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# OVERVIEW OF TRADITIONAL MEDICINAL ALCOHOLIC BEVERAGE CONSUMPTION IN CHINA

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**Abstract:** This paper examines the traditional context of alcoholic beverages like Baijiu in Chinese medicine, where they have historically functioned as a medium for herbal preparations. Contemporary scientific inquiry has directed attention toward understanding the health implications of alcohol consumption. A proposed "dual-activation" brewing theory, which suggests a potential method for influencing physiological responses to alcohol, is presented as a subject for further scientific validation. The review identifies several methodological considerations for future research, including the need to investigate specific biochemical pathways and to verify preliminary findings through population-level studies. The establishment of standardized analytical frameworks is also noted. The conclusion suggests that further evidence-based methodologies would contribute to a more comprehensive understanding of this traditional practice within its contemporary context.
**Keywords:** Alcohol consumption; Public health; Standards

## 1 INTRODUCTION

Baijiu is a distilled liquor with significant cultural relevance in China and is often used in traditional medicine as a vehicle for herbal extracts. The production of Baijiu involves established techniques and craftsmanship developed over centuries. Various methods, including the use of different grains, fermentation processes, and aging and blending practices, are employed to create Baijiu. Each method contributes to the distinct characteristics of the spirit. Recent research has primarily aimed to establish scientific evidence regarding the negative effects of alcohol consumption on the human body. Scientists have investigated various health concerns associated with different alcoholic beverages, including liver damage, addiction, and other related health issues, with studies examining spirits like Baijiu as well as other types of alcohol (1).

In traditional Chinese medicine, various liquors are prepared in specific ways. Baijiu, for example, is typically aged and distilled using a particular fermentation process. It can also be infused with herbs and roots during the aging process. Huangjiu, on the other hand, is fermented from glutinous rice and brewed with specific yeast strains to create a wine with a slightly sweet flavor. Yaojiu is prepared by steeping Chinese herbs, such as ginseng, goji berries, and licorice root, in liquor for an extended period (2). These herbal infusions are then mixed with base liquors and allowed to mature. Each step in the preparation process is designed to maximize the extraction from the ingredients (3).

### 1.1 Baijiu

(1) Aged and distilled with a specific fermentation process to enhance its warming properties.
(2) Infused with herbs and roots during aging.

### 1.2 Huangjiu (Fermented Rice Wine)

(1) Fermented from glutinous rice with specific yeast strains for a slightly sweet, aromatic profile.
(2) Blended with herbs and plants during fermentation.

### 1.3 Yaojiu

(1) Prepared by steeping herbs like ginseng and licorice in liquor for an extended period.
(2) Herbal infusions combined with base liquors and matured to harmonize flavors.

In the context of traditional Chinese medicine's production, exploring the claimed functions of alcohol in relation to health has inconsistent scientific evidence and require a carefully structured experimental framework. This effort necessitates detailed planning and execution to ensure that traditional methods are considered alongside current research standards (4,5). Rigorous experimental design is important for assessing the efficacy and safety of the product. Some recent studies, which involves studies focused on understanding the interactions between various components that may

activate the parasympathetic nervous system and cellular pathways such as PLC-IP3-PIP2, PI3K/Akt/eNOS, and NO/cGMP (6). The investigation aims to examine how these interactions relate to the effects of alcohol.

Additionally, a comprehensive understanding of traditional practices is important for maintaining the authenticity and cultural relevance of the final product (7). Adhering to established practices, including specific ingredients, fermentation methods, and aging processes, while considering modern components can influence the production of alcohol in traditional Chinese medicine (8). Ensuring that experimental design aligns with established practices is essential in the application of alcohol in traditional Chinese medicine (9).

A novel approach to Chinese Baijiu production is being explored through innovative techniques that incorporate specific ingredients (10). While preliminary evidence suggests these ingredients may play a role in addressing certain effects associated with alcohol consumption, comprehensive scientific evidence is yet to be provided to support these claims (11,12). The objective of this is to examine whether new standards should establish to build up for evidence.

This investigative product is rooted in the proposed "dual activation" brewing theory. This theoretical model points out that research has found that alcohol may activate the sympathetic nervous system while simultaneously inhibiting the parasympathetic nervous system, a state characterized as "mono-activation." This autonomic imbalance is thought to relate to various health concerns, including oxidative stress and inflammatory responses (13).

According to this finding, if alcohol activates the sympathetic nerves, complementary components could be introduced to stimulate the parasympathetic nerves (14). The proposed "dual activation" concept is theorized to potentially address autonomic nervous system imbalance following alcohol consumption, Further studies are necessary to determine scientific evidence whether such mechanisms could meaningfully influence physiological homeostasis (15).

Within the field, research initiatives exist to define analytical criteria for a category of alcoholic beverages historically linked to wellness (16). A subset of this research is directed at the Chinese baijiu manufacturing process, with a focus on the generation and accumulation of particular constituents. One example is the study of secondary fermentation employing defined bacterial cultures, which is evaluated for its effects on the final product's makeup and organoleptic properties (17). In addition, advanced methods such as ultrafiltration, nanofiltration, and distillation are used to selectively separate and recombine molecular components based on their size and boiling point (18,19).

