The 5th International Symposium on Environmental Economy and Technology (ISEET-2012): Preface
Dong-Ying Ju .............................. S1

Improvement of production of lipopeptide antibiotic iturin A using fish protein
Umme Salma Zohora, Mohammad Shahedar Rahman, Abdul Wahab Khan, Masahiro Okanami, Takashi Ano .......................... S2

Determination of vanillin in vanilla perfumes and air by capillary electrophoresis
Saaya Minematsu, Guang-Shan Xuan, Xing-Zheng Wu .......................... S8

Economic analysis of gradual "social exhaustion" of waste management capacity
Hideo Koide, Hirofumi Nakayama .............................. S15

Determinants of eco-efficiency in the Chinese industrial sector
Hidemichi Fuji, Shunsuke Managi .............................. S20

Study on preparation and microwave absorption property of the core-nanoshell composite materials doped with La
Liqiu Wei, Ruxin Che, Yijun Jiang, Bing Yu .............................. S27

Application of hinokitiol potassium salt for wood preservative
Junyi Hu, Yu Shen, Song Pang, Yun Gao, Guoyong Xiao, Shuqun Li, Yingqian Xu .............................. S32

Synthesis and characteristic of polyaniline/Dy$_2$O$_3$ composites: Thermal property and electrochemical performance
Shaoxiang Wang, Yan Li, Zihan Huang, Hui Li .............................. S36

Numerical simulation of alga growth and control in Dalian Bay
Ying Li, Caisheng Huang, Jiti Zhou .............................. S41

Simultaneous preconcentration of cadmium and lead in water samples with silica gel and determination by flame atomic absorption spectrometry
Hongbo Xu, Yun Wu, Jian Wang, Xuewei Shang, Xiaojun Jiang .............................. S45

Effect of stress corrosion cracking at various strain rates on the electrochemical corrosion behavior of Mg-Zn-In-Sn alloy
Zhan Yu, Dongying Ju, Hongyang Zhao .............................. S50

Study on the optical property and surface morphology of N doped TiO$_2$ film deposited with different N$_2$ flow rates by DCPMS
Honglin Liu, Tingting Yao, Wanyu Ding, Hualin Wang, Dongying Ju, Weiping Chai .............................. S54

Preparation of MgO/B$_2$O$_3$ coatings by plasma spraying on SUS304 surface and effects of heat-resistant
Bo Song, Ningning Zhou, Dongying Ju .............................. S59

Degradation mechanism of Direct Pink 12B treated by iron-carbon micro-electrolysis and Fenton reaction
Xiquan Wang, Xiaokang Gong, Qiuxia Zhang, Haijuan Du .............................. S63

Synthesis and characterization of agricultural controllable humic acid superabsorbent
Lijuan Gao, Shiqiang Wang, Xuefei Zhao .............................. S69

Electrochemical in situ regeneration of granular activated carbon using a three-dimensional reactor
Hong Sun, Zhigang Liu, Ying Wang, Yansheng Li .............................. S77

Photocatalytic degradation of C. I. Reactive Red 24 solution with K$_8$SiW$_{18}$O$_{67}$Sn$^{II}$
Guixiang Guo, Xiuhua Zhu, Fuyou Shi, Ainning Wang, Wei Wang, Jun Mu, Quanli Wan, Rong Zhang .............................. S80

Microalgae cultivation using an aquaculture wastewater as growth medium for biomass and biofuel production
Zhen Guo, Yuan Liu, Haiyan Guo, Song Yan, Jun Mu .............................. S85

Determination of thiocyanate in the vacuum carbonate desulfurization wastewater
Luyuan Wang, Lin Dong, Wenhui Song .............................. S89

Effect of acid solutions on plants studied by the optical beam deflection method
Liangjiao Nie, Mitsutoshi Kuboda, Tomomi Inoue, Xingzheng Wu .............................. S93

Synthesis of the starch grafting of superabsorbent and high oil-absorbing resin
Zhi Xu, Qingzhi Fei, Xiaoyu Zhang .............................. S97

Effect of calcium on adsorption capacity of powdered activated carbon
Gang Li, Junteng Shang, Ying Wang, Yansheng Li, Hong Gao .............................. S101

Interface-mediated synthesis of monodisperse ZnS nanoparticles with sulfate-reducing bacterium culture
Zhangguo Liang, Jun Mu, Ying Mu, Jiating Shi, Wenjing Hao, Xuewei Dong, Hongquan Yu .............................. S106

