

Horng-Huey Ko



Personal Profile

Name: Horng-Huey Ko (柯宏慧)

Position title: Professor and Director

School of Pharmacy, College of Pharmacy, Kaohsiung Medical University,
Kaohsiung, Taiwan

Joint Appointment Professor

¹Department of Fragrance and Cosmetic Science, College of Pharmacy, ²Department of Medical Research, Kaohsiung Medical University Hospital, and ³Drug Development and Value Creation Center, Kaohsiung Medical University, Kaohsiung, Taiwan.

Nationality: Taiwan

Affiliation and Contact Information

School of Pharmacy, College of Pharmacy, Kaohsiung Medical University, 100, Shih-Chuan 1st Road, San-Ming District, Kaohsiung 807, Taiwan.

E-mail: hhko@kmu.edu.tw

Tel. +886-7-3121101~9 ext. 2643

Education

1995-2000, Ph. D., School of Pharmacy, Kaohsiung Medical University, Taiwan.

1990-1994, B. S., School of Pharmacy, Kaohsiung Medical College, Taiwan.

License

Ph. D./Pharmacist, Board-certified, Taiwan

Level C Technician for Beauty, Board-certified, Taiwan

Level B Technician for Beauty, Board-certified, Taiwan

Employment and Experience

Aug. 2021-present, Professor, School of Pharmacy, Kaohsiung Medical University, Kaohsiung, Taiwan.

Feb. 2014-Jul. 2021, Professor, Department of Fragrance and Cosmetic Science, Kaohsiung Medical University, Kaohsiung, Taiwan.

Sep. 2009-Jan. 2014, Associate Professor, Department of Fragrance and Cosmetic Science, Kaohsiung Medical University, Kaohsiung, Taiwan.

Aug. 2003-Aug. 2009, Assistant Professor, Department of Fragrance and Cosmetic Science, Kaohsiung Medical University, Kaohsiung, Taiwan.

Aug. 2002-Jul. 2003, Assistant Professor, Department of Cosmetic Science, Chung Hwa University of Medicinal Technology, Tainan, Taiwan.

Feb. 2002-Jul. 2002, Assistant Professor, Department of Chemical Engineering, Yung Ta Institute of Technology and Commerce, Ping Tung, Taiwan.

Aug. 2001-Jan. 2002, Assistant Professor, Shu-Zen College of Medicine and Management, Kaohsiung, Taiwan.

Sep. 2000-Jun. 2001, Postdoctoral Fellow, School of Pharmacy, Kaohsiung Medical University, Taiwan.

Aug. 2021-Jul. 2024, Director of the School of Pharmacy

Aug. 2015-Jul. 2018, Director of the Department of Fragrance and Cosmetic Science

Awards & Honors

2017-2018, 2020 Excellent Industry-University Cooperation Award of Kaohsiung Medical University

2017-2019, 2021, 2022 Excellent Award of Patent Approval of Kaohsiung Medical University
2018 Award of Technology Transfer of Kaohsiung Medical University
2017-2018 Outstanding Research Award of Kaohsiung Medical University
2016 Outstanding Award of Patent Approval of Kaohsiung Medical University

Professional Society Memberships

The Pharmaceutical Society of Japan

The Pharmaceutical Society of Taiwan (Lifetime membership)

The Society of Chinese Natural Medicine (Lifetime membership)

The Society of Cosmetic Scientist of Taiwan

Research Interests

For many years, my research has focused on natural products chemistry, medicinal chemistry, functional cosmetics and foods, and cosmetic science. Our lab has been actively involved in employing bioassay-guided methods to investigate Formosan plants or Chinese herbal medicines, with the aim of developing bioactive constituents. This has resulted in the discovery of several bioactive natural products with photoprotective properties. These compounds show potential as candidates for anti-melanogenesis, anti-inflammatory, or anti-photoaging agents, and could be used as cosmetic active ingredients. In recent years, we have also turned our attention to the damage caused by PM_{2.5} to the skin. We are working towards developing natural protective agents to mitigate or prevent skin damage caused by external pollutants.

