

มีการอ้างอิงบทความวิจัย “Effects of Different Drying Processes on the Bioactivity and Rutin Content of *Prunus* spp. (Plums)” ตั้งแต่ 1 เมษายน 2568 – 30 กันยายน 2568

จำนวน 2 บทความ

1. <https://www.mdpi.com/2223-7747/14/11/1622>

The screenshot shows the MDPI article page for the article "Preparation of *Gynostemma pentaphyllum* Extracts Using Natural Deep Eutectic Solvents with Ultrasound-Assisted Extraction for Cosmetic Applications". The page is viewed in a web browser with the URL <https://www.mdpi.com/2223-7747/14/11/1622>. The article is published in *Plants* 2025, 14(11), 1622. The authors are Komcharn Jaikampan¹, Worapan Poomanee^{1,2}, Thasang Thavanapong¹, Chuda Chittasupho¹, Kantamane Jantadee¹, and Mathukorn Sainakham^{1,*}. The article has been submitted on 29 April 2025, revised on 20 May 2025, accepted on 23 May 2025, and published on 26 May 2025. The abstract describes the study of the phytochemicals of GP extracts isolated by DESs, investigating the biological activities and developing cosmetic formulations containing GP extracts. The results showed that the total phenolic and total flavonoid contents of DES extracts were 0.39 ± 0.04 to 6.93 ± 0.59 mg GAE/g extract and 1.48 ± 0.44 to 8.17 ± 0.07 mg QE/g extract, respectively. The highest IC₅₀ values of DES extract on DPPH assay, lipid peroxidation inhibition, and nitric oxide radical scavenging of DES extracts were 8.54 ± 3.31, 6.04 ± 0.82, and 38.63 ± 1.46 mg/mL, respectively. The DES extracts demonstrated collagenase enzyme inhibition at IC₅₀ values of 0.92 ± 0.04 mg/mL. The selected DES extracts, S7, S9, S11, and S13, exhibited low cytotoxic effects on RAW264.7 cells and exhibited the most substantial reduction in nitric oxide levels. The selected DES extract with high bioactivities, S7, exhibited a high rutin and kaempferol content at 7.87 ± 0.01 mg rutin/g extract and 25.36 ± 0.08 mg kaempferol/g extract in the active content determination by HPLC assay. The cosmetic formulations containing S7 exhibited excellent stability after the stability test. This study illustrated the potential of DES extracts for further development in novel cosmetic products.

The screenshot shows the references section of the article. The references are listed in a numbered format, starting from 23. The references include:

- Jo, H.G.; Baek, C.Y.; Hwang, Y.; Baek, E.; Park, C.; Song, H.S.; Lee, D. Investigating the Anti-Inflammatory, Analgesic, and Chondroprotective Effects of *Gynostemma pentaphyllum* (Thunb.) Makino in Osteoarthritis: An In Vitro and In Vivo Study. *Int. J. Mol. Sci.* **2024**, *25*, 9594. [Google Scholar] [CrossRef] [PubMed]
- García-Mediavilla, V.; Crespo, I.; Collado, P.S.; Esteller, A.; Sánchez-Campos, S.; Tuñón, M.J.; González-Gallego, J. The anti-inflammatory flavones quercetin and kaempferol cause inhibition of inducible nitric oxide synthase, cyclooxygenase-2 and reactive C-protein, and down-regulation of the nuclear factor kappaB pathway in Chang Liver cells. *Eur. J. Pharmacol.* **2007**, *557*, 221–229. [Google Scholar] [CrossRef]
- Lerche, D.; Sobisch, T. Direct and Accelerated Characterization of Formulation Stability. *J. Dispers. Sci. Technol.* **2011**, *32*, 1799–1811. [Google Scholar] [CrossRef]
- Choi, E.; Maeng, S.J.; Yun, S.; Yu, H.; Shin, J.-S.; Yun, J.-Y. The degeneration of skin cosmetics and the structural changes of the chemical components as an indicator of product shelf life. *J. Ind. Eng. Chem.* **2021**, *100*, 317–323. [Google Scholar] [CrossRef]
- Dai, Y.; van Spronsen, J.; Witkamp, G.J.; Verpoorte, R.; Choi, Y.H. Natural deep eutectic solvents as new potential media for green technology. *Anal. Chim. Acta* **2013**, *766*, 61–68. [Google Scholar] [CrossRef]
- Wongwad, E.; Preedakikit, W.; Changprasoed, S.; Somsai, S.; Singmee, N.; Srisuksomwong, P.; Srivilai, J.; Rungsang, T.; Mungmai, L. Effects of Different Drying Processes on the Bioactivity and Rutin Content of *Prunus* spp. (Plums). *Int. J. Food Sci.* **2024**, *16*, 9999731. [Google Scholar] [CrossRef]
- Manosroi, A.; Sainakham, M.; Chankhampan, C.; Abe, M.; Manosroi, W.; Manosroi, J. Potent in vitro anti-proliferative, apoptotic and anti-oxidative activities of semi-purified Job's tears (*Coix lachryma-jobi* Linn.) extracts from different preparation methods on 5 human cancer cell lines. *J. Ethnopharmacol.* **2016**, *187*, 281–292. [Google Scholar] [CrossRef]
- Poomanee, W.; Leelapornpisid, W.; Trakoolpua, K.; Salamon, I.; Leelapornpisid, P. Ameliorative Effect of *Bouea macrophylla* Griffith Seed Extract Against Bacteria-Induced Acne Inflammation: In vitro study. *J. Oleo Sci.* **2022**, *71*, 1521–1530. [Google Scholar] [CrossRef]
- Poomanee, W.; Thavanapong, T.; Yaowiwat, N.; Chaichit, S.; Sainakham, M.; Kiattisin, K.; Chaiyana, W. Unlocking the anti-aging ingredients of Sacha inchi husk through ultrasound-assisted extraction: Response surface methodology and comprehensive analytical approach. *J. Agric. Food Res.* **2024**, *15*, 101016. [Google Scholar] [CrossRef]
- Chittasupho, C.; Ditsri, S.; Singh, S.; Kanlayavattanukul, M.; Duangnir, N.; Ruksiriwanich, W.; Athikomkulchai, S. Ultraviolet Radiation Protective and Anti-Inflammatory Effects of Kaempferia galanga L. Rhizome Oil and Microemulsion: Formulation, Characterization, and Hydrogel Preparation. *Gels* **2022**, *8*, 639. [Google Scholar] [CrossRef] [PubMed]
- Ruksiriwanich, W.; Khamthan, C.; Muangsanguan, A.; Chittasupho, C.; Rachtanapun, P.; Jantanasakulwong, K.; Phimolsiripol, Y.; Sommano, S.R.; Srirang, K.; Ferrer, E.; et al. Phytochemical Constitution, Anti-Inflammation, Anti-Androgen, and Hair Growth-Promoting Potential of Shallot (*Allium ascalonicum* L.) Extract. *Plants* **2022**, *11*, 1499. [Google Scholar] [CrossRef] [PubMed]
- Liu, D.; Mei, Q.; Wan, X.; Que, H.; Li, L.; Wan, D. Determination of rutin and isoquercetin contents in Hibiscus