Influence of reactivation on the electrochemical performances of activated carbon based on coconut shell
Xin Geng, Lixiang Li, Meiling Zhang, Baigang An, Xiaoming Zhu .............................. S110

Effect of mass fraction of long flame coal on swelling pressure and microstructures of coals
Zhenning Zhao, Jinfeng Bai, Jun Xu, Yaru Zhang, Xiangyuan Zhong, Hongchun Liu, Dekai Yang .............................. S118

Screening of endophytic bacteria against fungal plant pathogens
Tatsuya Ohike, Kohei Makuni, Masahiro Okanami, Takashi Ano
Isolation of antifungal bacteria from Japanese fermented soybeans, natto
Daichi Murata, Sayaka Sawano, Tatsuya Ohike, Masahiro Okanami, Takashi Ano
Evaluation of the water quality of the Hakata River based on diatoms
Masami Sakai, Mitsuyasu Kawakami, Kei Amada
Entrepreneur environment management behavior evaluation method derived from environmental economy
Lili Zhang, Xilin Hou, Fengru Xi
Catalytic activities of zeolite compounds for decomposing aqueous ozone
Ai KUSUDA, Mikito KITAYAMA, Yoshio OHTA
Nitrogen and phosphorus removal in an airlift intermittent circulation membrane bioreactor
Haiyan Guo, Jiandong Chen, Yun Li, Tengteng Feng, Shoutong Zhang
Electroreductive dechlorination of chlorophenols with Pd catalyst supported on solid electrode
Caixia, Atsushi Matsunaga, Meguru Tezuka
Quantitative analysis of microbial biomass yield in aerobic bioreactor
Osamu Watanabe, Satoru Isoda
Chemical constituents of Prunella vulgaris
Xiaojie Gu, Youbin Li, Jun Mu, Yi Zhang
Decolorization of oxygen-delignified bleaching effluent and biobleaching of oxygen-delignified kraft pulp
by non-white-rot fungus Geotrichum candidum Dec 1
Noboru Shintani, Makoto Shoda
Overexpression of NADH oxidase gene from Deinococcus geothermalis in Escherichia coli
Sase Kazuya, Iwasaki Tomomi, Karasaki Hatsune, Ishikawa Masahide
Modeling the current-voltage characteristics of thin-film silicon solar cells based on photo-induced electron transfer processes
Satoru Isoda
Degradation of monofluorophenols in water irradiated with gaseous plasma
Haiming Yang, Giya Mengen, Yuki Matsumoto, Meguru Tezuka
Research on the evolvement of morphology of coking coal during the coking process
Xiangyun Zhong, Shiyong Wu, Yang Liu, Zhenning Zhao, Yaru Zhang, Jinfeng Bai, Jun Xu, Bai Xi
Effects of atamp-charging coke making on strength and high temperature thermal properties of coke
Yaru Zhang, Jinfeng Bai, Jun Xu, Xiangyun Zhong, Zhenning Zhao, Hongchun Liu
Enriching blast furnace gas by removing carbon dioxide
Chongmin Zhang, Zhimin Sun, Shuwen Chen, Baohai Wang
Removement of thiocyanate from industrial wastewater by microwave-Fenton oxidation method
Bai Xi, Qingzhong Shi
Effect of bulk density of coking coal on swelling pressure
Jinfeng Bai, Chunwang Yang, Zhenning Zhao, Xiangyun Zhong, Yaru Zhang, Jun Xu, Bai Xi, Hongchun Liu
Chemical constituents of *Prunella vulgaris*

Xiaojie Gu¹*, Youbin Li ², Jun Mu ¹, Yi Zhang ¹

¹. School of Environmental and Chemical Engineering, Dalian Jiaotong University, Dalian 116028, China
². Department of Natural Product Chemistry, Jiangsu Provincial Institute of Traditional Chinese Medicine, Nanjing 210028, China

Abstract

Nine compounds were isolated from the spikes of *Prunella vulgaris* by various kinds of chromatography. Their structures were established on the basis of spectral analysis as polygalacerebroside (1), ursolic acid (2), α-amyрин (3), quercetin (4), quercetin-3-O-β-D-galactoside (5), α-spinasterol (6), stigmasterol (7), β-sitosterol (8), and daucosterol (9). Compound 1 was isolated from this genus for the first time. Phytochemical investigation on the spikes of *P. vulgaris* provided chemical constituents diversity, which were performed to facilitate further development and utilization of *P. vulgaris* pharmaceutical resource.

