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Review Article

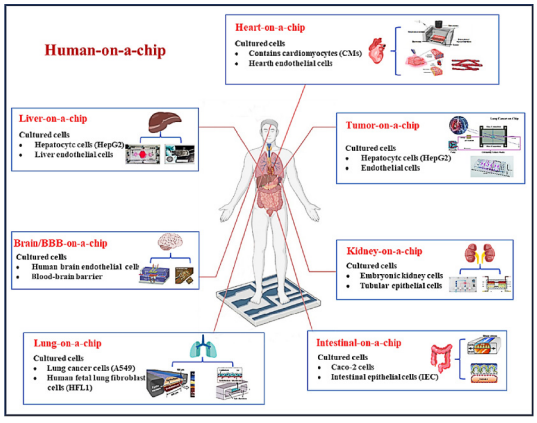
Perspectives on organ-on-a-chip technology for natural products evaluation

Xin Wang, Yu-Hang Miao, Xiao-Min Zhao, Xin Liu, Yan-Wei Hu, and Da-Wei Deng*

Food & Medicine Homology, **2024**, *1*, 9420013
https://doi.org/10.26599/FMH.2024.9420013

Highlights

(1) Explored the mechanisms and principles of organ-on-chip technology, which simulates human organs' physiological environments and functions.
(2) Organ-on-a-chip technology offers significant advantages in evaluating drug activity, physicochemical properties, and safety, bridging the gap between *in vitro* assessment models and the complex pathophysiology *in vivo*.
(3) Outlined the research progress on various organ-on-a-chip models used to simulate complex human diseases, offering a new paradigm for establishing the next generation of natural drug evaluation platforms.



Organ-on-a-chip (OoC) is an emerging technology based on microfluidic platforms and in vitro cell culture, capable of mimicking the physiological environment and functions of human organs, for disease modeling and drug assessment. As illustrated in Figure 1, this review outlines the research progress of various organ models on chips for simulating complex human disease conditions, providing new paradigms for establishing the next generation of natural drug assessment platforms.

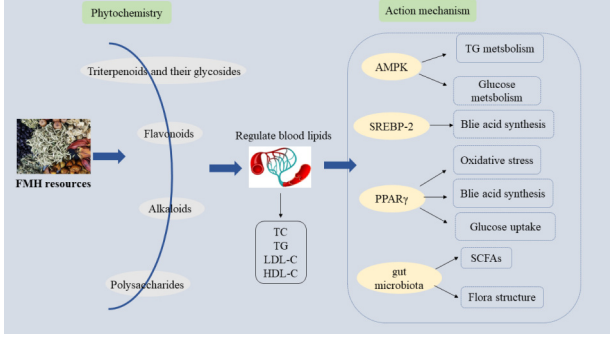
The food and medicinal homological resources benefiting patients with hyperlipidemia: categories, functional components, and mechanisms

Xu-Ting Hao, Rui Peng, Miao Guan, Huan-Jie Zhang, Yu-Han Guo, Nashwa M. Shalapy, Xu-Qiang Liu*, and Chang-Yang Ma*

Food & Medicine Homology, **2024**, *1*, 9420003
https://doi.org/10.26599/FMH.2024.9420003

Highlights

(1) This review focuses on the active ingredients and their mechanisms of action of food & medicine homology resources with lipid-regulating effects.
(2) The effects of 55 active ingredients of 53 food & medicine homology resources on regulating blood lipids were reviewed.
(3) Triterpenes and their glycosides, flavonoids, alkaloids and polysaccharides are the main active ingredients of food & medicine homology resources in regulating blood lipids.
(4) The active ingredients of food & medicine homology resources can regulate blood lipids mainly by regulating AMPK pathway, cholesterol metabolism pathway, PPARγ signaling pathway and gut microbiota.



This article reviews the types, frequency of use, active ingredients, and mechanisms of lipid-lowering drugs and homologous resources in food. A total of 53 drug-food analogues with lipid-regulating effects were found, and the main active ingredients were triterpenoids and their glycosides, flavonoids, alkaloids, and polysaccharides. They mainly regulate blood lipids by controlling AMPK, PPARγ, cholesterol metabolism, and modulating the gut microbiota.

