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4、 外语能力证书

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468	167	173	128

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frontiers | Frontiers in Sustainable Food Systems

TYPE Original Research
PUBLISHED 10 July 2024
DOI 10.3389/fsufs.2024.1424285

OPEN ACCESS

EDITED BY
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RECEIVED 27 April 2024
ACCEPTED 21 June 2024
PUBLISHED 10 July 2024

CITATION
Guo X, Qiao Q, Jin Y, Lei H, Guo K, Zhao Z, Li P, Liu A and Sun R (2024) Optimization of ultrasound-assisted extraction of two saponins from *Paris polyphylla* var. *yunnanensis* leaves using response surface methodology.
Front. Sustain. Food Syst. 8:1424285.
doi: 10.3389/fsufs.2024.1424285

Optimization of ultrasound-assisted extraction of two saponins from *Paris polyphylla* var. *yunnanensis* leaves using response surface methodology

Xianming Guo†, Qing Qiao†, Yutian Jin†, Huaxiong Lei, Kunyao Guo, Zhengxiong Zhao, Ping Li, Aizhong Liu* and Rui Sun*

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Paris polyphylla var. *yunnanensis* is one of the famous Chinese herbs, in which two saponins (polyphyllin II and polyphyllin VII) have anticancer effects. The endangerment of *Paris polyphylla* var. *yunnanensis*, makes the study of optimizing the extraction of polyphyllin II and polyphyllin VII from the leaves of *Paris polyphylla* var. *yunnanensis* more important. The study established and optimized the process of ultrasound-assisted extraction for polyphyllin II and polyphyllin VII using the Box Behnken Design method of response surface methodology. The results showed that the optimum extraction conditions for polyphyllin II and polyphyllin VII are ethanol concentration of 73 and 70%, extraction temperature of 43 and 50°C, and number of extraction 3, respectively. Under the above conditions, the contents of polyphyllin II and polyphyllin VII were measured to be 6.427 and 19.015 mg/g (DW). The results showed that the experimental model fitted well, and the response surface methodology (RSM) was feasible to optimize the extraction process of polyphyllin II and polyphyllin VII from *Paris polyphylla* var. *yunnanensis* leaves. This method provides an effective approach for the comprehensive development and utilization of non-medicinal parts of *Paris polyphylla* var. *yunnanensis*.

KEYWORDS

Paris polyphylla var. *yunnanensis*, saponins, ultrasound-assisted extraction, response surface methodology (RSM), optimization of the extraction process

1 Introduction

The rhizome of *Paris polyphylla* var. *yunnanensis* (*P. polyphylla* var. *yunnanensis*) is the raw material of traditional Chinese medicine – Paridis Rhizoma. *P. polyphylla* var. *yunnanensis* is mainly distributed in the Gaoligong Mountain Area of Tengchong, Southwest Yunnan and Sichuan Province of China, and the north of Myanmar, including evergreen broad-leaved forest, coniferous forest, and broad-leaved mixed forest at an altitude of 600–2,300 m. It usually grows in hillside shade and shrubs (Wu, 2020). Studies have found

报告编号：J20245001273209134

报告验真

检 索 报 告

检索主题：郭贤明发表论文收录情况

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一、检索结果附表

序号	论文信息	收录情况	期刊指标
1	Guo Xianming, Qiao Qing, Jin Yutian, Lei Huaxiong, Guo Kunyao, Zhao Zhengxiong, Li Ping, Liu Aizhong, Sun Rui. Optimization of ultrasound-assisted extraction of two saponins from Paris polyphylla var. yunnanensis leaves using response surface methodology. FRONTIERS IN SUSTAINABLE FOOD SYSTEMS, 2024, 8.	SCI	JCR影响因子(2023):3.7 中科院分区(2023升级版): 大类:农林科学2区

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二、检索结果附件

（一）SCI收录

1 record(s) printed from Clarivate Web of Science

第 1 条，共 1 条

标题: Optimization of ultrasound-assisted extraction of two saponins from Paris polyphylla var. yunnanensis leaves using response surface methodology

作者: Guo Xianming,Qiao Qing,Jin Yutian,Lei Huaxiong,Guo Kunyao,Zhao Zhengxiong,Li Ping,Liu Aizhong,Sun Rui

来源出版物: FRONTIERS IN SUSTAINABLE FOOD SYSTEMS 卷: 8 文献号: 1424285 DOI: 10.3389/fsufs.2024.1424285 出版年: JUL 10 2024

入藏号: WOS:001275287200001

文献类型: Article

地址: [Guo, Xianming; Qiao, Qing; Jin, Yutian; Lei, Huaxiong; Guo, Kunyao; Zhao, Zhengxiong; Li, Ping; Liu, Aizhong; Sun, Rui] Southwest Forestry Univ, Key Lab Forest Resources Conservat & Utilizat Sout, Minist Educ, Kunming, Peoples R China.

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eISSN: 2571-581X

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申请年度：2025

4、 外语能力证书

Journal of Applied Research on Medicinal and Aromatic Plants 43 (2024) 100599

Contents lists available at ScienceDirect

Journal of Applied Research on Medicinal and Aromatic Plants

journal homepage: www.elsevier.com/locate/jarmap

Infrared-spectrum-effect combined with deep learning to predict the origin of *Gentiana rigescens* Franch.

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ARTICLE INFO

Keywords:
FT-MIR
Gentiana rigescens Franch
ResNet
2DCOS
3DCOS

ABSTRACT

Gentiana rigescens Franch. (GR) is a high-value medicinal plant and is widely used as food additive and beverage. Due to the influence of the environment, the accumulation of active ingredients of GR from different origins varies and produces different brand values, which is of great significance for the certification of the GR origin. This study employs the infrared-spectrum-effect to reflect the differences among different origins. The partial least squares-discriminant analysis (PLS-DA) and data-driven version of SIMCA (DD-SIMCA) models were used to determine origin. The Residual Neural Network (ResNet) model was constructed using two-dimensional correlation spectra (2DCOS) and three-dimensional correlation spectra (3DCOS) to discriminate between different origins. Maximum Entropy (MaxEnt) was used to screen out environmental variables that have a significant effect on the accumulation of active ingredients. The conclusion is that the ResNet model based on synchronous 2DCOS and 3DCOS has better performance, the accuracy of training and test sets were 100 %.

1. Introduction

Gentiana rigescens Franch. (GR) is a traditional Chinese medicinal plant, which is also one of the top ten medicines in Yunnan. The roots and rhizomes of GR are often used as a medicine in the treatment of diseases such as hyperactivity of heart-liver fire, eye redness, and damp heat jaundice (Committee, 2020). According to the pharmacological study, the GR has main pharmacological components such as gentiopicroside, loganic acid, swertiamarin, and sweroside (Jiang et al., 2021). Among them, gentiopicroside and swertiamarin are the main hepatoprotective agents, which have stomachic and anti-inflammatory effects and are the main source of bitterness, as well as the important quality markers of GR (Committee 2020; Jiang et al., 2021). Sweroside has hepatoprotective and anti-inflammatory effects and has some protective effects in non-alcoholic liver disease (Yang et al., 2020). Loganic acid has hepatoprotective and antibacterial effects, as well as a strong antioxidant capacity that can better scavenge DPHH free radicals (Li et al., 2023). The excellent clinical efficacy of GR has been continuously explored, and the number of Chinese patent medicines containing it has reached more than one hundred, such as LongDanXieGanWan, ShiWeiLongDanHuaKeLi, and so on. GR also has great industrial value and is widely used in the pharmaceutical and food industries to produce bitter beverages and foods, and in traditional medicines to stimulate appetite and improve digestion (Andrée et al., 2005; Olennikov et al., 2015). For example, nomads in the Siberian region often drink bitter gentian tea, and the Japanese use it as a bitter food additive (Olennikov, et al., 2015; Yan et al., 2024).