Key words: *Prunella vulgaris*; chemical constituents

Introduction

*Prunella vulgaris* L. (Labiatae) is widely distributed in the temperate zone and tropical mountains of Europe and Asia. It is a botanical source for various pharmaceutically active components, and their treatments of hypotensive, hypoglycemic, antibacterial, antiviral, anti-inflammatory, and antitumor activities have been corroborated by long term use in traditional Chinese medicine (Jiangsu College of New Medicine, 2004). Previous phytochemical studies have revealed that *P. vulgaris* mainly contains triterpenoid glycosides (Gu et al., 2008) and phenolic compounds (Gu et al., 2011). Increasing interest in *P. vulgaris* has led to further discoveries of many other kinds of compounds. In our continuous search for chemical constituents, we isolated nine known compounds, polygalacerebroside (1), ursolic acid (2), α-amyрин (3), quercetin (4), quercetin-3-O-β-D-galactoside (5), α-spinasterol (6), stigmasterol (7), β-sitosterol (8), and daucosterol (9), from the spikes of *P. vulgaris* (Fig. 1). Compound 1 was described for the first time from this genus. In the present paper, the isolation and structural elucidation of 1–9 are reported.

1 Experimental

1.1 General procedures

Melting point was determined on an XT4-A micro-melting point apparatus and was uncorrected. IR (infrared) spectra were measured on FT-IR-8900 spectrometer (Shimadzu, Japan). NMR spectra were recorded on a AV-500 spectrometer (Bruker Co., USA) with TMS as internal standard. Mass spectra were obtained on a Wiff Agilent time-of-flight mass (TOF-MS) and Micromass Quattro spectrometer (HR) (Agilent Co., USA) with an ESI source. Silica gel (200–300 mesh) for CC (column chromatography) and GF254 for TLC (thin layer chromatography) were produced by Qingdao Marine Chemical Group Co., China. Sephadex was produced by Merck Co., Germany. Macroporous resin D101 was supplied by the Shanghai Resin Factory of China.

1.2 Plant materials

The spikes of *P. vulgaris* were collected in Xuyi County, Jiangsu Province, China, and identified by Prof. Shihui Qian. A voucher specimen was deposited in the Department of Natural Product Chemistry, Jiangsu Provincial Institute of Traditional Chinese Medicine.

1.3 Extration and isolation

Dried spikes (35 kg) of *P. vulgaris* were extracted two times with 50% ethanol at room temperature. The extract was concentrated to give the residue (4.4 kg), which was partitioned sequentially with petroleum ether, CHCl₃ and n-BuOH. The CHCl₃ extract was evaporated under reduced pressure to give a brown residue (120.0 g). The residue was subjected to a silica gel CC and eluted with CHCl₃-MeOH of increasing polarity (100:0, 100:1, 50:1, 25:1, 15:1, 10:1, V/V) to provide eight fractions according to TLC detection on silica gel plates. Fraction 2 (60 g) was separated by CC on silica gel, eluting with petroleum ether-EtOAc (95:5, 90:10, 80:20, 70:30, V/V) to give compound...
Fig. 1 Structures of compounds 1–9. (1) polygalacerebroside, (2) ursolic acid, (3) β-aminor, (4) quercetin, (5) quercetin-3-O-β-D-galactoside, (6) α-spinsisterol, (7) stigmasterol, (8) β-sitosterol, (9) daucosterol.

2 (323 mg) and compound 3 (235 mg) at gradient 95:5 (V/V), compound 6 (65 mg), compound 7 (148 mg) and compound 8 (881 mg) at gradient 90:10 (V/V). Fraction 3 (30 g) was purified by CC on silica gel, eluting with CHCl₃-MeOH of increasing polarity, to afford compound 4 (57 mg) at gradient 100:1 (V/V) and compound 9 (2 g) at gradient 50:1 (V/V), respectively. Compound 1 (100 mg) was isolated from fraction 4 (14 g) by Sephadex LH-20 column and elution with MeOH.

The n-BuOH extract was evaporated under reduced pressure to give a brown residue (1.2 kg). The residue was subjected to CC on macroporous resin D101 and eluted with 50% ethanol. Then, 50% fraction (380 g) was applied to a silica gel column and eluted with CHCl₃-MeOH of increasing polarity to provide five fractions. Fraction 4 (36 g) was further chromatographed over a silica gel column, eluting with CHCl₃-MeOH (80:20, V/V) to yield compound 5 (21 mg).