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Research Article

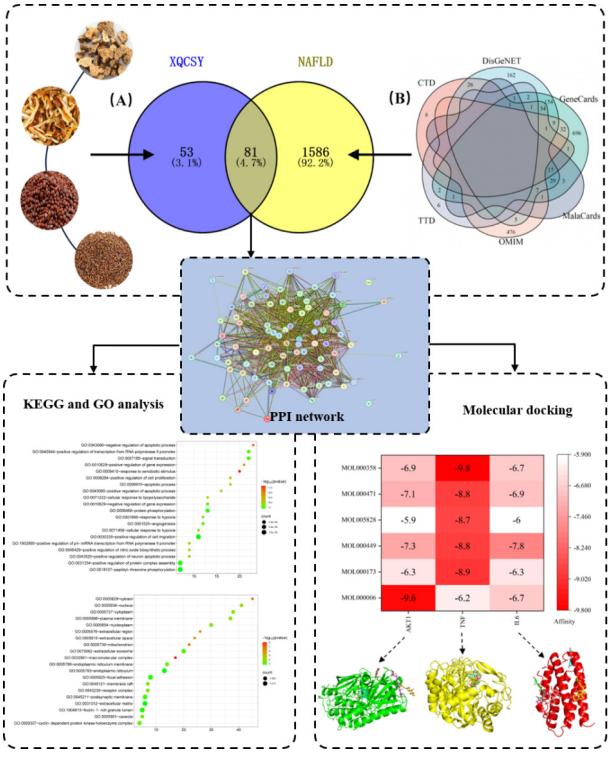
Identification and mechanism elucidation of medicative diet for food therapy XQCSY in NAFLD prevention: an integrative *in silico* study

Chen-Xi Ren, Ming-Yuan Gao, Ning Li, Chao Tang, Gang-Hui Chu, Abdulla Yusuf, Li-Xia Xiao, Zhen-Quan Yang, and Tian-Zhu Guan*

Food & Medicine Homology, **2024**, *1*, 9420015
https://doi.org/10.26599/FMH.2024.9420015

Highlights

(1) Network pharmacology and molecular docking were performed to study the role of XingQiChuShiYin (XQCSY) in preventing non-alcoholic fatty liver disease (NAFLD).
(2) The compound-target-disease network screened out six potential hub targets based on the cluster screening, GO, and KEGG analysis.
(3) Observations of the targets-active ingredients docking behavior and affinity indicate that XQCSY is well affinitive to the potential hub genes and thus greatly affects NAFLD prevention.
(4) This work may present a theoretical proof to deeply clarify the main bioactive constituents and mechanisms of XQCSY and its multi-component, multi-target and multi-pathway properties in NAFLD prevention.



With remarkable efficacy and small side effects, Conventional Chinese medicine dietary therapy is an ideal treatment for various diseases. As a conventional Chinese medicine dietary therapy, the effective constituents and functional mechanisms of XingQiChuShiYin (XQCSY) in preventing non-alcoholic fatty liver disease (NAFLD) are yet vague. Network pharmacology and molecular docking reveal that XQCSY plays a pivotal role in preventing NAFLD with a "multicomponent-multitarget-multichannel" mechanism. Molecular docking also confirms active ingredients from XQCSY are well affinitive to the key genes and thus greatly affect NAFLD prevention. In conclusion, this research may provide a vital theoretical basis for determining the prevention mechanism of XQCSY on NAFLD.

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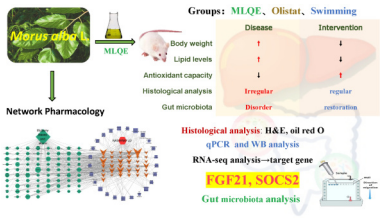
Flavonoid-Rich mulberry leaf extract modulate lipid metabolism, antioxidant capacity, and gut microbiota in high-fat diet-induced obesity: potential roles of FGF21 and SOCS2

Yi-Fan Liu, Nan Ling, Bing Zhang, Cong Chen, Xiao-Ning Mo, Jin-Yuan Cai, Xiang-Duan Tan*, and Qi-Ming Yu*

Food & Medicine Homology, **2024**, *1*, 9420016
https://doi.org/10.26599/FMH.2024.9420016

