

# Wu Zhuyu Decoction as a Food-as-Medicine Strategy for Hepatocellular Carcinoma: Multi-Target Mechanisms and Gut – Liver Axis Modulation

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## Abstract

Hepatocellular carcinoma (HCC) remains a major cause of cancer-related mortality worldwide, highlighting the need for safer and more holistic strategies that can complement current therapy. Wu Zhuyu Decoction (WZYD) is a classical botanical formula composed of *Evodia rutaecarpa*, *Panax ginseng*, *Zingiber officinale*, and *Ziziphus jujuba*[1]. Rooted in traditional medicine and increasingly supported by modern pharmacological evidence, WZYD represents a food-as-medicine-inspired approach that integrates bioactive natural ingredients, gastrointestinal regulation, and systemic health support.

We summarize the potential value of WZYD in HCC from the perspective of functional botanicals and nutritional bioactivity. Available evidence indicates that WZYD and its major constituents exert multi-component, multi-target effects through regulation of the EGFR/ERK/HIF-1 $\alpha$  and PI3K/Akt pathways, suppression of oxidative stress and inflammation, induction of apoptosis and autophagy, inhibition of angiogenesis, and modulation of the tumor immune microenvironment[2]. Major constituents such as evodiamine, ginsenosides, gingerols, and jujube-derived polysaccharides may collectively contribute to these protective effects[3].

Importantly, WZYD also shows promise in regulating gut microbiota composition, short-chain fatty acid-related metabolism, intestinal barrier integrity, and gut-derived inflammatory signaling, thereby linking digestive health with liver cancer management through the gut–liver axis[4]. These features align with the traditional concept of food and medicine sharing a common origin., as it bridges traditional dietary-botanical wisdom with emerging evidence on microbiota, immunity, and metabolic health.

Overall, WZYD is a promising adjunctive strategy for HCC prevention and supportive management. However, current evidence remains largely preclinical, and direct clinical evidence in HCC patients is still limited. Future studies should prioritize HCC-specific validation, standardized quality control, pharmacokinetic characterization, and clinical translation.

## References

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