As a product of nature, certification of origin and quality control are of concern to the public consumer. It contains a complex chemical component system that interacts with each other to produce a variety of therapeutic effects (Xu et al., 2015). Under the influence of the external environment, the accumulation of secondary metabolites of medicinal plants may be different, and there are certain differences between individuals (Mustafa et al., 2015). According to the GR growth habit, it is suitable for growing at an elevation of 1100–3000 m (Zhao et al., 2015), in acidic and neutral soils, and areas with suitable light and moderate precipitation. It is mainly distributed in southwestern China. Currently, Yunnan, Sichuan, Guizhou, and Guangxi are all planting large areas of GR, of which Lincang City in Yunnan is the main production area of GR and high yield and high-quality cultivation of GR can be achieved with environmental advantages (Shen et al., 2021; Zhao and Hu, 2022). The certification of the place of origin has an added value for the product. Due to the different environments, the quality of GR varies to a certain extent among different origins, as does its economic value. (Mustafa

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https://doi.org/10.1016/j.jarmap.2024.100599
Received 20 August 2024; Received in revised form 22 October 2024; Accepted 25 October 2024
Available online 29 October 2024

5、 学术能力证明材料

Microchemical Journal 202 (2024) 110824

Contents lists available at ScienceDirect

Microchemical Journal

journal homepage: www.elsevier.com/locate/microc

Validating the feasibility of the method of ensemble learning combined with FT-MIR for the discrimination of wild *Paris polyphylla* var. *Yunnanensis* from different geographical sources

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ARTICLE INFO

Keywords:
FT-MIR
Paris polyphylla var. *yunnanensis*
Ensemble learning
Random subspace method (RSM)

ABSTRACT

As a widely used medicinal plant with high economic value, *Paris polyphylla* var. *yunnanensis* (PPY), is mainly distributed in south-western China. Since different growing environments have a strong influence on the PPY quality, efficient means are needed to discriminate its origin source. The traditional machine learning model uses a single learner to classify and discriminate the samples, but it is difficult to apply its advantages to play for complex data samples. Ensemble learning can integrate the advantages of multiple learners to improve the model performance. In this experiment, Partial Least Squares Discriminant Analysis (PLS-DA), Random Subspace Method (RSM), Random Forest (RF), and Support Vector Machine (SVM) models were used to discriminate wild PPY from different origins, and then verify the feasibility of ensemble learning in discriminating them from different geographical sources. At the same time, the results of preprocessing the spectral data with multiplicative scattering correction (MSC), standard normal variate (SNV), and derivative operations (first, second and third derivatives) and their combination methods were compared. The results show that the combined preprocessing greatly improves the model performance. The RSM has the most stable performance with an accuracy of more than 85%. Indicating that the ensemble learning combined with Fourier transform mid-infrared spectroscopy (FT-MIR) has the feasibility of discriminating the wild PPY of different geographical origins.

1. Introduction

Paris polyphylla var. *yunnanensis* (PPY) has been used for thousands of years as a medicinal plant which has remarkable medical effects and has the effect of clearing heat and removing toxins, subduing swelling and relieving pain, cooling the liver and calming alarm, etc [1]. According to the pharmacological research, PPY has isolated more than 100 kinds of compounds, including the main saponins, flavonoids, pentacyclic triterpenoids, phytosterol compounds [2]. Which has anti-inflammatory, anti-tumor, analgesic, and sedative, antibacterial, antiviral, organ-protection and other pharmacological effects [1,2]. Up to now, there are about 80 kinds of Chinese patent medicines containing PPY [3], such as Yunnanbaiyao. With the continuous development of Chinese medicine, the demand for PPY in the pharmaceutical industry is increasing. The wild resources have been subjected to a large number of man-made destructions is greatly reduced, at this time the wild PPY resources seem to be so precious [4]. According to its growing conditions, its main distribution area is in the south-western region of China [5]. However, the quality of PPY varies from place to place. The quality of the herb determines its efficacy, and different geographical origins are significant factors in the efficacy of the herb [4,6]. Studies have shown that the secondary metabolic accumulation of PPY is different depending on its origin and that its economic value is also different [7]. Some unscrupulous merchants will pass off PPY from other production areas as PPY from production areas with higher economic value. Therefore, it is very important to determine the geographical origin of the herb.

Wild PPY from different sources are also extremely similar in appearance and morphology, which is not an easy thing to judge by experience alone. Traditional techniques such as wet chemical testing and chromatography are used, but these methods are time consuming, consumable and have a degree of hazard. This can be a challenge for purchasers or regulators. The application of infrared spectroscopy alleviates the above problems [7,8]. Infrared spectroscopy is a fast analysis technique, which can greatly improve work efficiency and has certain

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https://doi.org/10.1016/j.microc.2024.110824
Received 24 February 2024; Received in revised form 26 April 2024; Accepted 17 May 2024
Available online 18 May 2024

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Effects of water and fertilizer treatment on water potential, phenolic substances and photosynthetic characteristics of Pistacia weinmannifolia

Authored by:

Zhenmin He; Yongyu Sun; Lingxiao Peng; Zhifeng Luo; Jianhua Qi; Xiangfei Li; Xingwu Duan; Zhaorong Ou

was accepted in *Horticulturae* (ISSN 2311-7524) on 28 November 2024

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Basel, December 2024

Prof. Dr. Luigi De Bellis
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中文核心期刊要目总览 2023 版（第 10 版）核心期刊
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Article

Comparative Study of Water and Fertilizer Regimes on Water Potential, Phenolic Substances, and Photosynthetic Characteristics of *Pistacia weinmannifolia*

Zhenmin He [1,2,†], Yongyu Sun [2,3,†], Lingxiao Peng [2], Zhifeng Luo [1], Jianhua Qi [4], Xiangfei Li [2], Xingwu Duan [5] and Zhaorong Ou [1,*]

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Abstract: Effective water and fertilizer management is crucial for the forestry production of *Pistacia weinmannifolia*. This experiment employed an orthogonal design to measure the water potential, anthocyanins, chlorophyll, and photosynthetic parameters of *Pistacia weinmannifolia* under different water and fertilizer regimes. The effects of different water and fertilizer regimes on the water potential, phenolic compounds, and photosynthetic characteristics of *Pistacia weinmannifolia* were analyzed. A comprehensive analysis method was used to evaluate and establish the best water and fertilizer regimes system. The results showed that the water and fertilizer regimes increased the water potential, anthocyanins, chlorophyll content, flavonoids, and photosynthesis ($p < 0.05$). During the mid-growth stage and late mid-stage growth of *Pistacia weinmannifolia*, the fertilizers with the most significant effects on water potential, chlorophyll, and anthocyanins were nitrogen (N) and phosphorus (P). The supply of a certain amount of N and P had positive effect on water potential, chlorophyll, and anthocyanins. Increasing N content was more effective in improving carboxylation efficiency than increasing P content. The effect of N content on photosynthetic efficiency was greater than that of P content Analyses using the TOPSIS model demonstrate that *Pistacia weinmannifolia* exhibits superior comprehensive efficiency in water potential, chlorophyll, flavonoid, and anthocyanin content. When applying 0.54 g·plant^{-1} of pure P and 0.67 g·plant^{-1} of pure N, with the relative soil moisture content maintained at 85%, the optimal comprehensive benefit for photosynthetic indicators is achieved with 0.34 g·plant^{-1} of pure P and 0.77 g·plant^{-1} of pure N, while maintaining the relative soil moisture content at 46.66%. These findings indicate that the water–fertilizer coupling treatment group exhibited improved growth status and photosynthesis. Therefore, the cultivation of *Pistacia weinmannifolia* should prioritize maintaining a balanced water–fertilizer ratio to optimize resource utilization.

Keywords: Anacardiaceae; *Pistacia weinmannifolia*; water and fertilizer regimes; plant physiological characteristics; comprehensive evaluation

Citation: He, Z.; Sun, Y.; Peng, L.; Luo, Z.; Qi, J.; Li, X.; Duan, X.; Ou, Z. Comparative Study of Water and Fertilizer Regimes on Water Potential, Phenolic Substances, and Photosynthetic Characteristics of *Pistacia weinmannifolia*. *Horticulturae* **2024**, *10*, 1302. https://doi.org/10.3390/horticulturae10121302

Academic Editor: Rhuanito S. Ferrarezi

Received: 16 October 2024
Revised: 20 November 2024
Accepted: 28 November 2024
Published: 6 December 2024

1. Introduction

Pistacia weinmannifolia belongs to the Anacardiaceae family within the *Pistacia* genus. It is typically an evergreen shrub or small tree, predominantly distributed across the Chinese provinces of Yunnan, Tibet, Sichuan, Guizhou, and Guangxi. It inhabits forests or shrublands at altitudes ranging from 580 to 2700 m [1]. The aromatic oil extracted from the

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总　　分：**467**

听　　力：**147**

阅　　读：**173**

写作和翻译：**147**

考试时间：2019年12月

口试成绩

准考证号：F19342009010965

等　　级：**C+**

考试时间：2019年11月

成绩报告单编号：192142013000857

5、 学术能力证明材料

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Article

Preparation and Properties of Walnut Protein Isolate–Whey Protein Isolate Nanoparticles Stabilizing High Internal Phase Pickering Emulsions

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Abstract: To enhance the functional properties of walnut protein isolate (WalPI), hydrophilic whey protein isolate (WPI) was selected to formulate WalPI-WPI nanoparticles (nano-WalPI-WPI) via a pH cycling technique. These nano-WalPI-WPI particles were subsequently employed to stabilize high internal phase Pickering emulsions (HIPEs). By adjusting the mass ratio of WalPI to WPI from 9:1 to 1:1, the resultant nano-WalPI-WPI exhibited sizes ranging from 70.98 to 124.57 nm, with a polydispersity index of less than 0.326. When the mass ratio of WalPI to WPI was 7:3, there were significant enhancements in various functional properties: the solubility, denaturation peak temperature, emulsifying activity index, and emulsifying stability index increased by 6.09 times, 0.54 °C, 318.94 m²/g, and 352.95 min, respectively, and the surface hydrophobicity decreased by 59.23%, compared with that of WalPI nanoparticles (nano-WalPI), with the best overall performance. The nano-WalPI-WPI were held together by hydrophobic interactions, hydrogen bonding, and electrostatic forces, which preserved the intact primary structure and improved resistance to structural changes during the neutralization process. The HIPEs stabilized by nano-WalPI-WPI exhibited an average droplet size of less than 30 µm, with droplets uniformly dispersed and maintaining an intact spherical structure, demonstrating superior storage stability. All HIPEs exhibited pseudoplastic behavior with good thixotropic properties. This study provides a theoretical foundation for enhancing the functional properties of hydrophobic proteins and introduces a novel approach for constructing emulsion systems stabilized by composite proteins as emulsifiers.