Publications in Peer-reviewed Journals

1. W. H. Chang, H. T. Hsu, C. C. Lin, L. M. An, C. H. Lee, **H. H. Ko**, C. L. Lin, Y. C. Lo. Linalool, a fragrance compound in plants, protects dopaminergic neurons and improves motor function and skeletal muscle strength in experimental models of Parkinson's disease. *Int. J. Mol. Sci.*, **2024**, *25*, 2514.
2. M. J. Cheng, M. D. Wu, **H. H. Ko**, C. Y. Chen, J. Y. Leu, J. J. Chen. Natural product from the culture broth of Actinobacteria *Actinomadura miaoliensis*. *Chem. Nat. Compd.*, **2023**, *59*, 351.
3. J. H. Cheng, H. C. Wu, C. H. Yen, T. L. Hwang, **H. H. Ko**, H. S. Chang. Chemical constituents with anti-lipid droplet accumulation and anti-inflammatory activity from *Elaeagnus glabra*. *Plants* **2023**, *12*, 294.
4. W. Y. Liu, Y. S. Hsieh, **H. H. Ko***, Y. T. Wu*. Formulation approaches of crystallization status modification for carotenoids: impacts on dissolution, stability, bioavailability and bioactivities. *Pharmaceutics* **2023**, *15*, 485. (Review article)
5. W. D. Yang*, J. X. Wang, Y. T. Wu, H. S. Chang, **H. H. Ko**. Preparatory conditions optimization and characterization of hierarchical porous carbon from seaweed as carbon-precursor using a box-behnken design for application of supercapacitor. *Materials* **2022**, *15*, 5748.
6. Y. C. Chen, S. H. Su, J. C. Huang, C. Y. Chao, P. J. Sung, Y. F. Chen, **H. H. Ko***, Y. H. Kuo*. Tyrosinase inhibitors derived from chemical constituents of *Dianella ensifolia*. *Plants* **2022**, *11*, 2142.
7. S. S. Yang, Y. F. Chen, **H. H. Ko**, H. C. Wu, S. Y. Hsieh, M. D. Wu, M. J. Cheng*, H. S. Chang*. Undescribed alkyne-geranylcylohexenetriols from the endophyte *Diaporthe caulivora* 09F0132 and their anti-melanogenic activity. *Phytochemistry* **2022**, *202*, 113312.
8. Y. F. Chen, H. C. Wu, J. M. Chang, **H. H. Ko**, C. H. Lin, H. S. Chang*. Chemical investigations and cytotoxic effects of metabolites from *Antrodia camphorate* against human hepatocellular carcinoma cells. *Nat. Prod. Res.*, **2022**; May18; 1-11.
9. C. I. Chang, C. C. Chen, **H. H. Ko**, J. J. Chen, M. J. Cheng, C. Y. Chao*, Y. H. Kuo*, Seco-abietanoids from *Cryptomeria japonica* and their inhibitory activity toward xanthine oxidase. *Chem. Nat. Compd.*, **2022**, *58*, 478-481.
10. C. C. Wang, C. Y. Hsiao, Y. J. Hsu, **H. H. Ko**, D. C. Chang, C. F. Hung*, Anti-inflammatory effects of cycloheterophyllin on dinitrochlorobenzene-induced atopic dermatitis in HaCaT cells and BALB/c mice. *Molecules* **2022**, *27*, 2610.
11. A. Chang, C. F. Hung, P. W. Hsieh, **H. H. Ko**, S. J. Wang*, Eupafolin suppresses P/Q-type Ca²⁺

channels to inhibit Ca²⁺/Calmodulin- dependent protein kinase II and glutamate release at rat cerebrocortical nerve terminals. *Biomol. Ther.*, **2021**, *29*, 630-636.