2 Results and discussion

Compound 1: white amorphous powder, mp. (melting point) 215–216°C; IR (KBr, cm⁻¹): 3380, 1645, 1540, 1080, 1030, 720; TOF-MS m/z (mass to charge ratio): 754.5454 [M+Na⁺]; ¹H-NMR (Py-d₅): δ: 0.87 (3H, t, J = 7.0 Hz, H-16''), 0.88 (3H, t, J = 7.0 Hz, H-18), 1.25 (CH₂)n, 2.01 (4H, H-10, 13), 3.85 (1H, m, H-5), 3.99 (1H, m, H-2), 4.17 (2H, H-4, 3), 4.19 (1H, m, H-4), 4.28 (1H, H-3), 4.32 (1H, dd, J = 6.0, 12.0 Hz, H-6), 4.47 (1H, dd, J = 2.0, 12.0 Hz, H-6), 4.51 (1H, dd, J = 6.0, 11.0 Hz, H-11), 4.57 (1H, dd, J = 3.0, 7.0 Hz, H-2''), 4.70 (1H, dd, J = 7.0, 11.0 Hz, H-1), 4.94 (1H, d, J = 8.0 Hz, H-1), 5.27 (1H, m, H-2), 5.48 (1H, dt, J = 6.0, 15.0 Hz, H-11), 5.54 (1H, dt, J = 6.0, 15.0 Hz, H-12), 8.55 (1H, d, J = 9.0 Hz, NH). ¹³C-NMR (DMSO-d₆): δ: 13.9 (C-18), 13.9 (C-16’), 32.6 (C-13), 51.4 (C-2’), 62.3 (C-6), 70.1 (C-1), 71.1 (C-4), 72.1 (C-2’), 72.1 (C-4), 74.8 (C-2’), 75.5 (C-3), 78.1 (C-3), 78.2 (C-5), 105.2 (C-1), 130.3 (C-12), 130.5 (C-11), 175.3 (C-1’). The detailed NMR and MS data analysis and comparison with reference data (Zhang et al., 2006) indicated that this compound was polygalacerebroside.

Compound 2: white amorphous powder, mp. 280–281°C; IR (KBr, cm⁻¹): 3425, 2923, 2865, 1685, 1451, 1028, 996; ESI-MS m/z: 303.3 [M+H⁺]; ¹H-NMR (DMSO-d₆): δ: 0.76, 0.81, 0.92, 0.96, 1.10 (5 x CH₃, each s), 0.86 (2 × CH₂, each d, J = 6.6 Hz), 3.27 (1H, brs, H-3), 5.20 (1H, m, H-12). On comparing the spectral data with those in the literature (Wang et al., 1999), this compound was determined as ursolic acid.

Compound 3: white amorphous powder, mp. 197–198°C; IR (KBr, cm⁻¹): νmax: 3400, 2920, 2840, 1460, 1380, 1358, 1040; ESI-MS m/z: 449.3 [M+Na⁺]; ¹H-NMR (Py-d₅): δ: 0.78, 0.82, 0.85, 0.92, 0.98, 1.23, 1.23 (3H, s, CH₃), 3.26 (1H, brs, H-3), 5.24 (1H, m, H-12). The compound was confirmed by comparison of its NMR and MS data with literature values (Mabate and Kundu, 1994). Thus, its structure was identified as β-aminor.

Compound 4: yellow amorphous powder, mp. 308–310°C; ESI-MS m/z: 301.2 [M-H⁻]; ¹H-NMR (CD₂OD, 500 MHz): δ: 7.72 (1H, d, J = 2.0 Hz, H-2’), 7.61 (1H, dd, J=20, 8.5 Hz, H-6’), 6.88 (1H, d, J = 8.5 Hz, H-5’), 6.38 (1H, d, J = 2.0 Hz, H-8), 6.17 (1H, d, J = 2.0 Hz, H-6); ¹³C-NMR (CD₂OD, 125 MHz) δ: 148.5 (C-2), 137.7 (C-3), 177.8 (C-4), 163.0 (C-5), 99.7 (C-6), 166.1 (C-7), 94.0 (C-8), 158.7 (C-9), 105.0 (C-10), 124.7 (C-1’), 116.2 (C-2’), 146.7 (C-3’), 1493 (C-4’), 116.7 (C-5’), 122.1 (C-6’). Comparing the data and features of the ¹H- and ¹³C-NMR spectra with the known compound (Wang et al., 2008), a structure based on quercetin was inferred.