Keywords: walnut protein isolate; pH cycling; high internal phase Pickering emulsions; stability

Citation: Lu, Y.; Jiang, Y.; Liu, J.; Yang, X.; Zhao, Y.; Fan, F. Preparation and Properties of Walnut Protein Isolate-Whey Protein Isolate Nanoparticles Stabilizing High Internal Phase Pickering Emulsions. *Foods* 2024, *13*, 2389. https://doi.org/10.3390/foods13152389

Academic Editor: Francesca Cuomo

Received: 30 June 2024
Revised: 25 July 2024
Accepted: 26 July 2024
Published: 28 July 2024

1. Introduction

Emulsion is a dispersed system formed from two immiscible phases (usually an oil phase and an aqueous phase) through the input of external energy (e.g., stirring, homogenizing, dispersing, and sonication). Conventional emulsions utilize small-molecule surfactants to reduce the oil–water interfacial tension for dynamic stabilization [1]. However, conventional emulsions tend to become unstable over time, and the toxic side effects of surfactants on the human body, as well as their environmental pollution, limit their application in the food field [2]. Currently, organic food ingredients that have undergone canonization are commonly used in emulsion preparation, particularly Pickering emulsions, which have shown promising research results. Pickering emulsions are emulsions

食品工业科技
Science and Technology of Food Industry
ISSN 1002-0306,CN 11-1759/TS

《食品工业科技》网络首发论文

题目：核桃分离蛋白-花青素稳定 Pickering 乳液的制备及性质研究
作者：鲁燕玲，梁珀溶，邓艳梅，蒋雨心，范方宇
DOI：10.13386/j.issnl 002-0306.2024090376
网络首发日期：2025-01-09
引用格式：鲁燕玲，梁珀溶，邓艳梅，蒋雨心，范方宇. 核桃分离蛋白-花青素稳定 Pickering 乳液的制备及性质研究[JOL]. 食品工业科技.
https://doi.org/10.13386/j.issn1002-0306.2024090376

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基金项目：中央引导地方科技发展资金自由探索类基础研究项目（202407AA110007）；云南省基础研究计划项目重点项目（202401AS070012）；云南省科技厅中青年学术和技术带头人后备人才项目（202405AC350032）。

核桃分离蛋白-花青素稳定 Pickering 乳液的制备及性质研究

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摘　要：为扩展核桃粕利用价值，以核桃分离蛋白（Walnut protein isolate，WalPI）和花青素（Anthocyanin，ACN）为原料，制备复合颗粒，并用于稳定 Pickering 乳液。研究不同 ACN 添加量（0.05%～0.15%）对复合颗粒的粒径、Zeta 电位、傅里叶变换红外光谱、表面疏水性和热稳定性的影响，以液滴尺寸、微观结构、贮藏稳定性和流变特性为指标研究 Pickering 乳液的性质。结果表明：WalPI 与 ACN 结合形成了大颗粒，二者存在静电相互作用、氢键和疏水相互作用；ACN 提高了 WalPI 的亲水性和热稳定性。ACN 添加量为 0.05%时，复合颗粒的粒径、Zeta 电位的热变性温度分别为 299.1 nm、-19.47 mV 和 85.86 ℃，综合性能最佳。WalPI-ACN 稳定的 Pickering 乳液液滴平均尺寸小于 16 μm，呈单峰均匀分布，属于假塑性特征的非牛顿流体。ACN 添加量为 0.05%时，Pickering 乳液平均液滴尺寸为 7.04 μm，具有良好的分散性，其液滴呈完整的圆形结构，贮藏 15 天后乳析指数为 1.48%，具有较高的表观黏度和应力，呈以弹性为主的凝胶状结构，综合性能最佳。本研究可为蛋白质-多酚复合颗粒在食品工业中的潜在应用和食品级 Pickering 乳液的开发提供新思路。

关键词：核桃分离蛋白；花青素；Pickering 乳液；流变特性；稳定性

Preparation and properties of walnut protein isolate-anthocyanin stabilized Pickering emulsion

LU Yanling[1], LIANG Porong[1], DENG Yanmei[1], JIANG Yuxin[1], FAN Fangyu[1,2,3*]

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Abstract: Composite particles were prepared from walnut protein isolate (WalPI) and anthocyanin (ACN) and used to stabilize Pickering emulsions. The effects of different ACN additions (0.05%-0.15%) on the particle size, Zeta potential, Fourier transform infrared spectroscopy, surface hydrophobicity, and thermal stability of the composite particles were investigated, and the properties of Pickering emulsions were studied in terms of droplet

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申请学院：（001）林学院

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申请年度：2025

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Functionalization of biochar using SDS/SAP nanomicelles enhanced its immobilization capacity for dyes and heavy metals in water

Kun Tian[1,2], Chunping Li[1,2], Huiming Liu[1] & Lianchun Wang[1,2]✉

To enhance the adsorption capacity of biochar (BC), herein a novel multifunction modified biochar (SDMBC) was prepared by directly crosslinking of the nanomicelle of sodium dodecyl sulfate/ sapindus-saponin (SDS/SAP) composite system onto the BC through a simple, environmental friendly approach. Result showed that the adsorption performance of SDMBC has been greatly improved, compared with BC or using alone SDS and SAP, adsorption ability increased by 48.83%, 29.50%, 36.44%, respectively, the best modified effect was appeared when the concentration of SAP to SDS was 0.8 and 0.8 CMC. SDMBC exhibited high adsorption abilities of 130.23, 108.43, 277.09 125.27, 112.78 mg/g for heavy metal ions lead Pb(II), Cadmium Cd(II) and organic pollutants with different chemical properties bisphenol A(BPA), Methylene blue (MB), P-nitrophenol (PNP), respectively, higher than most previously reported adsorbents, importantly, SDMBC can still efficient removal capabilities even in the binary competition. Subsequently, the SDMBC and BC was characterized by Fourier Transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), scanning electron microscopy (SEM), Zeta potential (Zeta), it found SDMBC has a more layered structure, richer functional groups and more amorphous structure compared with BC, which are closely related with improving its adsorption capacity. The adsorption behavior of SDMBC for MB show that process was found to be spontaneous, propitious, endothermic, the adsorption isotherms fitted Freundlich models well, pseudo-second-order best describes kinetics adsorption, suggesting that the process is multi-layer chemical adsorption. The little affected by ionic strength and coexisting substances, could remained removal rate over a wide pH range, SDMBC still keep high removal rates even after 5 reuses. Based on FT-IR analysis, plausible adsorption mechanism proposed, including hydrogen bond, electrostatic attraction and π-π bonding. Cost analysis manifests that the SDMBC are high efficiency and cheap eco-adsorbents compared with commercial activated carbon, and the SDMBC dosage required for the removal of 99% of a fixed amount of MB in different volumes of effluent was predicted. Seven machine learning (ML) models were used to predict the MB (60 mg/L) adsorption of the SDMBC, using Shapley Additive Explanations (SHAP) for model interpretation. Finding Extreme Gradient Boosting (XGBoost) exhibited best performance, the order of feature importance as time> Ratio> pH> concentration> temperature. Thus, SDMBC as a new cheap and eco-adsorbents, can be used to effectively remove various types of pollutants, has a great application potential in sewage treatment, while the accurate ML prediction model presented a valuable advice for designing efficient adsorbents and optimization operating conditions in the future.