12. **H. H. Ko**, Y. T. Chang, Y. H. Kuo, C. H. Lin, Y. F. Chen*, *Oenothera laciniata* Hill extracts exhibits antioxidant effects and attenuates melanogenesis in B16-F10 cells via downregulating CREB/MITF/tyrosinase and upregulating p-ERK and p-JNK. *Plants*, **2021**, *10*, 727.
13. H. H. Chang, **H. H. Ko**, T. M. Lu, J. Y. Lin, D. C. Chang, T. W. Chu, C. F. Hung*, Inhibition of UVA damage on human skin dermis fibroblasts by the isoflavonoid intermediate deoxybenzoin-3A. *Chem. Res. Toxicol.*, **2021**, *34*, 1133-1139.
14. Y. Chang, C. F. Hung, **H. H. Ko**, S. J. Wang*, Albanin A, derived from the root bark of *Morus alba* L., depresses glutamate release in the rat cerebrocortical nerve terminals via Ca²⁺/calmodulin/adenylate cyclase 1 suppression. *J. Med. Food*, **2021**, *24*, 209-217.
15. C. H. Lin, H. J. Chou, C. C. Chang, I. S. Chen, H. S. Chang, T. L. Cheng, Y. H. Kuo*, **H. H. Ko***, Chemical constituent of β -glucuronidase inhibitors from the root of *Neolitsea acuminatissima*. *Molecules*, **2020**, *25*, 5170.
16. C. I Chang, M. J. Cheng, S. Y. Wang, J. J. Chen, M. D. Wu, C. C. Chen, **H. H. Ko**, Y. H. Kuo*, Two new dimeric abietane-type diterpenoids from the bark of *Cryptomeria japonica* and their enzyme inhibitory activity. *Phytochemistry Letters*, **2019**, *33*, 84-89.
17. T. S. Chang *, **H. H. Ko**, T. Y. Wang, C. H. Lee, J. Y. Wu *, Biotransformation of ganoderic acid A to 3-O-acetyl ganoderic acid A by soil-isolated *Streptomyces* sp. *Fermentation*, **2018**, *4*, 101.
18. K. T. Peng, Y. C. Chiang, **H. H. Ko**, P. L. Chi, C. L. Tsai, M. I Ko, M. H. Lee, L. F. Hsu*, and C. W. Lee*, Mechanism of lakoochin A inducing apoptosis of A375.S2 melanoma cells through mitochondrial ROS and MAPKs pathway. *Int. J. Mol. Sci.*, **2018**, *19*, 2649.
19. J. R. Weng*, L. Y. Bai^a, **H. H. Ko**^a, Y. T. Tsai, Cyclocommunol induces apoptosis in human oral squamous cell carcinoma partially through a Mcl-1-dependent mechanism. *Phytomedicine*, **2018**, *39*, 25-32. (^a equal contribution)
20. C. I Chang, C. C. Chen, C. Y. Chao, **H. H. Ko**, H. S. Chang, S. Y. Wang, J. J. Chen, C. C. Chen, Y. H. Kuo*, Two new abietane-type diterpenes from the bark of *Cryptomeria japonica*. *Nat. Prod. Commun.*, **2017**, *12*, 1553-1555.
21. C. H. Lin, H. L. Chu, W. S. Hwang, M. C. Wang*, and **H. H. Ko***, Synthesis and optical properties of Mg-Al layered double hydroxides precursor powders. *AIP Advances*, **2017**, *7*, 125005.
22. C. I Chang, S. Y. Wang, M. D. Wu, M. J. Cheng^a, **H. H. Ko**, H. S. Chang, J. J. Chen^a, C. C. Chen^a, Y. H. Kuo^{a,*} Two new sesquiterpenoids from the bark of *Cryptomeria japonica*. *Phytochemistry Letters*, **2017**, *22*, 56-60. (^a equal contribution)
23. C. W. Lee, F. L. Yen, **H. H. Ko**, S. Y. Li, Y. C. Chiang, M. H. Lee, M. H. Tsai, L. F. Hsu, Cudraflavone C induces apoptosis of A375.S2 melanoma cells through mitochondrial ROS production and MAPK activation. *Int. J Mol. Sci.*, **2017**, *18*, E1508.
24. B. Huang, H. L. Chu, M. C. Wang*, C. L. Wang, W. S. Hwang, C. Liu, **H. H. Ko**, X. Zhao*, Crystallization kinetics evaluated by the modified formula and optical properties of CdO and ZnO in 0.5ZnO-0.5CdO thin films. *J. Alloys Compd.*, **2017**, *702*, 509-519.
25. C. L. Wang, T. H. Lan, C. W. Tzeng, C. C. Chang, T. C. Lin, **H. H. Ko***, W. S. Hwang, H. H. Huang, F. L. Yen*, and M. C. Wang*, Densification and biocompatibility of sintering 3.0 mol% yttria- tetragonal ZrO₂ polycrystal ceramics with x wt% Fe₂O₃ and 5.0 wt% mica powders additive. *Ceram. Int.*, **2017**, *43*, 1809-1818.
26. C. I Chang, C. C. Chen, S. Y. Wang, C. Y. Chao, Louis K. Chao, J. J. Chen, **H. H. Ko**^a, C. C. Chen^a, and Y. H. Kuo^{*a}, Three New Abietane-type diterpenes from the bark of *Cryptomeria japonica*. *Helv. Chim. Acta*, **2016**, *99*, 710-715. (^a equal contribution)
27. Z. C. Lin, C. W. Lee, M. H. Tsai, **H. H. Ko**, J. Y. Fang, Y. C. Chiang, C. J. Liang, L. F. Hsu, Stephen C. S. Hu*, and F. L. Yen*, Eupafolin Nanoparticles Protect HaCaT Keratinocytes from Particulate Matter-induced Inflammation and Oxidative Stress. *Int. J. Nanomed.*, **2016**, *11*, 3907-3926.
28. C. L. Wang, W. S. Hwang, H. L. Chu, H. J. Lin, **H. H. Ko***, and M. C. Wang*, Kinetics of Anatase Transition to Rutile TiO₂ from Titanium Dioxide Precursor Powders Synthesized by a Sol-gel Process. *Ceram. Int.*, **2016**, *42*, 13136-13143.
29. T. M. Lu* and **H. H. Ko**, A New Anthraquinone Glycoside from *Rhamnus nakaharai* and