Highlights

(1) Network pharmacology analysis identified key targets such as IL6, STAT3, FXR, PPAR, and CYP family, revealing the potential mechanisms of mulberry leaves in NAFLD treatment.
(2) Mulberry leaf aqueous extract (MLQE) intervention significantly reduced body weight, improved lipid profiles, and alleviated hepatic steatosis in high-fat diet-induced obese mice, with notable histological and metabolic improvements.
(3) MLQE enhanced hepatic and plasma antioxidant activities, elevating catalase (CAT), glutathione peroxidase (GSH-Px), and HDL-C levels, while reducing oxidative stress markers.
(4) RNA-seq and Western Blot analyses demonstrated that MLQE normalized metabolic gene expressions, upregulating FXR and SHP, and correcting FGF21 and SOCS2 downregulation, with positive modulation of gut microbiota composition.



Mulberry leaves are a rich source of active ingredients exhibiting notable antioxidant activity and have been demonstrated to possess hypolipidemic and hypoglycemic effects. Non-alcoholic fatty liver disease (NAFLD), the most prevalent chronic liver disease, is increasingly prevalent worldwide, with a strong correlation between NAFLD occurrence and obesity. We aimed to investigate the association between the active ingredient targets in mulberry leaves and stems and the disease targets of NAFLD/NASH through network pharmacology, and designed animal experiments to verify our findings. In addition to the normal and model groups, three intervention groups were established for the experiment: the mulberry leaf aqueous extract (MLQE), Orlistat, and swimming exercise groups. The intervention effect of MLQE on NAFLD was observed by comparing it with widely recognized weight loss drugs and exercise interventions. The results demonstrated that all three interventions effectively reduced body weight and body fat, exhibited robust antioxidant capacity, and significantly improved the dysbiosis of gut microbiota induced by a high-fat diet. Histological analysis also supported the conclusions of lipid-lowering, anti-inflammatory, and amelioration of liver injury. Through RNA-seq analysis, we identified the key genes FGF21 and SOCS2 that may be associated with the effective intervention of mulberry leaves in NAFLD, and validated the genes and proteins related to NAFLD and lipid metabolism by qPCR and WB analysis. Our study found that MLQE has an anti-NAFLD effect not inferior to orlistat and swimming exercise, indicating that it is a promising candidate for the treatment of NAFLD. Meanwhile, FGF21 and SOCS2 may be key targets for the treatment of NAFLD, and more studies are needed to verify this.

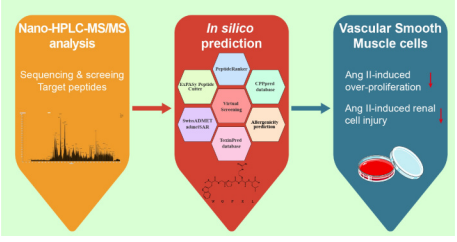
Novel ACE-inhibiting peptides from soybean protein hydrolysates by peptidomics combined with *in silico* analysis and their inhibitory effects on proliferation and migration of Ang II-induced VSMCs

Tian-Tian Zhang, Qiao-Lin Cai, Zhen-Yu Gu, and Tian-Yuan Song*

Food & Medicine Homology, **2024**, *1*, 9420023
https://doi.org/10.26599/FMH.2024.9420023

Highlights

(1) Sixty-eight target peptides were identified by peptidomics and assessed potential properties.
(2) The WGPRL, a non-competitive inhibitor to ACE, was assessed ADMET characteristics.
(3) The WGPRL attenuated the Ang II-induced over-proliferation and migration of VSMCs.



Peptide sequences from soybean protease hydrolysates were identified by high-throughput peptidomics technology. Combined with ACE inhibition activity and structure-activity relationship (SAR) -based computer simulation system, potential active peptides in the enzymatic hydrolysates were rapidly screened. A novel soybean antihypertensive peptide WGPRL with high ACE inhibitory activity and inhibitory effect on Ang II-induced VSMC proliferation and migration was identified by peptidomics.