Keywords Micellar aggregates, Modification, Heavy metal, Organic pollutant, Machine learning

With the rapid development of industry over the past decades, an increasing number of toxic substances were discharge into ecological environment, contributing to many serious environmental problems, such as water and soil pollution[1]. Among them, organic pollutants (OP) and heavy metal ions (HMs) are one of the most common and harmful pollutants. Among various HMs, Cd(II) and pb(II) are the most common pollutants in

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说明：

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明细： 影响因子为论文发表当年 Journal Citation Reports 数据（注：2023 年以后发表论文采用 2023 年 Journal Citation Reports 数据。）

序号	文章信息	数据库	JCR 影响因子	中科院大类分区(升级版)	作者排序
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合计		----	----	----	

MEDLINE：收录 1 篇

第 1 条，共 1 条
标题: Functionalization of biochar using SDS/SAP nanomicelles enhanced its immobilization capacity for dyes and heavy metals in water.
作者: Tian, Kun;Li, Chunping;Liu, Huiming;Wang, Lianchun
来源出版物: Scientific reports 卷：15 期：1 页：7199 DOI:10.1038/s41598-025-91229-z 出版年： Feb 2025
Web of Science 核心合集的"被引频次": 0
被引频次合计:0
文献类型:Journal Article
入藏号: MEDLINE:40021799
地址: Key Laboratory for Forest Resources Conservation and Utilization in the Southwest Mountains of China, Ministry of Education, Southwest Forestry University, Kunming, 650224, Yunnan, China.
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College of Forestry, Southwest Forestry University, Kunming, 650224, Yunnan, China. 13904988843@qq.com.
通讯作者地址:
电子邮件地址:
eISSN:2045-2322
2023 期刊影响因子:3.8
2023 中科院升级版分区信息 ：
小类学科: MULTIDISCIPLINARY SCIENCES 综合性期刊; 2 区;
大类学科: 综合性期刊; 2 区; Top 期刊:否
输出日期：2025 年 03 月 20 日

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Functionalization of biochar using SDS/SAP nanomicelles enhanced its immobilization capacity for dyes and heavy metals in water

Kun Tian[1,2], Chunping Li[1,2], Huiming Liu[1] & Lianchun Wang[1,2]✉

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检索结果

数据库名称	收录情况（篇）	发表时间范围
MEDLINE	1	2025-2025

说明：

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（公章）

查证人	张璐	完成时间	**2025 年 03 月 20 日**

联系电话：027－67883388　　邮箱：chaxz@cug.edu.cn

明细： 影响因子为论文发表当年 Journal Citation Reports 数据（注：2023 年以后发表论文采用 2023 年 Journal Citation Reports 数据。）

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Web of Science 核心合集的"被引频次": 0
被引频次合计:0
文献类型:Journal Article
入藏号: MEDLINE:40021799
地址: Key Laboratory for Forest Resources Conservation and Utilization in the Southwest Mountains of China, Ministry of Education, Southwest Forestry University, Kunming, 650224, Yunnan, China.
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College of Forestry, Southwest Forestry University, Kunming, 650224, Yunnan, China. 13904988843@qq.com.
通讯作者地址:
电子邮件地址:
eISSN:2045-2322
2023 期刊影响因子:3.8
2023 中科院升级版分区信息 ：
小类学科: MULTIDISCIPLINARY SCIENCES 综合性期刊; 2 区;
大类学科: 综合性期刊; 2 区; Top 期刊:否
输出日期：2025 年 03 月 20 日

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申 请 年 度：2025

4、 外语能力证书

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Metabolomic Diversity in *Polygonatum kingianum* Across Varieties and Growth Years

Liangjun Xiao [1,†], Huimei Xu [2,†], Tao Wu [1], Qiufeng Xie [2], Rouyuan Wen [2], Le Wang [2], Baoshun Su [3,*] and Haizhu Zhang [2,*]

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† These authors contributed equally to this work.

Abstract: *Polygonatum* rhizome is a traditional Chinese medicine of the same origin as food and medicine, and it has high economic value and social benefits. To screen the excellent germplasm resources of *Polygonatum kingianum* (*P. kingianum*) and clarify the nutritional and medicinal value of the rhizome of *P. kingianum*, we used widely targeted metabolomics to analyze the traits and metabolomics of rhizomes of different germplasms of *P. kingianum* from different growth years. The results showed that different germplasms and growth years of *P. kingianum* were rich in different nutritional and medicinal components. Among them, *Polygonatum kingianum* 'Linyun 1' rhizome (PWR) was richer in amino acids and derivatives, alkaloids, and phenolic acids, while *Polygonatum kingianum* rhizome (PRR) was richer in flavonoids, organic acids, and phenolic acids. Most of the differential compounds were mainly enriched in PRR when the growth year was one, and PWR had a greater variety and higher content of differential compounds in the third year, which also reflected the advantages of *Polygonatum kingianum* 'Linyun 1' (*P. kingianum* 'Linyun 1') as an excellent new variety of *P. kingianum*. The Kyoto Encyclopedia of Genes and Genomes (KEGG) metabolic pathway analysis showed that in *P. kingianum* with the same age and different germplasms, the significantly enriched metabolic pathway was more active in biosynthesis in PWR. In the same germplasm of *P. kingianum* from different years, the metabolites involved in PRR were mainly the highest in one-year-old *P. kingianum* (PR-1) or three-year-old *P. kingianum* (PR-3), and the metabolites involved in PWR were mainly the highest in three-year-old *P. kingianum* 'Linyun 1' (PW-3). The above results showed that the three-year-old PWR had more advantages based on chemical substances. Therefore, this study provided a new theoretical reference for the development of *P. kingianum* products and the breeding of new varieties.

Keywords: *Polygonatum kingianum*; varieties; growth years; metabolomics; differential metabolites

Citation: Xiao, L.; Xu, H.; Wu, T.; Xie, Q.; Wen, R.; Wang, L.; Su, B.; Zhang, H. Metabolomic Diversity in *Polygonatum kingianum* Across Varieties and Growth Years. *Molecules* **2024**, *29*, 5180. https://doi.org/10.3390/molecules29215180

Academic Editor: Armando Zarrelli

Received: 7 September 2024
Revised: 22 October 2024
Accepted: 29 October 2024
Published: 1 November 2024

1. Introduction

Polygonatum kingianum Coll. et Hemsl (*P. kingianum*) is a perennial herb of the genus *Polygonatum* in the Liliaceae family, and the rhizome is used as medicine or food [1]. It is mainly produced in Guizhou, Guangxi, Yunnan, and other places, and Yunnan is the most important distribution area of *P. kingianum*. As one of the three medicinal *Polygonatum* species, *P. kingianum* is included in the 2020 edition of the Chinese Pharmacopoeia [2]. The rhizome of *P. kingianum* is rich in polysaccharides, saponins, alkaloids, flavonoids and other chemical components [3–5]. Additionally, the above components have the effects of enhancing immunity, anti-aging, reducing blood sugar levels, anti-inflammatory and antibacterial [6–8]. *P. kingianum* has high medicinal value and broad development prospects in nutrition and health care, health preservation, and the prevention of senile

一、 项目的技术要求

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   中科院 JCR 分区数据库
2. 检索式：略

三、检出文献情况（编号、名称、文献题目及出处）

（一）SCI-E 收录情况

1. 标题：Metabolomic Diversity in Polygonatum kingianum Across Varieties and Growth Years

作者： Xiao, LJ(Xiao, Liangjun)[1];Xu, HM(Xu, Huimei)[2];Wu, T(Wu, Tao)[1];Xie, QF(Xie, Qiufeng)[2];Wen, RY(Wen, Rouyuan)[2];Wang, L(Wang, Le)[2];Su, BS(Su, Baoshun)[3];Zhang, HZ(Zhang, Haizhu)[2];

来源出版物： MOLECULES 卷：29 期：21 出版时间：NOV 2024

在 WOS 核心合集中的被引频次： 1

DOI： 10.3390/molecules29215180

入藏号： WOS:001351747700001

文献类型： Article;

地址： [1]Yunnan Acad Forestry & Grassland, Kunming 650201, Peoples R China; [2]Dali Univ, Coll Pharm, Dali 671000, Peoples R China; [3]Linyun Biotechnol Dev Co Ltd, Dali 671000, Peoples R China;

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27657@163.com;15828608051@163.com;wl10192391@163.com;17352095358@163.com;hzzhang@dali.edu.cn;

eISSN：1420-3049

（二）期刊影响因子（IF）

期刊名称	影响因子	
	2023 年	五年影响因子
MOLECULES	4.2	4.6

（三）中国科学院 JCR 期刊分区(2023 年)

期刊全称	ISSN	所属大类	大类分区	Top 期刊
MOLECULES	1420-3049	化学	2	不是

四、检索结论

依照用户委托，通过国际联机数据库检索，具体结果如下：

（一）SCI 收录：云南省林业和草原科学院肖良俊以第一作者发表的 1 篇论文被 SCI-E 收录。

（二）期刊影响因子见上表；

（三）中国科学院 JCR 期刊分区见上表。

以上检索结论可在 SCI-E、JCR、中国科学院 JCR 期刊分区数据库中检索、验证。

检索员（签字）： 杨琴

检索员职称：馆员

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西南林业大学图书馆咨询部

2025 年 03 月 26 日

5、 学术能力证明材料

molecules

MDPI

Article

Metabolomic Diversity in *Polygonatum kingianum* Across Varieties and Growth Years

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† These authors contributed equally to this work.