- Anti-tyrosinase Effect of 6-Methoxysorigenin. *Nat. Prod. Res.*, **2016**, 30 (23), 2655-2661.
30. S. Y. Lin, **H. H. Ko**, S. J. Lee, H. S. Chang*, C. H. Lin, and I. S. Chen*, Biological Evaluation of Secondary Metabolites from the Root of *Machilus obovatifolia*. *Chem. Biodivers.*, **2015**, 12, 1057-1067.
 31. Y. J. Jin, C. C. Lin, T. M. Lu, J. H. Li, I. S. Chen, Y. H. Kuo, and **H. H. Ko***, Chemical Constituents Derived from *Artocarpus xanthocarpus* as Inhibitors of Melanin Biosynthesis. *Phytochemistry*, **2015**, 117, 424-435.
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 33. T. M. Lu*, **H. H. Ko**, L. T. Ng, and Y. P. Hsieh, Free Radical Scavenging, Anti-tyrosinase and Cellular Melanogenesis Inhibitory Activities of Synthetic Isoflavonoids. *Chem. Biodivers.*, **2015**, 12, 963-979.
 34. C. L. Wang, H. L. Chu, **H. H. Ko**, C. S. Hsi, W. L. Li, W. S. Hwang, K. M. Chang, and M. C. Wang*, Phase Formation Mechanism of the Zinc Titanate Precursor powders prepared at various pH using a hydrothermal process. *Ceram. Int.*, **2015**, 41, 2028-2041.
 35. T. H. Lee, C. C. Chen, J. J. Chen, H. F. Liao^a, H. S. Chang, P. J. Sung, M. H. Tseng, S. Y. Wang, **H. H. Ko**^a, and Y. H. Kuo, New and Cytotoxic Components from *Antrodia camphorate*. *Molecules* **2014**, 19, 21378-21385. (^a equal contribution)
 36. S. W. Yeh, **H. H. Ko**, H. M. Chiang, Y. L. Chen*, J. H. Lee, C. M. Wen, and M. C. Wang*, Characteristics and Properties of a Novel in Situ Method of Synthesizing Mesoporous TiO₂ Nanopowders by a Simple Coprecipitation Process without Adding Surfactant. *J. Alloys Compd.*, **2014**, 613, 107-116.
 37. **H. H. Ko**, G. Yang, M. C. Wang*, and X. Zhao, Thermal Behavior and Crystallization Kinetics of Cerium Dioxide Precursor Powders. *Ceram. Int.*, **2014** 40, 13953-13959.
 38. F. J. Lin, F. L. Yen, P. C. Chen, M. C. Wang, C. N. Lin, C. W. Lee, and **H. H. Ko***, HPLC-Fingerprints and Antioxidant Constituents of *Phylla nodiflora*. *SCI World J.* **2014**, Volume 2014, Article ID 528653, 8 pages.
 39. Y. C. Ting, **H. H. Ko**, H. C. Wang, C. F. Peng, H. S. Chang, P. C. Hsieh, and I. S. Chen*, Biological Evaluation of Secondary Metabolites from the roots of *Myrica adenophora*. *Phytochemistry*, **2014**, 103, 89-98.
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 43. **H. H. Ko**, C. S. Hsi, M. C. Wang*, and X. J. Zhao, Crystallite Growth Kinetics of TiO₂ Surface Modification with 9 mol% ZnO Prepared by a Coprecipitation Process. *J. Alloys Compd.*, **2014**, 588, 428-439.
 44. **H. H. Ko**, G. L. Yang, H. Z. Cheng, M. C. Wang*, and X. J. Zhao*, Growth and Optical Properties of Cerium Dioxide Nanocrystallites Prepared by Coprecipitation Routes. *Ceram. Int.*, **2014**, 40, 4055-4064.
 45. Y. T. Fu, C. W. Lee, **H. H. Ko**, and F. L. Yen*, Extracts of *Artocarpus communis* Decrease α -Melanocyte Stimulating Hormone-induced Melanogenesis through Activating ERK and JNK Signaling Pathway. *SCI World J.*, **2014**, Volume 2014, Article ID 724314, 8 pages.
 46. **H. H. Ko**^a, Y. C. Chiang^a, M. H. Tsai, C. J. Liang, L. F. Hsu, S. Y. Li, M. C. Wang, F. L. Yen*, and C. W. Lee*, Eupafolin, a Skin Whitening Flavonoid Isolated from *Phylla nodiflora*, Downregulated Melanogenesis: Role of MAPK and Akt pathways. *J. Ethnopharmacol.*, **2014**, 151, 386-393. (^a equal contribution)
 47. S. W. Yeh, Y. L. Chen, C. S. Hsi, **H. H. Ko**, and M. C. Wang*, Thermal Behavior and Phase