The process, very often in the industry referred to as "directional ingredient edits," is designed to reduce or concentrate the levels of certain compounds formed during traditional fermentation that can affect sensory characteristic, or affect the interactions. It is also the method used to implement the "dual activation" brewing theory (20).

## 2 DISCUSSION

The investigation into traditional Chinese medicinal alcoholic beverages, such as Baijiu, Huangjiu, and Yaojiu, reveals a persistent gap between longstanding cultural practices and contemporary scientific evidence. While these beverages have historically been valued as conduits for herbal medicine, modern public health research consistently underscores the significant risks associated with alcohol consumption. The primary challenge lies in objectively evaluating the purported health benefits of herbal infusions against the inherent pharmacological effects of ethanol. Future research must therefore prioritize elucidating the specific biochemical pathways—such as PLC-IP3-PIP2 and PI3K/Akt/eNOS—through which the bioactive compounds from steeped herbs operate within the body. It is critical that preliminary findings from in vitro and animal models be substantiated through large-scale human cohort studies and big data analytics to determine real-world relevance and safety. Furthermore, the development of standardized analytical frameworks and quality control measures is essential to ensure product consistency and safety. A multidisciplinary approach, integrating advanced analytical techniques, rigorous clinical evaluation, and a nuanced understanding of sociocultural contexts, is paramount for navigating the complex interplay between traditional practice and modern health standards.

## 3 LIMITATION

Expanding research in this field to further characterize the production of traditional Chinese medicine alcohol and to inform alcohol control frameworks involves several key areas of focus. First, comprehensive research is needed to investigate the specific mechanisms by which the components that interact with parasympathetic nerves influence cellular pathways such as PLC-IP3-PIP2, PI3K/Akt/eNOS, and NO/cGMP in the context of Baijiu production. Understanding the metabolic pathways of these components and their effects on the characteristics of the final product will provide relevant data that could serve as a benchmark for establishing production standards.

Secondly, research can investigate fermentation techniques, the strains of fermentation-related organisms, and aging processes to gather information relevant to traditional Chinese medicine alcohol production. By examining the effects of different production methods on the composition and activity of the final product.

Enhancing alcohol control frameworks involves developing standardized protocols and quality assurance measures to ensure the safety and consistency of traditional Chinese medicine alcohol. This includes establishing guidelines for sourcing raw materials, production practices, and product testing to comply with regulatory standards.

Many research findings that demonstrate effects observed in animal models need to be substantiated and validated at the population level through comprehensive efforts such as big data analysis and cohort studies. While animal studies provide a useful starting point and insights into potential mechanisms, human populations are more complex and diverse. Conducting research on a larger scale involving varied human populations is important to determine whether

observations from animal models translate effectively to humans. Big data analysis and cohort studies can contribute to a broader understanding of how these effects manifest in real-world scenarios and across different demographic groups. By utilizing these population-level research methodologies, researchers can gather evidence to support findings from animal studies, facilitating the development of health policies and clinical interventions relevant to human health outcomes. For example, a study conducted in animal models might suggest a certain compound in Baijiu has effects on liver function. It is important to investigate how this compound impacts human health in real-world settings. To further explore the initial findings from animal models, researchers could design a cohort study involving a diverse group of human participants who consume Baijiu regularly. By analyzing data from this study over time, researchers can observe trends in liver function, lipid metabolism, and overall health among participants. This human population-level study would provide insights into the actual impact of the Baijiu compound, linking animal model research to its practical implications.

Additionally, research efforts can focus on assessing the cultural and societal implications of traditional Chinese medicine alcohol consumption, considering factors such as social acceptance, behavioral patterns, and public health awareness. By integrating sociocultural perspectives into alcohol control frameworks, a more comprehensive regulatory framework can be established. Overall, further research in characterizing traditional Chinese medicine alcohol production and enhancing alcohol control frameworks should involve multidisciplinary collaboration, advanced analytical techniques, and a holistic approach that takes into account both scientific advancements and cultural traditions. By addressing these research priorities, the application of alcohol in traditional Chinese medicine can be approached with greater regulation and consideration for community norms.

## 4 CONCLUSION

In summary, the use of alcoholic beverages like Baijiu in traditional Chinese medicine is a practice deeply embedded in cultural and historical contexts. This review underscores the critical tension between this traditional heritage and the well-established health concerns associated with alcohol consumption. Moving forward, a rigorous, evidence-based methodology is essential to navigate this complex field. The integration of traditional knowledge with modern scientific inquiry must be pursued with caution and precision. Future efforts should focus on multidisciplinary research to characterize the specific mechanisms of action of herbal components, verify any impacts through robust population-level studies, and establish standardized production and analytical protocols. By addressing these research priorities, the cultural significance of these beverages can be respected and preserved, while ensuring that any discussion of their role in health is informed by scientific evidence and a paramount concern for public safety.

## COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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