Abstract: *Polygonatum* rhizome is a traditional Chinese medicine of the same origin as food and medicine, and it has high economic value and social benefits. To screen the excellent germplasm resources of *Polygonatum kingianum* (*P. kingianum*) and clarify the nutritional and medicinal value of the rhizome of *P. kingianum*, we used widely targeted metabolomics to analyze the traits and metabolomics of rhizomes of different germplasms of *P. kingianum* from different growth years. The results showed that different germplasms and growth years of *P. kingianum* were rich in different nutritional and medicinal components. Among them, *Polygonatum kingianum* 'Linyun 1' rhizome (PWR) was richer in amino acids and derivatives, alkaloids, and phenolic acids, while *Polygonatum kingianum* rhizome (PRR) was richer in flavonoids, organic acids, and phenolic acids. Most of the differential compounds were mainly enriched in PRR when the growth year was one, and PWR had a greater variety and higher content of differential compounds in the third year, which also reflected the advantages of *Polygonatum kingianum* 'Linyun 1' (*P. kingianum* 'Linyun 1') as an excellent new variety of *P. kingianum*. The Kyoto Encyclopedia of Genes and Genomes (KEGG) metabolic pathway analysis showed that in *P. kingianum* with the same age and different germplasms, the significantly enriched metabolic pathway was more active in biosynthesis in PWR. In the same germplasm of *P. kingianum* from different years, the metabolites involved in PRR were mainly the highest in one-year-old *P. kingianum* (PR-1) or three-year-old *P. kingianum* (PR-3), and the metabolites involved in PWR were mainly the highest in three-year-old *P. kingianum* 'Linyun 1' (PW-3). The above results showed that the three-year-old PWR had more advantages based on chemical substances. Therefore, this study provided a new theoretical reference for the development of *P. kingianum* products and the breeding of new varieties.

Keywords: *Polygonatum kingianum*; varieties; growth years; metabolomics; differential metabolites

Citation: Xiao, L.; Xu, H.; Wu, T.; Xie, Q.; Wen, R.; Wang, L.; Su, B.; Zhang, H. Metabolomic Diversity in *Polygonatum kingianum* Across Varieties and Growth Years. *Molecules* **2024**, *29*, 5180. https://doi.org/10.3390/molecules29215180

Academic Editor: Armando Zarrelli

Received: 7 September 2024
Revised: 22 October 2024
Accepted: 29 October 2024
Published: 1 November 2024

1. Introduction

Polygonatum kingianum Coll. et Hemsl (*P. kingianum*) is a perennial herb of the genus *Polygonatum* in the Liliaceae family, and the rhizome is used as medicine or food [1]. It is mainly produced in Guizhou, Guangxi, Yunnan, and other places, and Yunnan is the most important distribution area of *P. kingianum*. As one of the three medicinal *Polygonatum* species, *P. kingianum* is included in the 2020 edition of the Chinese Pharmacopoeia [2]. The rhizome of *P. kingianum* is rich in polysaccharides, saponins, alkaloids, flavonoids and other chemical components [3–5]. Additionally, the above components have the effects of enhancing immunity, anti-aging, reducing blood sugar levels, anti-inflammatory and antibacterial [6–8]. *P. kingianum* has high medicinal value and broad development prospects in nutrition and health care, health preservation, and the prevention of senile

报告编号：（2025 年）SWFU012897

论文收录 / 引用检索报告

项目名称：云南省林业和草原科学院肖良俊发表论文被 SCI 收录、期刊影响因子及中科院 JCR 分区情况

委 托 人：肖良俊

委托日期：2025 年 03 月 26 日

完成日期：2025 年 03 月 26 日

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地址：云南省昆明市盘龙区白龙寺西南林业大学
电话：（0871）-63862224

一、 项目的技术要求

云南省林业和草原科学院肖良俊发表论文被 SCI 收录、期刊影响因子及中科院 JCR 分区情况。

标题: 略

二、情报检索情况

1. 检索数据库： Science Citation Index Expanded(SCI-E) 网络版
   Journal Citation Reports（JCR）
   中科院 JCR 分区数据库
2. 检索式：略

三、检出文献情况（编号、名称、文献题目及出处）

（一）SCI-E 收录情况

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来源出版物： MOLECULES 卷：29 期：21 出版时间：NOV 2024

在 WOS 核心合集中的被引频次： 1

DOI： 10.3390/molecules29215180

入藏号： WOS:001351747700001

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地址： [1]Yunnan Acad Forestry & Grassland, Kunming 650201, Peoples R China; [2]Dali Univ, Coll Pharm, Dali 671000, Peoples R China; [3]Linyun Biotechnol Dev Co Ltd, Dali 671000, Peoples R China;

通讯作者地址： Zhang, Haizhu;(通讯作者)Dali Univ, Coll Pharm, Dali 671000, Peoples R China. ; Su, Baoshun;(通讯作者)Linyun Biotechnol Dev Co Ltd, Dali 671000, Peoples R China. ;

电子邮件地址： xiaoliangjun@yafg.ac.cn;xhm19682020@163.com;wutao@yafg.ac.cn;xx1843

27657@163.com;15828608051@163.com;wl10192391@163.com;17352095358@163.com;hzzhang@dali.edu.cn;

eISSN：1420-3049

（二）期刊影响因子（IF）

期刊名称	影响因子	
	2023 年	五年影响因子
MOLECULES	4.2	4.6

（三）中国科学院 JCR 期刊分区(2023 年)

期刊全称	ISSN	所属大类	大类分区	Top 期刊
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检索员职称：馆员

审核员（签字）：

审核员职称：研究馆员

西南林业大学图书馆咨询部

2025 年 03 月 26 日

园艺学报，2022，49(3)：707－708.
Acta Horticulturae Sinica
doi：10.16420/j.issn.0513-353x.2020-0138；http：//www.ahs.ac.cn

滇黄精新品种‘林韵1号’

肖良俊[1]，李仙兰[2]，吴　涛[1,*]
（[1]云南省林业和草原科学院，昆明 650201；[2]大理州林业科学研究所，云南大理 671000）

摘　要：‘林韵1号’是由在滇黄精野生资源调查中发现的优良单株，通过初选、复选、决选、无性系扩繁、无性系测定等选育出来的新品种。植株顶端作攀援状，叶轮生，花序轮生于叶腋，花白色，圆筒状，浆果橘色，球形。块茎表面淡黄色，具环节皱纹，质硬而韧，不易折断。具有植株生长健壮、产量高、品质好、无病虫害、抗逆性强等特性。

关键词：滇黄精；品种
中图分类号：S 567.23+9　　**文献标志码**：B　　**文章编号**：0513-353X（2022）03-0707-02

A New *Polygonatum kingianum* Cultivar ‘Linyun 1’

XIAO Liangjun[1]，LI Xianlan[2]，and WU Tao[1,*]
（[1]*Yunnan Academy of Forestry and Grassland，Kunming* 650201，*China*；[2]*Forestry Research Institute of Dali Bai Autonomous Prefecture，Dali，Yunnan* 671000，*China*）

Abstract：The primary material of *Polygonatum kingianum* ‘Linyun 1’ was found in the investigation of *P. kingianum* wild resources. The cultivar was selected through the process of primary selection，re-selection，final selection，clone propagation，clone test and so on. The apex of the plant is cirrose，having leaves in whorls，inflorescences whorled in leaf axils，white and cylindrical flowers，orange and globose berries. The surface of tuber is light yellow，with link wrinkles. The tuber is hard and tough，not easy to break. It has the characteristics of robust growth and vigour，high yield，good quality，strong resistance to diseases，insects，and other adversities.