Transformation of TiO₂ Nanocrystallites Prepared by Coprecipitation Route. *Metall. Mater. Trans. A*, **2014**, 45A, 261-268.

48. C. L. Wang, W. S. Hwang, **H. H. Ko***, C. S. Hsi, K. M. Chang, and M. C. Wang*, Phase Transformation and Microstructure of Zn₂Ti₃O₈ Nanocrystallite Powders Prepared Using the Hydrothermal Process. *Metall. Mater. Trans. A*, **2014**, 45A, 250-260.
49. **H. H. Ko**^a, Y. T. Tsai^a, M. H. Yen, C. C. Lin, C. J. Liang, T. H. Yang, C. W. Lee*, and F. L. Yen*, Norartocarpetin from a Folk Medicine *Artocarpus communis* Plays a Melanogenesis Inhibitor without Cytotoxicity and Skin Irritation in Mice. *BMC Complement. Altern. Med.*, **2013**, 13, 348-359. (^a equal contribution)
50. C. W. Lee^a, **H. H. Ko**^a, C. C. Lin, C. Y. Chai, W. T. Chen, and F. L. Yen*, Artocarpin Attenuates Ultraviolet B-induced Skin Damage in Hairless Mice by Antioxidant and Anti-inflammatory Effects. *Food Chem. Toxicol.*, **2013**, 60, 123-129. (^a equal contribution)
51. **H. H. Ko***, Y. J. Jin, T. M. Lu*, and I. S. Chen, A Novel Monoterpene–Stilbene Adduct with 4,4-Dimethyl-2,3-diphenylchromane Skeleton from *Artocarpus xanthocarpus*. *Chem. Biodivers.*, **2013**, 10, 1269-1275.
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55. G. L. Yang, **H. H. Ko**, Y. W. Hsu, K. H. Yang, M. C. Wang*, J. J. Han, and X. J. Zhao*, Growth Behavior of Nanosized Ceria Powders Prepared by Coprecipitation Routes. *Ceram. Int.*, **2013**, 39, 6805-6811.
56. C. W. Lee^a, **H. H. Ko**^a, C. Y. Chai, W. T. Chen, C. C. Lin, and F. L. Yen*, Effect of *Artocarpus communis* Extract on UVB Irradiation-induced Oxidative Stress and Inflammation in Hairless Mice. *Int. J. Mol. Sci.* **2013**, 14, 3860-3873. (^a equal contribution)
57. H. T. Chen, H. F. Chang, **H. H. Ko**, I. M. Hung, F. L. Yen, H. H. Huang, M. H. Hon, M. C. Wang*, and W. J. Shih, Effects of Solute and Surfactant Addition on the Crystallization and Morphology of Hydroxyapatite Powders Synthesized by Hydrolysis of Calcium Hydrogen Phosphate Dehydrate (DCPD). *Metall. Mater. Trans. A*, **2013**, 44A, 1023-1033.
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- Agent or Mineralizer. *Int. J. Mol. Sci.* **2011**, *12*, 935-945.
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Patents