2. <https://www.mdpi.com/2079-9284/12/3/92>

mdpi.com

Pawalee Srisuksomwong | Stats

Preparation of Gynostemma pentaphyllum Extracts Using Natural Deep Eutectic Sol... Evaluation of Biological Activities and Cytotoxicity of Peristrophe bivalvis (L.) Merr E...

cosmetics

Submit to this Journal

Review for this Journal

Propose a Special Issue

Article Menu

Academic Editors

Agnieszka Feliczak-Guzik

Agata Wawrzyńczak

Subscribe SciFeed

Recommended Articles

Related Info Link

More by Authors Links

Article Views 1378

Citations 1

Table of Contents

Abstract

Evaluation of Biological Activities and Cytotoxicity of *Peristrophe bivalvis* (L.) Merr Extracts and Investigation of Its Novel Natural Active Ingredient-Loaded Nanoemulsion and Stability Assessment

by Panikchar Wichayapreechar¹, Ranit Charoenjittichai¹, Anchalee Prasansuklab^{2,3}, Pimchanok Charoongchit⁴ and Eakkaluk Wongwad^{1,*}

¹ Department of Cosmetic Sciences, School of Pharmaceutical Sciences, University of Phayao, Phayao 56000, Thailand

² College of Public Health Sciences, Chulalongkorn University, Bangkok 10330, Thailand

³ Center of Excellence on Natural Products for Neuroprotection and Anti-Ageing, Chulalongkorn University, Bangkok 10330, Thailand

⁴ Department of Pharmaceutical Care, School of Pharmaceutical Sciences, University of Phayao, Phayao 56000, Thailand

* Author to whom correspondence should be addressed.

Cosmetics **2025**, *12*(3), 92; <https://doi.org/10.3390/cosmetics12030092>

Submission received: 31 March 2025 / Revised: 25 April 2025 / Accepted: 30 April 2025 / Published: 2 May 2025

(This article belongs to the Special Issue Fine Chemicals from Natural Sources with Potential Application in the Cosmetic/Pharmaceutical Industry—Volume 2)

Download Browse Figures Versions Notes

Abstract

Peristrophe bivalvis (L.) Merr. (Acanthaceae family) has traditionally been used as a natural food colorant and in the treatment of various diseases. However, its biological activities—particularly its anti-glycation and anti-lipid peroxidation properties—as well as the development of novel nanoemulsions incorporating crude *P. bivalvis* leaf extracts for cosmetic applications, have not yet been reported. The aim of this study was to explore the potential of *P. bivalvis* leaf crude extracts as an active ingredient in nanocosmetics. Various solvents, including deionized water, 95% ethanol, and 1% HCl in 50% ethanol were used to macerate the plant material. These crude extracts were subsequently screened for their phytochemical constituents, total phenolic and flavonoid contents, as well as antioxidant, anti-glycation, anti-lipid peroxidative activities, and fibroblasts cytotoxicity. In addition, a nanoemulsion containing *P. bivalvis* crude extracts was formulated using high-speed homogenization. The formulation was

mdpi.com

Pawalee Srisuksomwong | Stats

Preparation of Gynostemma pentaphyllum Extracts Using Natural Deep Eutectic Sol... Evaluation of Biological Activities and Cytotoxicity of Peristrophe bivalvis (L.) Merr E...