Keywords：*Polygonatum kingianum*；cultivar

滇黄精（*Polygonatum kingianum* Coll. et Hemsl.）系百合科黄精属多年生草本植物，以块茎入药或食用（Wu & Raven，2000），是中国药典规定作为黄精使用的3种原生药（滇黄精、黄精和多花黄精）之一，为地道药材品种（国家药典委员会，2015），主产云南，云南西部地区产量较大，野生资源十分丰富，四川、贵州、广西等地也有分布，（姚馨 等，2018）。2012 年开展野生滇黄精资源调查；收集野生种质资源500余份；根据自拟优选标准2013年初选出60株，2014年复选出6株；2015年决选出1株进行扩繁，2017—2018年形成无性系并开展无性系测定试验和区域性试验。2019年通过云南省林木品种审定委员会认定为滇黄精良种，定名为‘林韵1号’（图1）。

收稿日期：2022－01－06；**修回日期**：2022－02－27
基金项目：云南省基础研究专项（202001AT070146）
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西南林业大学博士研究生招生
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申 请 导 师：范方宇

申 请 专 业：（090702）森林培育

申 请 学 院：（001）林学院

考 生 类 别：往届毕业生

申 请 年 度：2025

4、 外语能力证书

全国大学英语六级考试
成绩报告单

CET®

姓　　名：杨娇娇

学　　校：云南民族大学

院　　系：化学与环境学院

身份证号：

笔　试

准考证号：530051222217928

考试时间：2022年12月

总分	听力 (35%)	阅读 (35%)	写作和翻译 (30%)
466	155	177	134

口　试

准考证号：--

考试时间：--

等级	--

成绩报告单编号：222253005000737

教育部教育考试院

证书专用章

1101021004722B

校验码：R7A5 DL31 GVEM O2L3

5、 学术能力证明材料

Optical Materials 126 (2022) 112223

Contents lists available at ScienceDirect

Optical Materials

journal homepage: www.elsevier.com/locate/optmat

A red-emitting phosphor $K_5In_3F_{14}$ Mn^{4+} and its potential application in the backlighting

Jiaojiao Yang [a], Qingmei Fan [a], Jie Li [a], Yanqing Ye [a], Qiang Zhou [a,**], Yayun Zhou [b], Zhengliang Wang [a,*]

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ARTICLE INFO

Keywords:
Fluoride phosphors
Luminescence
Decay time
Backlighting

ABSTRACT

A red-emitting phosphor with a short fluorescence lifetime plays an important role in LED backlighting. Herein, new red phosphor $K_5In_3F_{14}:Mn^{4+}$ (0.59%) with a tetragonal structure was prepared with the non-equivalent doping of Mn^{4+}. The typical luminescent behaviors of Mn^{4+} can be observed from the phosphors. Different from the fluoride phosphors with the equivalent doping of Mn^{4+}, $K_5In_3F_{14}:Mn^{4+}$ (0.59%) has a short decay time (2.74 ms). The white LED fabricated with $K_5In_3F_{14}:Mn^{4+}$ (0.59%) and commercial β-SiAlON:Eu^{2+} emits bright white light under a 20 mA current, and its color gamut is up to 103% of the National Television System Committee (NTSC) standard value. So, $K_5In_3F_{14}:Mn^{4+}$ (0.59%) is a potential red component for LED backlighting.

1. Introduction

Phosphors-converted white light-emitting diodes (LEDs) can be used not only in the field of illumination but also in liquid-crystal displays (LCDs) [1–3]. At present, the commercial white LEDs are mainly based on blue GaN-chips and yellow phosphor $Y_3Al_5O_{12}:Ce^{3+}$ (YAG: Ce^{3+}) [4]. Due to the lack of enough red emission, this kind of w-LEDs exhibits a narrow color gamut, which is not suitable for LCDs [5]. To obtain the backlighting with the wide color gamut for LCDs, narrow-band red-emitting phosphors and green-emitting phosphors were assembled in the white LEDs based on blue LED chips [6–12]. Compared with the commercial β-SiAlON:Eu^{2+} as a green component, the red components for the backlighting still have to overcome some problems before commercialization, although a lot of red-emitting phosphors have been investigated in detail [6–12]. To explore red-emitting phosphors for the LED backlighting, the attention may be focused on not only their spectral features and luminescence intensity but also luminescence decay time, since the long lifetime can result in picture delay phenomenon [9].

In recent years, Mn^{4+}-activated fluoride phosphors as highly efficient red components exhibit huge potential in the application of warm white LEDs [13–15]. Many attempts for these phosphors have been made to explore their potential application in LED backlighting. For instance, $K_2SiF_6:Mn^{4+}$ can obviously broaden the color gamut of the white LED based on one blue chip and β-SiAlON:Eu^{2+} [6,8]. However, its long luminescence lifetime restricts its application prospect in the field of LCDs. As we know, the red emission of Mn^{4+} in fluorides originates from its parity-forbidden transition from the ^2E level to $^4A_2$ level in the octahedral field. This forbidden transition results in longer lifetimes of Mn^{4+} in fluorides. Obviously, the parity selection rule for Mn^{4+} can be relaxed by coupling the electronic transition with vibrations of suitable symmetry [16]. So, the lifetime of Mn^{4+} in fluoride phosphors can be adjusted by changing the local symmetry of Mn^{4+}. According to our investigation, some fluoride phosphors with the non-equivalent doping Mn^{4+} have shorter decay times (<4 ms) [9,10,17–19]. In these phosphors, the low symmetry of Mn^{4+} relaxes the parity section rule and enhances the efficiency of the parity-forbidden ^2E-$^4A_2$ transition [20]. Hence, the non-equivalent doping of Mn^{4+} is a reliable method to obtain red-emitting phosphors with short decay times.

Herein, we have prepared new red-emitting phosphors $K_5In_3F_{14}:x Mn^{4+}$ (x = 0.35%, 0.59%, 1.26%, 1.88%, and 2.00%) and investigated their crystal structure and luminescence properties. A short decay time (2.74 ms) of as-prepared $K_5In_3F_{14}:Mn^{4+}$ (0.59%) is conducive to the LED

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https://doi.org/10.1016/j.optmat.2022.112223
Received 10 January 2022; Received in revised form 3 March 2022; Accepted 9 March 2022
Available online 14 March 2022
0925-3467/

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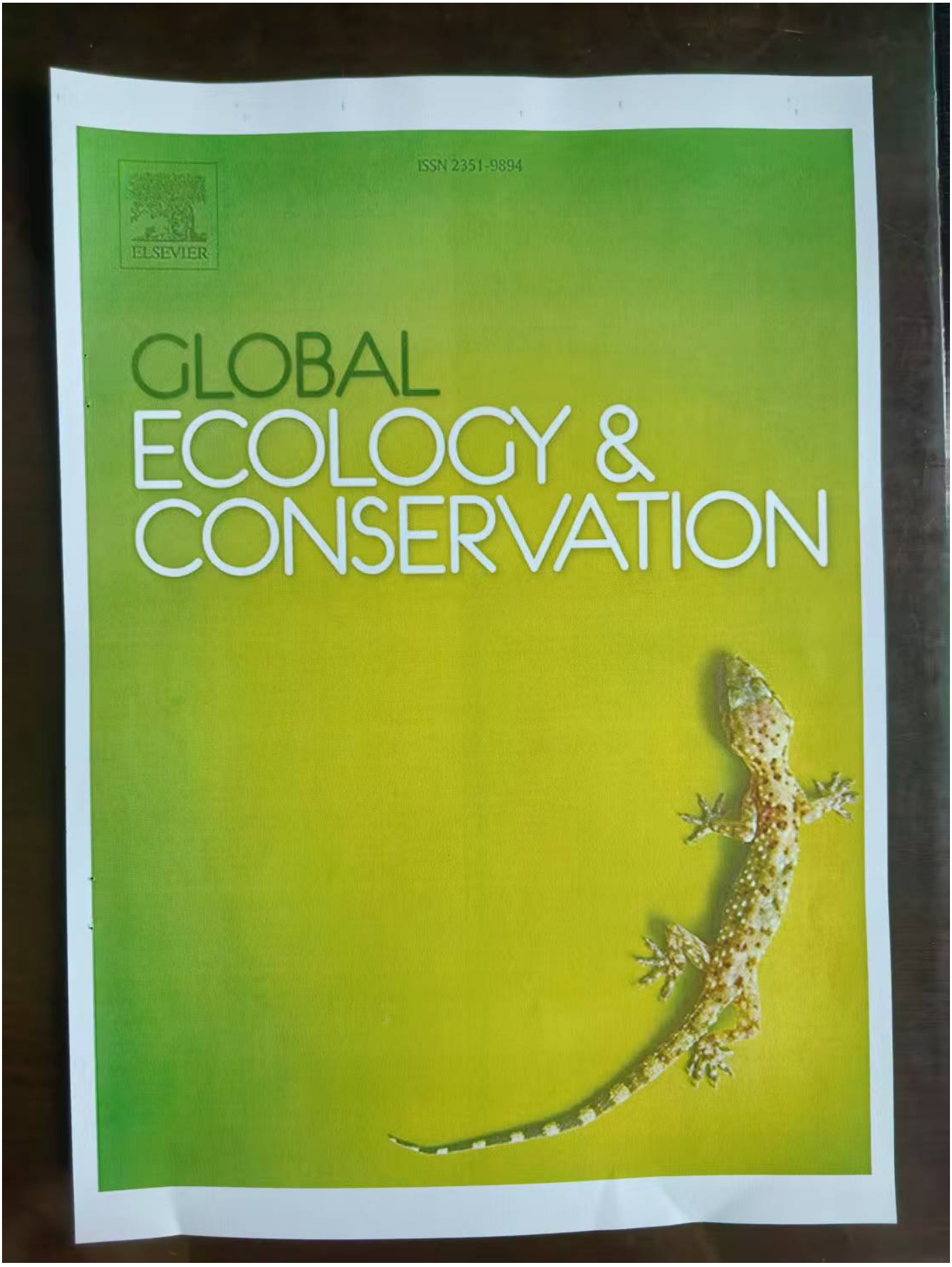
申请专业：（090702）森林培育