Compound 5: yellow needle-like crystal, mp. 284–286°C; ESI-MS m/z: 487.2 [M+Na⁺]; ¹H-NMR (DMSO-d₆): δ: 6.19 (1H, brs, H-6), 6.40 (1H, brs, H-6), 7.52 (1H, brs, H-2’), 6.81 (1H, d, J = 8.3 Hz, H-5’), 7.66 (1H, d, J = 8.3 Hz, H-6’), 5.36 (1H, d, J = 7.6 Hz, H'-Gal), ¹³C-NMR (DMSO-d₆): δ: 156.3 (C-2), 133.8 (C-3), 177.5 (C-4), 161.2 (C-5), 98.6 (C-6), 164.0 (C-7), 93.4 (C-8), 156.3 (C-9), 104.0 (C-10), 121.3 (C-1’), 115.2 (C-2’), 144.7 (C-3’), 148.3 (C-4’), 116.2 (C-5’), 121.7 (C-6’), 102.3 (C-1’), 71.3 (C-2’), 73.4 (C-3’), 68.0 (C-4’), 75.8 (C-5’), 60.8 (C-6’). This compound was identified as quercetin-3-O-β-D-galactoside by comparison of data with the reported in the literature (Markham et al., 1978).
Compound 6: white plate crystal, mp. 160–162°C; ESI-MS m/z: 413.1 [M+H]+. 1H-NMR (CDCl3, 500 MHz) δ: 5.0–5.2 (3H, m, H-7, H-22, H-23), 3.59 (1H, m, H-3), 2.16 (1H, s, –OH), 1.02 (3H, d, J = 6 Hz, H-19), 0.80–0.55 (3H × 4, –CH3). On comparing NMR and ESI-MS data with literature values (Kojima et al., 1990), the compound was identified as α-spinasterol by co-TLC with reference substance.

Compound 7: white plate crystal, mp. 168–171°C; ESI-MS m/z: 413.3 [M+H]+. 1H-NMR (500 MHz, CDCl3): 0.71 (3H, s, CH3), 0.79 (3H, s, CH3), 0.81 (3H, s, CH3), 0.84 (3H, s, CH3), 1.00 (3H, s, CH3), 1.02 (3H, s, CH3), 3.48 (1H, m, H-23), 5.03 (1H, m, H-23), 5.15 (1H, m, H-22), 5.32 (1H, m, H-6). The compound was characterized by detailed 1H-NMR analyses to be α-spinasterol (Ren et al., 2008).

Compound 8: white plate crystal, mp. 288–289°C; showed positive Lieberman-Burchard reaction. It was elucidated as β-sitosterol by TLC comparison with authentic sample.

Compound 9: white plate crystal, mp. 136–138°C; showed positive Lieberman-Burchard and Molish reactions. It was determined to daucosterol by TLC comparison with authentic sample.

3 Conclusions

In continuation with our studies on P. vulgaris chemistry, increasing interest in medicinal resources has led to additional discoveries of cerebroside, flavonoids, sterols and triterpenoids. We report here on the isolation and structural elucidation of these nine compounds by chemical and spectroscopic analysis. Compound 1 was isolated from this genus for the first time. The present investigation provided pharmaceutical chemistry ingredient diversity.

Acknowledgments

This work was supported by the Jiangsu Provincial Public Welfare Foundation of China (No. BM2004525). The authors are grateful to Mr. Wenbin Shen (Analytical Center of China Pharmaceutical University) for some NMR measurements.

References

Jiangsu College of New Medicine, 2004. A Dictionary of the Traditional Chinese Medicines. Shanghai, People’s Hygiene Publisher. 1827.


Editorial Board of Journal of Environmental Sciences

Editor-in-Chief
Hongxiao Tang
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China

Associate Editors-in-Chief
Jiuhui Qu
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China
Shu Tao
Peking University, China
Nigel Bell
Imperial College London, United Kingdom
Po-Keung Wong
The Chinese University of Hong Kong, Hong Kong, China

Editorial Board

Aquatic environment
Baoyu Gao
Shandong University, China
Maoshong Fan
University of Wyoming, USA
Chihpin Huang
National Chiao Tung University, Taiwan, China
Ng Wun Jern
Nanyang Environment & Water Research Institute, Singapore
Clark C. K. Liu
University of Hawaii at Manoa, USA
Hokyong Shon
University of Technology, Sydney, Australia
Zijian Wang
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China
Zhifu Wang
The Ohio State University, USA
Yuxiang Wang
Queen’s University, Canada
Min Yang
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China