Download PDF

Order Article Reprints

23. Abioye, E.O.; Akinpelu, D.A.; Aiyegoro, O.A.; Adegboye, M.F.; Ori, M.O.; Okoh, A.I. Preliminary phytochemical screening and antibacterial properties of crude stem bark extracts and fractions of *Parkia biglobosa* (Jacq.). *Molecules* **2013**, *18*, 8485–8499. [Google Scholar] [CrossRef] [PubMed]

24. Auwal, M.S.; Saka, S.; Mairiga, I.A.; Sanda, K.A.; Shuaibu, A.; Ibrahim, A. Preliminary phytochemical and elemental analysis of aqueous and fractionated pod extracts of *Acacia nilotica* (Thorn mimosa). *Vet. Res. Forum.* **2014**, *5*, 95–100. [Google Scholar] [PubMed]

25. Wichayapreechar, P.; Prasansuklab, A.; Charoongchit, P.; Charoenjittichai, R. The potential of *Tecoma stans* (Linn.) flower extract as a natural antioxidant and anti-aging agent for skin care products. *Cosmetics* **2024**, *11*, 214. [Google Scholar] [CrossRef]

26. Shaikh, J.R.; Patil, M.K. Qualitative tests for preliminary phytochemical screening: An overview. *Int. J. Chem. Stud.* **2020**, *8*, 603–608. [Google Scholar] [CrossRef]

27. Rungsang, T.; Srivilai, J.; Rakasawapokin, P.; Rakasawapokin, P.; Mungmai, L.; Saesue, K.; Aonboontum, P.; Plukham, N.; Siriwipanan, P.; Chaichanathawikit, P.; et al. Assessment of antioxidant, anti-lipid peroxidation, antiglycation, anti-inflammatory and anti-tyrosinase properties of *Dendrobium sulcatum* Lindl. *Cosmetics* **2023**, *10*, 43. [Google Scholar] [CrossRef]

28. Wongwad, E.; Preedakikit, W.; Changprasoed, S.; Somsai, S.; Singmee, N.; Srisuksomwong, P.; Srivilai, J.; Rungsang, T.; Mungmai, L. Effects of different drying processes on the bioactivity and rutin content of *Prunus* spp. (Plums). *Int. J. Food Sci. Technol.* **2024**, *2024*, 9999731. [Google Scholar] [CrossRef]

29. Wongwad, E.; Pingyod, C.; Saesong, T.; Waranuch, N.; Wisuttiprot, W.; Sritularak, B.; Temkithawon, P.; Ingkaninan, K. Assessment of the bioactive components, antioxidant, antiglycation and anti-inflammatory properties of *Aquilaria crassna* Pierre ex Lecomte leaves. *Ind. Crops Prod.* **2019**, *138*, 111448. [Google Scholar] [CrossRef]

30. Elfahal, I.A.; Elhussein, S.; Osman, N.A.; Ali, H.A. Recovery of alkaloids from leaves and seeds of *Argemone mexicana*. *Planta Med.* **2011**, *77*, 19. [Google Scholar] [CrossRef]

31. Wang, Y.; Hu, X.; Liu, G.; Hu, D.; Liu, D. Influence of solvents on steroid extraction from animal feces and quantification using enzyme immunoassay. *Wildl. Soc. Bull.* **2020**, *44*, 749–755. [Google Scholar] [CrossRef]

32. Kumar, A.; Nirmal, P.; Kumar, M.; Jose, A.; Tomer, V.; Oz, E.; Proestos, C.; Zeng, M.; Elobeid, T.; Sneha, K.; et al. Major phytochemicals: Recent advances in health benefits and extraction method. *Molecules* **2023**, *28*, 887. [Google Scholar] [CrossRef]

33. Böttger, A.; Voithknecht, U.; Bolle, C.; Wolf, A. Plant Secondary Metabolites and Their General Function in Plants. In *Lessons on Caffeine, Cannabis & Co: Plant-Derived Drugs and Their Interaction with Human Receptors*; Springer International Publishing: Cham, Switzerland, 2018; pp. 3–17. [Google Scholar]

34. Li, H.; Zhang, C.; Deng, Z.; Zhang, B.; Li, H. Antioxidant activity of delphinidin and pelargonidin: Theory and practice. *J. Food Biochem.* **2022**, *46*, e14192. [Google Scholar] [CrossRef] [PubMed]

35. Li, W.; Gu, M.; Gong, P.; Wang, J.; Hu, Y.; Hu, Y.; Tan, X.; Wei, J.; Yang, H. Glycosides changed the stability and antioxidant activity of pelargonidin. *LWT Food Sci. Technol.* **2021**, *147*, 111581. [Google Scholar] [CrossRef]

Back to Top