavailability: *Trikatu* reduces first-pass metabolism and improves nutritional absorption by inhibiting CYP450 enzymes and P-glycoprotein, especially through the action of piperine. This could increase the effectiveness of synbiotic components like lactobacilli strains and fructooligosaccharides (FOS) by improving their absorption.

2. Alteration of Gut Microbiota: *Trikatu's* phytochemicals, such as gingerol and piperine, have antibacterial qualities that allow good strains of bacteria to flourish while selectively inhibiting harmful ones. By increasing the populations of advantageous bacteria like *Lactobacillus* and *Bifidobacterium*, synbiotics promote microbial diversity.⁶

3. Anti-inflammatory Effects *Trikatu* modulates COX-2 activity and downregulates pro-inflammatory cytokines (such as TNF- α and IL-6) to reduce systemic inflammation. By improving the integrity of the gut barrier and lowering endotoxemia, synbiotics lessen inflammation that comes from the gut.⁷

4. Production of SCFA: Synbiotic prebiotics encourage the fermentation of dietary fibers into SCFAs (such as butyrate and acetate), which enhance energy metabolism, lower inflammation, and maintain the function of the gut barrier. The digestive qualities of *Trikatu* may improve the breakdown of fiber, which would obliquely increase the production of SCFA.⁸

Potential Applications

1. Treatment of Metabolic Conditions

Obesity and Diabetes: Synbiotics increase insulin sensitivity and lower adipose inflammation, while *trikatu* improves lipid metabolism.

Hyperlipidaemia: The combination may increase lipid excretion and decrease absorption of cholesterol.⁹

2. Digestive Health

IBS and IBD: Synbiotics help to balance the gut flora, and *trikatu's* carminative qualities may reduce gas and bloating.

Dyspepsia: Improved microbial variety and the release of digestive enzymes can alleviate symptoms.¹⁰

3. Disorders of the Gut-Brain Axis

Better gut health and a decrease in systemic inflammation may help conditions like depression, anxiety, and stress-related disorders.¹¹

Challenges and Future Directions

1. Dosing and Standardization: For findings to be repeatable, *Trikatu* and synbiotic dosage and quality must be maintained consistently. Determining the ideal ratios for mixing *Trikatu* with particular synbiotic formulations should be the main goal of research.

2. Clinical Trials: Although preclinical data suggests potential advantages, extensive clinical trials are required to confirm safety and efficacy.

- Parameters including the composition of the gut microbiota, inflammatory indicators, and metabolic consequences should all be evaluated in trials.

3. Personalized Medicine: A customized strategy for this combo therapy is required due to individual differences in gut flora and metabolic reactions.

Conclusion

Combining *Trikatu* with synbiotics presents a viable strategy for improving systemic health and gut health. *Trikatu's* anti-inflammatory and bioavailability-boosting qualities combined with synbiotics' gut microbiota-modulating capabilities could potentially treat a variety of illnesses, including metabolic diseases and dysfunctions of the gut-brain axis. Future studies are necessary to confirm this idea and determine its place in integrative medicine, including carefully planned clinical trials.

References

- Joshi S., Rai A., Gupta R., (2024) Phytopharmacological review on bioavailability enhancer [Trikatu] Journal of Pharmacognosy and Phytochemistry, 13(3): 298-307.
- Ouwehand, A. C., Salminen, S., & Isolauri, E. (2002). Probiotic and other functional microbes: from markets to mechanisms. Current Opinion in Biotechnology, 13(5), 483-487.
- Kaushik R., Jain J., Khan A., Rai P., (2018) Trikatu - A combination of three bioavailability enhancers International Journal of Green Pharmacy 12 (3), S 437-441
- Shoba, G., Joy, D., Joseph, T., Majeed, M., Rajendran, R., & Srinivas, P. S. (1998). Influence of piperine on the pharmacokinetics of curcumin in animals and human volunteers. Planta Medica, 64(4), 353-356.
- Annamalai AR, Manavalan R. (1989) Effects of Trikatu and its individual components and piperine on gastrointestinal tracts: Trikatu bioavailability enhancer. Indian Drugs, 27:595-604.
- Kumar, R., Gupta, N., & Sharma, S. (2020). Comparative standardization of a polyherbal Ayurvedic formulation Trikatu Churna. Journal of Ayurveda and Integrative Medicine, 11(3), 312-319.

7. Singh, B., Upadhyay, S., Nunna S., (2014) Critical Review of Trikatu in Ayurvedic classics Dev Sanskriti Interdisciplinary International Journal 4:73-78
8. Sharma, P., Kumar, A., Aggarwal, R., Tripathi S., (2024) A review on trikatu churna, Int. J. Res. Ayurveda Pharm. 15 (1),126-128
9. Kumar, A., (2023) Morphology, Phytochemistry, and Pharmacology of constituent plants of Trikatu in Ayurveda- A review study. Journal of Survey in Fisheries Sciences 10(1) 17155-17161.
10. Bajad, S., Bedi KL, Singla AK, Johri RK., (2001) Piperine inhibits gastric emptying and gastrointestinal transit in rats and mice. Planta Med, 67:176-9.
11. Bhutani MK, Bishnoi M, Kulkarni SK., (2009) Anti-depressant like effect of curcumin and its combination with piperine in unpredictable chronic stress-induced behavioural, biochemical and neurochemical changes. Pharmacol Biochem Behav, 92:39-43.