Terrestrial environment
Christopher Anderson
Massey University, New Zealand
Zaocng Cai
Nanjing Normal University, China
Xinbin Feng
Institute of Geochemistry, Chinese Academy of Sciences, China
Hongjing Hu
Huazhong Agricultural University, China
Kim-Cher Lam
The Chinese University of Hong Kong, Hong Kong, China
Erwin Klumpp
Research Centre Juelich, Agrosphere Institute, Germany
Peijun Li
Institute of Applied Ecology, Chinese Academy of Sciences, China
Michael Schloter
German Research Center for Environmental Health, Germany
Xuejun Wang
Peking University, China
Lizhong Zhu
Zhejiang University, China
Jiannin Chen
Fudan University, China
Abdelwahid Mellouki
Centre National de la Recherche Scientifique, France
Yujaing Mu
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China
Min Shao
Peking University, China
James Jay Schauer
University of Wisconsin-Madison, USA
Yuesi Wang
Institute of Atmospheric Physics, Chinese Academy of Sciences, China
Xin Yang
University of Cambridge, UK
Yong Cai
Florida International University, USA
Henner Holtert
RWTH Aachen University, Germany
Jae-Seong Lee
Hanyang University, South Korea
Christopher Rensing
University of Copenhagen, Denmark
Bojan Sedmak
National Institute of Biology, Ljubljana
Lirong Song
Institute of Hydrobiology, Chinese Academy of Sciences, China
Chuxia Wang
National Natural Science Foundation of China
Gehong Wei
Northwest A & F University, China
Daqiang Yin
Tongji University, China
Zhongtao Yu
The Ohio State University, USA

Environmental toxicology and health
Jingwen Chen
Dalian University of Technology, China
Jianying Hu
Peking University, China
Guibin Jiang
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China
Sijin Liu
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China
Tsuyoshi Nakanishi
Gifu Pharmaceutical University, Japan
Willie Peijnenburg
University of Leiden, The Netherlands
Bingsheng Zhou
Institute of Hydrobiology, Chinese Academy of Sciences, China

Environmental catalysis and materials
Hong He
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China
Jinhua Li
Tsinghua University, China
Wenfeng Shangguan
Shanghai Jiao Tong University, China
Yasutake Teraoka
Kyushu University, Japan
Ralph T. Yang
University of Michigan, USA

Environmental analysis and method
Zongwei Cai
Hong Kong Baptist University, Hong Kong, China
Jiping Chen
Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China
Minghui Zheng
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China

Municipal solid waste and green chemistry
Pinjing He
Tongji University, China

Environmental ecology
Rusong Wang
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China

Editorial office staff
Managing editor: Qingcai Feng
Editors: Zixuan Wang, Suqin Liu, Zhengang Mao
English editor: Catherine Rice (USA)

Copyright © Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences. Published by Elsevier B.V. and Science Press. All rights reserved.
Aims and scope

*Journal of Environmental Sciences* is an international academic journal supervised by Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences. The journal publishes original, peer-reviewed innovative research and valuable findings in environmental sciences. The types of articles published are research article, critical review, rapid communications, and special issues.

The scope of the journal embraces the treatment processes for natural groundwater, municipal, agricultural and industrial water and wastewaters; physical and chemical methods for limitation of pollutants emission into the atmospheric environment; chemical and biological and phytoremediation of contaminated soil; fate and transport of pollutants in environments; toxicological effects of terrorist chemical release on the natural environment and human health; development of environmental catalysts and materials.

For subscription to electronic edition

Elsevier is responsible for subscription of the journal. Please subscribe to the journal via http://www.elsevier.com/locate/jes.

For subscription to print edition

China: Please contact the customer service, Science Press, 16 Donghuangchenggen North Street, Beijing 100717, China. Tel: +86-10-64017032; E-mail: journal@mail.sciencep.com, or the local post office throughout China (domestic postcode: 2-580).

Outside China: Please order the journal from the Elsevier Customer Service Department at the Regional Sales Office nearest you.

Submission declaration

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere. The submission should be approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out. If the manuscript accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder.

Submission declaration

Submission of the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere. The publication should be approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out. If the manuscript accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder.

Editorial

Authors should submit manuscript online at http://www.jesc.ac.cn. In case of queries, please contact editorial office, Tel: +86-10-62920553, E-mail: jesc@263.net, jesc@rcees.ac.cn. Instruction to authors is available at http://www.jesc.ac.cn.