申请学院：（001）林学院

考生类别：往届毕业生

申请年度：2025

4、 外语能力证书



Global Ecology and Conservation 43 (2023) e02451

Contents lists available at ScienceDirect

Global Ecology and Conservation

journal homepage: www.elsevier.com/locate/gecco

Mapping potential human-elephant conflict hotspots with UAV monitoring data

Nan Yang [a], Xiaohua Dai [b,*], Bin Wang [c], Mangcai Wen [c], Zhongli Gan [d], Zelin Li [a], Kevin J. Duffy [e]

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ARTICLE INFO

Keywords:
Drone
Human–wildlife conflict (HWC)
Asian elephants
Elephas maximus
Early warning
Hotspot analysis

ABSTRACT

Human–elephant conflicts (HECs) threaten both elephants and humans globally. Many modern techniques have been adopted to mitigate HECs, including remote sensing with unmanned aerial vehicles (UAVs). Based on the UAV monitoring data of wild Asian elephants in China, we mapped the potential HEC hotspots and identified the possible related environmental factors. Our results indicated that there were six clusters of UAV-monitored elephant positions, and these corresponded to the previously known elephant subpopulations. According to the local Getis-Ord Gi* statistic, the potential HEC hotspots were mainly distributed around Mangao subreserve, Jingne Town, Mengman Town and near Mengwang Town. Physical barriers, including large rivers and highways, separated elephant position clusters and potential HEC hotspot areas. Generally, the potential HECs were near human settlements when the loss of human and elephant lives were emphasized more than the loss of economic plants. In addition, the potential HEC hotspots were distributed in regions with both lower slopes and lower river cover but higher food-rich covers. There have been few reports on HEC mapping based on UAV monitoring data, and our study may help widen and deepen the application of UAVs in mitigating HECs in China and elsewhere in the future.

1. Introduction

With expanding human territories and the shrinking of elephant habitats, elephants are forced to intrude into human plantations and settlements (Jiang and Yang, 2021; Tiller et al., 2021; Yin et al., 2021), which can cause conflicts to arise. Human–elephant conflicts can cause injury, death, and economic loss (Di Minin et al., 2021; Jiang and Yang, 2021). As a result, HECs have become a challenge in many Asian and African countries in the last ten years (Gross et al., 2020; Gross et al., 2022; Hu et al., 2021; Shaffer et al., 2019; Thant et al., 2021), where elephants can damage crops, livestock, poultry, and houses, leading to substantial economic loss (Gross et al., 2020; Gross et al., 2022; Hu et al., 2021; Jiang and Yang, 2021). HECs also pose severe threats to the lives of human beings and wild elephants (Gross et al., 2020; Gross et al., 2022; Hu et al., 2021).

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https://doi.org/10.1016/j.gecco.2023.e02451
Received 23 July 2022; Received in revised form 1 April 2023; Accepted 1 April 2023
Available online 1 April 2023

5、 学术能力证明材料

图书在版编目（CIP）数据

西双版纳野生食用植物图谱 / 文世荣等著. — 昆明 : 云南科技出版社, 2024. 8. — ISBN 978-7-5587-5864-5

Ⅰ. Q949.91-64

中国国家版本馆 CIP 数据核字第 2024J3Y699 号

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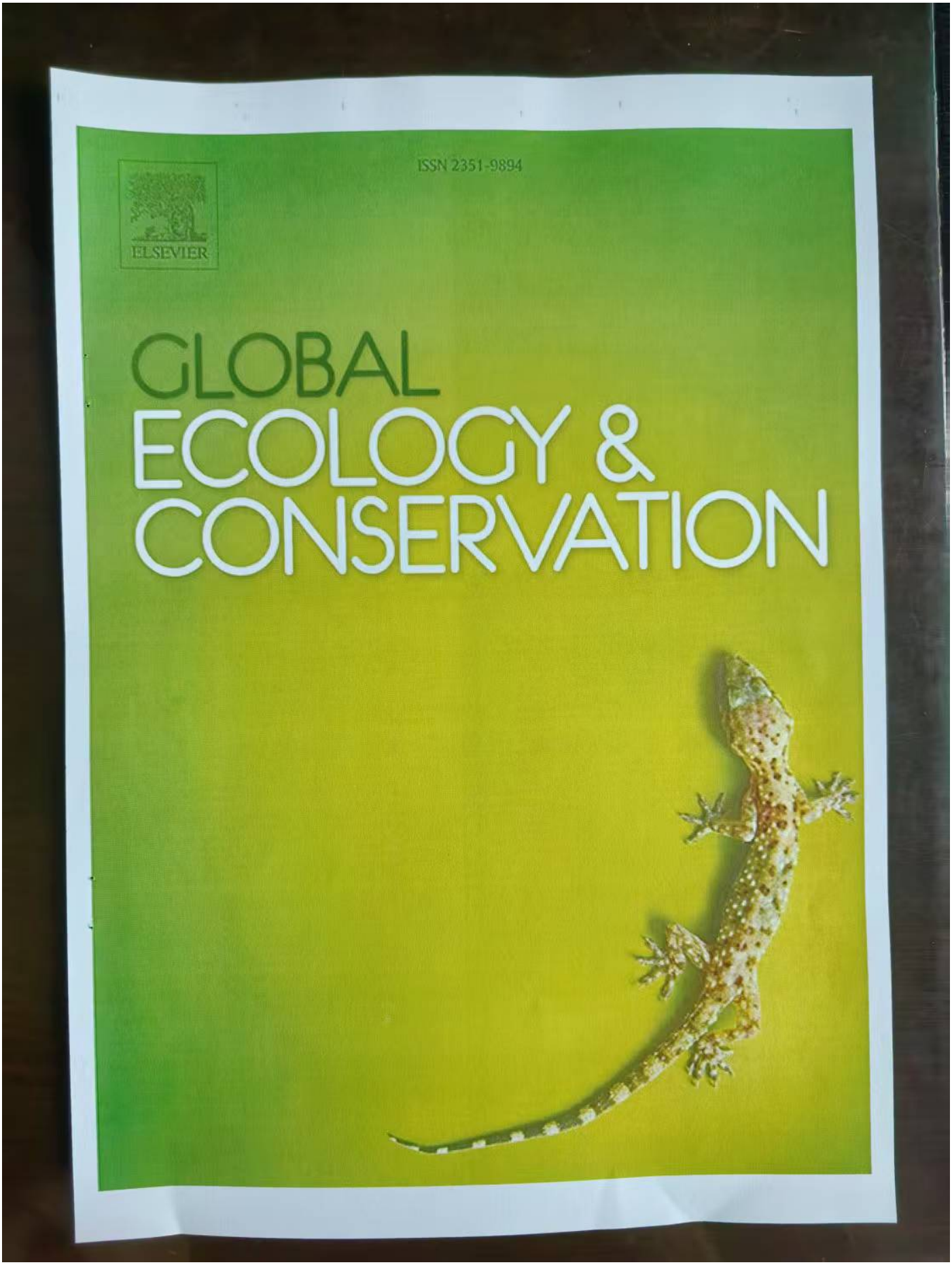
出 版 人：温　翔
策　　划：胡凤丽
责任编辑：杨　雪
整体设计：长策文化
责任校对：秦永红
责任印制：蒋丽芬

书　　号：ISBN 978-7-5587-5864-5
印　　刷：昆明亮彩印务有限公司
开　　本：787mm × 1092mm　1/16
印　　张：28.25
字　　数：650千字
版　　次：2024年8月第1版
印　　次：2024年8月第1次印刷
定　　价：188.00元

