

## Curriculum Vitae



**Name:** Asst. Prof. Dr. Krisana Nilsuwan

### Education:

2013 B.Sc. (Food Science and Technology) 1st Hons. Prince of Songkla University, Thailand

2016 M.Sc. (Food Science and Technology) Prince of Songkla University, Thailand

2020 Ph.D. (Bi-nationally supervised (Cotutelle) PhD research)

- “Food Science and Technology” program: Department of Food Technology, Faculty of Agro-Industry, Prince of Songkla University, Hat Yai, Songkhla, Thailand
- “Renewable materials engineering” program: BIOMAT Research Group, University of The Basque Country (UPV/EHU), Donostia-San Sebastian, Spain

### Field of interest:

- Food chemistry and processing
- Biodegradable and edible films
- Utilization of fish processing by-products

### Publications:

1. Sharma, K.; **Nilsuwan, K.**; Hong, H.; Fan, X.; Benjakul, S. Debittering of salmon frame protein hydrolysate and plastein using Maillard reaction as affected by types of sugar. *International Journal of Food Science and Technology* 2024, doi:10.1111/ijfs.16904.
2. Fikry, M.; Benjakul, S.; Al-Ghamdi, S.; Mittal, A.; **Nilsuwan, K.**; Fulleros, R.; Dabbour, M. Sorption isotherms and thermodynamic characteristics of gelatin powder extracted from whitefish skin: Mathematical Modeling Approach. *Foods* 2024, 13, doi:10.3390/foods13010092.
3. Tagrida, M.; **Nilsuwan, K.**; Gulzar, S.; Prodpran, T.; Benjakul, S. Fish gelatin/chitosan blend films incorporated with betel (*Piper betle* L.) leaf ethanolic extracts: Characteristics, antioxidant and antimicrobial properties. *Food Hydrocolloids* 2023, 137, doi:10.1016/j.foodhyd.2022.108316.
4. Tagrida, M.; Gulzar, S.; **Nilsuwan, K.**; Prodpran, T.; Ma, L.; Benjakul, S. Properties of gelatin/chitosan blend films incorporated with betel leaf ethanolic extract loaded in liposomes and their use as pouches for shrimp oil packaging. *International Journal of Food*