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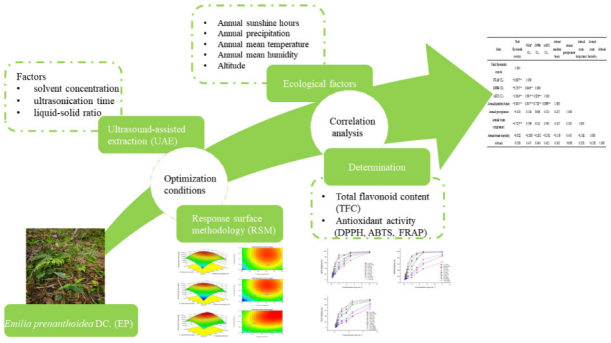
Optimization of ultrasound-assisted extraction of flavonoids from *Emilia prenanthoidea* DC. using response surface methodology and exploration of the ecological factors on total flavonoid and antioxidant activity

Dan-Ni Zhao, Xiao-Mei Zhou, Xiao-Jian Gong, Wen-Xuan Quan, Geng-Shen Gao*, and Chao Zhao*

Food & Medicine Homology, **2024**, *1*, 9420017
https://doi.org/10.26599/FMH.2024.9420017

Highlights

(1) An effective method was developed for the extraction of total flavonoids from *Emilia prenanthoidea* DC. (EP).
(2) The correlation of total flavonoid content and antioxidant capacity of EP with ecological factors was analyzed for the first time.
(3) Total flavonoid content and antioxidant activity of EP in 12 regions were related to ecological factors, especially annual sunshine hours.



In the present study, ultrasound-assisted extraction (UAE) conditions were optimized using response surface methodology (RSM) for the extraction of total flavonoids from *Emilia prenanthoidea* DC. (EP). The total flavonoid content and antioxidant activity of EP in 12 regions were determined using optimized conditions. Finally, the correlation of ecological factors on total flavonoid content and antioxidant activity was analyzed.

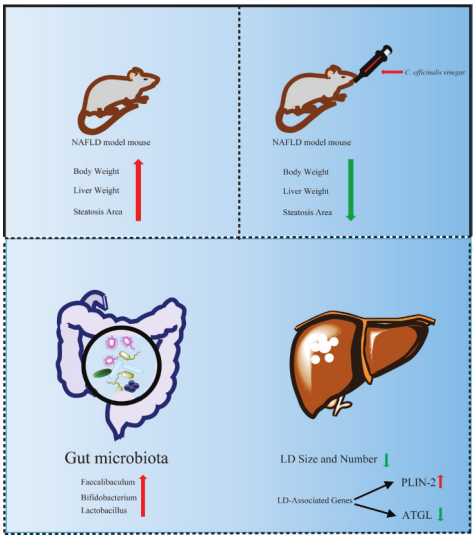
Cornus officinalis vinegar alters the gut microbiota, regulating lipid droplet changes in nonalcoholic fatty liver disease model mice

Li Cao, Ying Wu, Kai-Yu Liu, Ning-Xian Qi, Jie Zhang, Shan-Shan Tie, Xuan Li, Ping-Ping Tian, and Shao-Bin Gu*

Food & Medicine Homology, **2024**, *1*, 9420002
https://doi.org/10.26599/FMH.2024.9420002

Highlights

(1) *Cornus officinalis* vinegar improved microbiota composition and enhanced gut microbial diversity that decreased by HFD.
(2) *Cornus officinalis* vinegar improved liver function in HFD-fed mice.
(3) *C.officinalis* vinegar improved histological changes and reduced size and number of lipid droplets in HFD-fed mice.
(4) *Cornus officinalis* vinegar reduced liver steatosis in HFD-fed mice.



Cornus officinalis vinegar reduced body weight, liver weight and liver steatosis area. This article shows that *Cornus officinalis* vinegar impacts gut microbiota, Specifically, increased the abundance of known beneficial bacteria *Bifidobacterium*, *Lactobacillus*, *Faecalibaculum* at the level of genus in NAFLD model mice. *Cornus officinalis* vinegar also decreased the number and the size of hepatocyte with fat vacuoles and the volume and number of LD per cell, and changed expression of PLIN2 and ATGL gene to protect against NAFLD.