1. 2022/02/11–2040/11/23 Invention Patent of Taiwan, Patent No. I755170, Use of *Diaporthe caulivora* extract for anti-UV damage and reducing pigmentation
2. 2019/10/21–2038/07/17 Invention Patent of Taiwan, Patent No. I674892, Linalool lotion preparation
3. 2016/12/20–2034/09/17 Invention Patent of Taiwan, Patent No. I 531552
2016/12/20–2034/09/17 Invention Patent of United States, Patent No. US 9,522,848 B2,
2018/08/14–2034/08/07 Invention Patent of People's Republic of China, Patent No. CN105439558B
Methods for producing a silicon-containing zirconia calcined body and a silicon-containing zirconia sintered body
4. 2016/02/21–2032/10/28 Invention Patent of Taiwan, Patent No. I 522127, *Phyla nordiflora* extract uses as a skin whitening agent
5. 2015/08/21–2032/11/12 Invention Patent of Taiwan, Patent No. I 496593, *Artocarpus communis* extract is used as an additive in sunscreen skin care products to prevent ultraviolet rays from damaging the skin.
6. 2015/10/12–2035/10/11 Invention Patent of People's Republic of China, Patent No. CN106562893B
2016/08/21–2035/10/01 Invention Patent of Taiwan, Patent No. I 546083
A use of kazinol M, kazinol N and 2*S*-7,4'-dihydroxy-3'-methoxyflavan, and a whitening composition including kazinol M and 2*S*-7,4'-Dihydroxy-3'-Methoxyflavan

Research Project within the past five years

1. 2023/08/01–2026/07/31 Development of novel skin protectants for alleviating airborne particulate damage: a research strategy combining green extraction of natural products and nanoformulations
National Science and Technology Council (NSTC) of Taiwan, NSTC112-2320-B-037-022-MY3

2. 2023/01/01–2023/12/31 Dendrimer vehicles for cardiac delivery of therapeutics for heart failure treatment
Kaohsiung Medical University (KMU) and National Yang-Ming Chiao Tung University Collaborative Research Integrated Project, NYCUKMU-112-I004
3. 2023/01/01–2023/12/31 A comparison of deleterious mechanisms of particulate matters (PM2.5) collected in different Kaohsiung localities on the skin and the development of natural skin protectants
KMU Research Project, KMU-M112002
4. 2022/11/01–2023/10/31 Using green extraction method to develop protective agents from Formosan plants against skin damage caused by particulate matter
KMU-NKUST Collaborative Research Project, 111KK021
5. 2022/01/01–2022/12/31 Green solvent-free microwave extraction assisted in the development of skin chemopreventive agents
KMU Research Project, KMU-M111004
6. 2021/10/01–2022/09/30 Development of novel antimicrobial agents based on natural product functionalized carbon hybrid nanocomposites
KMU-NKUST Collaborative Research Project, 110KK007
7. 2020/08/01–2021/07/31 Green solvent-free microwave extraction assisted in the development of skin chemopreventive agents
NSTC109-2320-B-037-016
8. 2019/08/01–2020/07/31 Using solvent-free green extraction technology to improve the extraction rate of natural active components and its application value
NSTC 108-2320-B-037-023
9. 2019/06/01–2020/05/31 The development and application of Formosan endophytic fungus in cosmetic actives
NSTC 108-2622-B-037-001 -CC2
10. 2019/08/01–2020/07/31 Developing a diverse skin protection active ingredient using probiotics and plant symbiotic fungi—A New Solution to Enhance the Application Value and Economic Benefits in the Cosmetics Industry
KMU Research Center Project