出版发行：云南科技出版社
地　　址：昆明市环城西路609号
电　　话：0871-64190886


ISSN 2351-9894
ELSEVIER
GLOBAL
ECOLOGY &
CONSERVATION

Global Ecology and Conservation 43 (2023) e02451

Contents lists available at ScienceDirect

Global Ecology and Conservation

journal homepage: www.elsevier.com/locate/gecco

Mapping potential human-elephant conflict hotspots with UAV monitoring data

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ARTICLE INFO

Keywords:
Drone
Human–wildlife conflict (HWC)
Asian elephants
Elephas maximus
Early warning
Hotspot analysis

ABSTRACT

Human–elephant conflicts (HECs) threaten both elephants and humans globally. Many modern techniques have been adopted to mitigate HECs, including remote sensing with unmanned aerial vehicles (UAVs). Based on the UAV monitoring data of wild Asian elephants in China, we mapped the potential HEC hotspots and identified the possible related environmental factors. Our results indicated that there were six clusters of UAV-monitored elephant positions, and these corresponded to the previously known elephant subpopulations. According to the local Getis-Ord Gi* statistic, the potential HEC hotspots were mainly distributed around Mangao subreserve, Jingne Town, Mengman Town and near Mengwang Town. Physical barriers, including large rivers and highways, separated elephant position clusters and potential HEC hotspot areas. Generally, the potential HECs were near human settlements when the loss of human and elephant lives were emphasized more than the loss of economic plants. In addition, the potential HEC hotspots were distributed in regions with both lower slopes and lower river cover but higher food-rich covers. There have been few reports on HEC mapping based on UAV monitoring data, and our study may help widen and deepen the application of UAVs in mitigating HECs in China and elsewhere in the future.

1. Introduction

With expanding human territories and the shrinking of elephant habitats, elephants are forced to intrude into human plantations and settlements (Jiang and Yang, 2021; Tiller et al., 2021; Yin et al., 2021), which can cause conflicts to arise. Human–elephant conflicts can cause injury, death, and economic loss (Di Minin et al., 2021; Jiang and Yang, 2021). As a result, HECs have become a challenge in many Asian and African countries in the last ten years (Gross et al., 2020; Gross et al., 2022; Hu et al., 2021; Shaffer et al., 2019; Thant et al., 2021), where elephants can damage crops, livestock, poultry, and houses, leading to substantial economic loss (Gross et al., 2020; Gross et al., 2022; Hu et al., 2021; Jiang and Yang, 2021). HECs also pose severe threats to the lives of human beings and wild elephants (Gross et al., 2020; Gross et al., 2022; Hu et al., 2021).

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https://doi.org/10.1016/j.gecco.2023.e02451
Received 23 July 2022; Received in revised form 1 April 2023; Accepted 1 April 2023
Available online 1 April 2023

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“申请-审核制”审核材料

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申 请 学 院：（001）林学院

考 生 类 别：往届毕业生

申 请 年 度：2025

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Article

Effect of Karst Microhabitats on the Structure and Function of the Rhizosphere Soil Microbial Community of *Rhododendron pudingense*

Congjun Yuan [1,2,†], Haodong Wang [1,2,3,†], Xiaoyong Dai [1,2,*], Meng Chen [1], Jun Luo [1], Rui Yang [3] and Fangjun Ding [1,2,*]

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Abstract: Soil microbes play an important role in the microbial circulation and energy flow of ecosystems. In order to understand the change in the rhizosphere soil microbial community structure and function in the heterogeneous karst habitats, the nutrient content and enzyme activity were analyzed, and Illumina MiSeq high-throughput sequencing technology was used to detect the composition, quantity and functional types of the rhizosphere soil microbial community in *Rhododendron pudingense* under three kinds of karst microhabitats (soil surface, rock gully and rock surface) in Wangmo Country (WM), Zhenning Country (ZN) and Qinglong Country (QL). The results showed that SS and RG microhabitats had a higher nutrient content and enzyme activity, while RS had the lowest. At the phylum level, *Proteobacteria* and *Actinomycetes* were dominant in terms of bacteria, while *Ascomycota* and *Basidiomycotina* were dominant in terms of fungi. There was no significant difference in microbial diversity among different karst microhabitats ($p > 0.05$). At the microbial genus level, there were some differences in species composition among the three karst microhabitats, which may lead to soil heterogeneity in karst microhabitats. WM was a little different from ZN and QL. The results of PCoA showed that the community composition of RG and RS was more similar to that of SS. There was no significant difference in microbial functional types among different microhabitats ($p > 0.05$). Only the abundance of pathothoph-symbiothoph fungi in RG was significantly higher than that in RS ($p < 0.05$). The main function of bacteria was metabolism, and saprophytic and symbiotic fungi were the dominant fungal group. In conclusion, soil organic carbon and alkaline phosphatase are important factors affecting the level distribution of microflora in different karst microhabitats. *R. pudingense* in the SS and RG microhabitats has better soil conditions, which may require protection for the plants in the RS microhabitat. The current study results can provide a theoretical basis for the adaptation mechanism of *Rhododendron pudingense* to the karst microhabitat.

Keywords: karst microhabitat; *Rhododendron pudingense*; rhizosphere; soil microbes; community structure diversity; high-throughput sequencing

Citation: Yuan, C.; Wang, H.; Dai, X.; Chen, M.; Luo, J.; Yang, R.; Ding, F. Effect of Karst Microhabitats on the Structure and Function of the Rhizosphere Soil Microbial Community of *Rhododendron pudingense*. *Sustainability* **2023**, *15*, 7104. https://doi.org/10.3390/su15097104

Academic Editor: Adriano Sofo

Received: 3 April 2023
Revised: 13 April 2023
Accepted: 19 April 2023
Published: 24 April 2023

1. Introduction

Soil is the largest reservoir of biodiversity on Earth, and the soil microbial community is composed of bacteria, fungi, archaea and viruses, which is an important manifestation of soil biodiversity [1,2]. Soil microorganisms can provide fixed nitrogen sources for plants [3], regulate soil nutrient conversion [4], affect plant hormone metabolism and thus promote plant growth or enhance plant stress resistance [5], but they may also be affected by some pathogenic bacteria [6]. The rhizosphere refers to the narrow area near plant roots. Due to the influence of plant root exudates, its physical and chemical properties

中国农学通报 2022,38(17):75-81
Chinese Agricultural Science Bulletin

花椒废弃物功能化利用研究进展

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摘 要:花椒种植、采收与加工过程会产生大量废弃物,但通常被直接丢弃或焚烧,造成环境污染与资源浪费问题。围绕花椒废弃物功能性成分开发相应产品对提高花椒产业附加值,促进产业健康持续发展具有重要意义。文章梳理了花椒籽、花椒渣、花椒籽粕、花椒枝叶与花椒根等废弃物所含功能性成分,围绕花椒废弃物抑菌抗炎、抗肿瘤、杀虫、抗氧化与抗血小板聚集等药理活性进行了综述。并对花椒废弃物在高吸附活性炭、医疗功能材料、环保型涂料、皮革加脂剂与功能性助剂等功能性材料方面的应用研究进行了介绍。最后,围绕花椒废弃物功能性成分及功能化利用研究现状,展望了花椒废弃物利用的新方向。

关键词:花椒;加工剩余物;活性成分;功能性材料;资源化利用;产业附加值
中图分类号:S789.9 **文献标志码**:S **论文编号**:casb2021-0633

Functional Utilization of *Zanthoxylum bungeanum* Waste: Research Progress

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Abstract: A large amount of waste produced in the process of planting, harvesting and processing of *Zanthoxylum bungeanum*, which is usually discarded or burned directly, can result in environmental pollution and waste of resources. It is of significance to develop corresponding products of the functional components of *Zanthoxylum bungeanum* waste to improve the added value of *Zanthoxylum bungeanum* industry and promote its healthy and sustainable development. The article reviewed the functional components of *Zanthoxylum bungeanum* seed, pomace, seed cake, leaves and root. Moreover, the pharmacological activities of anti-inflammatory and anti-tumor, insecticidal effect, anti-oxidation and anti-platelet aggregation of *Zanthoxylum bungeanum* waste were summarized. The application of *Zanthoxylum bungeanum* waste in high adsorption activated carbon, medical functional materials, environmental protection coatings, leather fat liquoring agents and functional additive agents were introduced. Finally, based on the previous research on the functional components and utilization of *Zanthoxylum bungeanum* waste, a new direction of *Zanthoxylum bungeanum* waste utilization was discussed.

Keywords: *Zanthoxylum bungeanum*; processing residue; active ingredient; functional material; resource utilization; industrial added value

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基金项目:贵州省科技计划项目"花椒废弃枝叶创制功能型复合材关键技术研究与应用"(黔科合支撑[2020]4Y101号);黔科合服企"贵州林下经济研究创新能力建设"([2020]4010);贵州省林业科研课题"功能化油茶果壳复合材的制备关键技术研究"(黔林科合[2019]3号)。
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收稿日期:2021-06-28,**修回日期**:2021-08-05。