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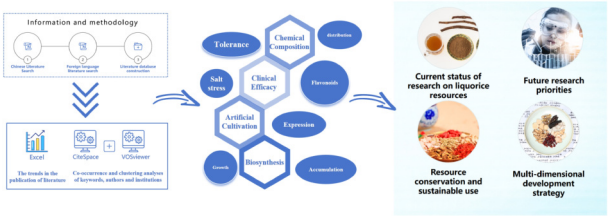
Visualized analysis of licorice research hotspots and trends in the field of traditional Chinese medicine resources based on VOSviewer and CiteSpace knowledge maps

Guang-Ying Guo, Hong-Zhen Yu, Hui Wang, Ping Wang, Jin-Xin Liu, Tsambaa Battseren, Jukov Azzaya, Mandakh Urtnasan, and Almaz Borjigidai*

Food & Medicine Homology, **2024**, *1*, 9420011
https://doi.org/10.26599/FMH.2024.9420011

Highlights

(1) CiteSpace and VOSviewer are the effective bibliometric visualization analysis software.
(2) The bibliometric analysis can elucidate the research hotspots of licorice.
(3) The investigation of licorice focused on agricultural, botanical, and pharmaceutical.



The chinese search terms for licorice were licorice and resource, and the foreign search terms for licorice were liquorice, *Glycyrrhiza uralensis*, and resource. The retrieved literature was collected and imported into EndNote to establish a database for archiving, and then manually reviewed to eliminate duplicates and literature unrelated to the topic.

The included Chinese and foreign literature publication data were imported into Excel, and a chart was established to analyze the trend of publication and discipline distribution of research in the field of liquorice; CiteSpace was used to carry out the visual analysis of keyword clustering, timeline, and bursts. VOSviewer was utilized to perform co-occurrence analysis on the keywords, authors, and the cooperation of the institutions with the limited conditions respectively.

The analysis has found that: keyword co-occurrence and cluster analysis show that the main content of research focused on chemical composition, clinical efficacy, artificial cultivation, biosynthesis and other aspects; keyword emergent analysis showed that TCM, salt stress, tolerance and accumulation are the recent research hotspot of this discipline.

In conclusion, licorice resource-related research hotspot mainly around its botany and ecology research, chemical composition and clinical application, new technology application development, in recent years, the change of external factors such as environmental climate make people pay more attention to licorice resource use and protection, heat in the field of resources, analyze the current licorice in the research progress in the field of resources, summarize past experience for future research, in the future, it is expected to achieve more scientific, sustainable and efficient use, contribute to the Chinese herbal medicine industry and the healthy development of the ecological environment.

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Review Article

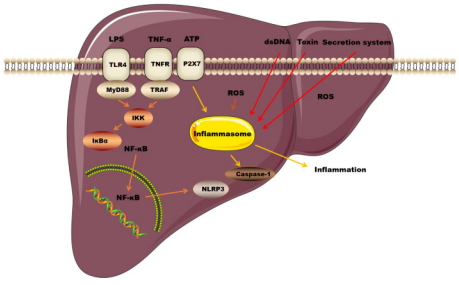
Inflammation and gut microbiota in the alcoholic liver disease

Yan Gao*

Food & Medicine Homology, **2024**, *1*, 9420020
https://doi.org/10.26599/FMH.2024.9420020

Highlights

(1) Inflammation is essential to pathogenesis of hepatic diseases, especially inflammasome.
(2) We mainly pay close attention to the activation and function of inflammasome in ALD.
(3) After alcohol stimulation, the metabolites of gut microbiota will change, and then create a vicious cycle to liver.



Alcohol consumption promotes the second stroke of liver cells via action of oxidative stress-related lipid peroxidation and inflammatory cytokines, resulting into inflammatory response. Therefore, inflammasomes are multi-protein complexes which realize the risk and gather to regulate caspase-1 activation. The inflammasome activation particularly needs two signals in other to enlarge inflammation. Additionally, gut microbes are involved in the regulation of inflammation by constructing a gut specific immune system rather than reusing the infectious pathogens. After alcohol stimulation, the metabolites of gut microbiota will change, and then create a vicious cycle to liver.

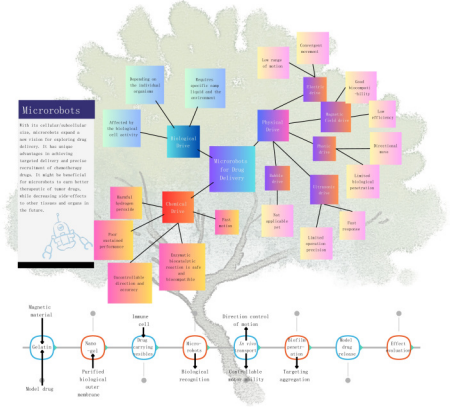
Research progress of microrobots in tumor drug delivery

Jin Wang and Zhi-Xin Liao*

Food & Medicine Homology, **2024**, *1*, 9420025
https://doi.org/10.26599/FMH.2024.9420025

Highlights

(1) The arrival of the intelligent era and the iteration of robotics technology have focused medical means from the macro to the micro and nano scale.
(2) Tumor drug therapy mainly relies on micro-nano robots to realize drug load encapsulation and path editing. It creates a new chemotherapy mode of "identification - penetration - reversal - elimination".
(3) The relevant researches are mostly in the mechanism basis and in vitro or animal test stage, there are still challenges in the clinical transformation and practical application of micro-nanorobots.



With its cellular/subcellular size, microrobots expand a new vision for exploring drug delivery. It has unique advantages in achieving targeted delivery and precise recruitment of chemotherapy drugs. This paper reviews the relevant research at home and abroad in recent years. It searches the relevant literature in the past 10 years with the keywords "tumor drugs" and "micro-nano robots". The results obtained were described according to "research progress of tumor therapeutic drugs", "nano drug delivery system" and "microrobots drug delivery". Then focused the main discussion on "microrobots and cancer drug delivery". Through this research, its micro-size and multi-source drive provides microrobots technical basis. As the result, they can achieve in-vivo motion efficiency, targeted path planning, biological barrier penetration and efficient drug delivery. It might be beneficial for microrobots to earn better therapeutic of tumor drugs, while decreasing side-effects to other tissues and organs in the future.

Aims and Scope

Aims

Food & Medicine Homology is a peer-reviewed, cross-disciplinary, open access journal dedicated to cutting-edge research integrating findings in food science and medicine. The journal publishes papers dealing with plants, animals and microorganisms, reporting the food resources and base materials with nutritional and medicinal values and health-promoting effects that are discovered and confirmed using modern scientific theories and technologies, and providing insights into their health-promoting functions, underlying molecular mechanisms of action and regulatory modes.

Food & Medicine Homology focuses on the scientific evidence and practical application guidance of the composition-efficacy-mechanism relationship in food resources with medicinal and therapeutic values, and provides theoretical basis for the development of products with nutritional, health-promoting, therapeutical and medicinal functions. The content reported in the articles must be scientifically innovative, impactful and excellent.

Scope

- **Research on functional components:**
  Including isolation, structural characterization and activity evaluation of polysaccharides, proteins and secondary metabolites.

- **Efficacy studies:**
  In vivo and *in vitro* efficacy studies of extracts, effective fractions/parts and secondary metabolites.

- **Health effects:**
  In vitro and *in vivo* research on the mechanisms of action of functional ingredients, including clinical studies such as human oral administration trials.

- **Interdisciplinary research:**
  Including but not limited to:

- Screening and discovering new food resources based on traditional Chinese medicine framework and folk medicine practices, include toxicity evaluation;
- Research on the applications of new functions of clinical formulas/preparations based on the homology of medicine and food exploration of new food raw materials and ingredients;
- Food nutrition and safety evaluation systems for the digestive tract;
- New analytical technologies for the identification and activity screening of functional components. Bioavailability, targeted delivery, and microecological regulation of functional components.

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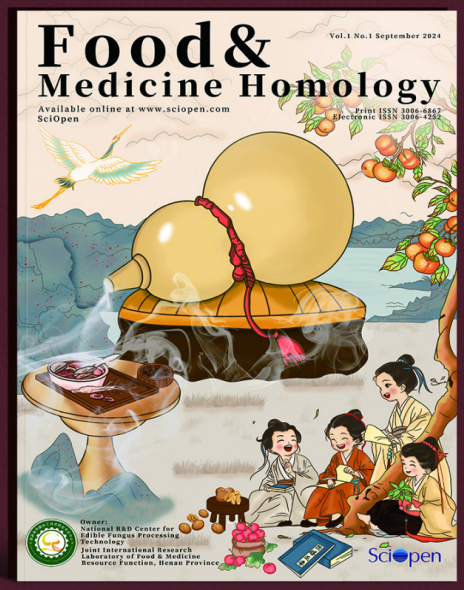

- 聚焦具有药用和康养价值的食物资源中成分-功效-机理之间关系的科学证据，为开发兼具营养、保健、康养、医疗功能的健康产品提供理论基础
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