- Science and Technology* 2023, 58, 1108-1119, doi:10.1111/ijfs.16254.
5. Sharma, K.; **Nilsuwan, K.**; Zhang, B.; Hong, H.; Benjakul, S. Protein hydrolysate from salmon frame debittered by plastein reaction: amino acid composition, characteristics and antioxidant activities. *International Journal of Food Science and Technology* 2023, 58, 154-166, doi:10.1111/ijfs.16183.
  6. Sharma, K.; **Nilsuwan, K.**; Ma, L.; Benjakul, S. Effect of liposomal encapsulation and ultrasonication on debittering of protein hydrolysate and plastein from salmon frame. *Foods* 2023, 12, doi:10.3390/foods12040761.
  7. Petsong, K.; Kaewthong, P.; Kingwascharapong, P.; **Nilsuwan, K.**; Karnjanapratum, S.; Tippayawat, P. Potential of jackfruit inner skin fibre for encapsulation of probiotics on their stability against adverse conditions. *Scientific Reports* 2023, 13, doi:10.1038/s41598-023-38319-y.
  8. Patil, U.; **Nilsuwan, K.**; Buamard, N.; Zhang, B.; Benjakul, S. Characteristics and molecular properties of crude hemeproteins extracted from Asian seabass gills using an ultrasound-assisted process. *Journal of the Science of Food and Agriculture* 2023, doi:10.1002/jsfa.13121.
  9. **Nilsuwan, K.**; Pomtong, S.; Chedosama, A.; Sookchoo, P.; Benjakul, S. Chemical compositions and characteristics of biocalcium from Asian sea bass (*Lates calcarifer*) scales as influenced by pretreatment and heating processes. *Foods* 2023, 12, doi:10.3390/foods12142695.
  10. Naher, J.; **Nilsuwan, K.**; Palamae, S.; Hong, H.; Zhang, B.; Osako, K.; Benjakul, S. Ethanolic extracts from mint (*Mentha arvensis*) and basil (*Ocimum basilicum*) leaves: Antioxidant, antimicrobial capacities and shelf-life extension of refrigerated squid mantle cut. *International Aquatic Research* 2023, 15, 313-332, doi:10.22034/iar.2023.1995310.1502.
  11. Khalifa, I.; **Nilsuwan, K.**; Prodpran, T.; Benjakul, S. Covalently phenolated- $\beta$ -lactoglobulin-pullulan as a green halochromic biosensor efficiency monitored Barramundi fish's spoilage. *International Journal of Biological Macromolecules* 2023, 243, doi:10.1016/j.ijbiomac.2023.125189.
  12. Tagrida, M.; Gulzar, S.; **Nilsuwan, K.**; Prodpran, T.; Zhang, B.; Benjakul, S. Polylactic acid film coated with electrospun gelatin/chitosan nanofibers containing betel leaf ethanolic extract: Properties, bioactivities, and use for shelf-life extension of tilapia slices. *Molecules* 2022, 27, doi:10.3390/molecules27185877.
  13. **Nilsuwan, K.**; Widyanti, N.; Prodpran, T.; Benjakul, S.; de la Caba, K. Properties and characteristics of salmon frame protein isolate films influenced by glycerol and squalene. *International Food Research Journal* 2022, 29, 676-685, doi:10.47836/ifrj.29.3.19.
  14. **Nilsuwan, K.**; Patil, U.; Tu, C.; Zhang, B.; Benjakul, S. Salmon skin acid-soluble collagen produced by a simplified recovery process: Yield, compositions, and molecular characteristics. *Fishes* 2022, 7, doi:10.3390/fishes7060330.
  15. **Nilsuwan, K.**; Fusang, K.; Pripatnanont, P.; Benjakul, S. Properties and characteristics of acid-soluble collagen from salmon skin defatted with the aid of ultrasonication. *Fishes* 2022, 7, doi:10.3390/fishes7010051.
  16. **Nilsuwan, K.**; Chantakun, K.; Zhang, B.; Ma, L.; Yesilsu, A.F.; Benjakul, S. Ammonium sulfate and repeated freeze-thawing recover oil from emulsion separated from salmon skin

- hydrolysate. *European Journal of Lipid Science and Technology* 2022, 124, doi:10.1002/ejlt.202200027.
17. **Nilsuwan, K.**; Arnold, M.; Benjakul, S.; Prodpran, T.; de la Caba, K.; Mohan, C.O. Characteristics and seal ability of blend films based on chicken protein isolate and fish skin gelatin. *Journal of Food Science and Technology* 2022, 59, 2562-2571, doi:10.1007/s13197-021-05273-4.
  18. Gulzar, S.; Tagrida, M.; **Nilsuwan, K.**; Prodpran, T.; Benjakul, S. Electrospinning of gelatin/chitosan nanofibers incorporated with tannic acid and chitoooligosaccharides on polylactic acid film: Characteristics and bioactivities. *Food Hydrocolloids* 2022, 133, doi:10.1016/j.foodhyd.2022.107916.
  19. Gulzar, S.; **Nilsuwan, K.**; Raju, N.; Benjakul, S. Whole wheat crackers fortified with mixed shrimp oil and tea seed oil microcapsules prepared from mung bean protein isolate and sodium alginate. *Foods* 2022, 11, doi:10.3390/foods11020202.
  20. Chotphruethipong, L.; Hutamekalin, P.; **Nilsuwan, K.**; Sukketsiri, W.; Aluko, R.E.; Abdul, N.R.; Benjakul, S. Combined effects of defatted hydrolyzed collagen from salmon skin and vitamin C on proliferation and migration of human fibroblast cell. *Fishes* 2022, 7, doi:10.3390/fishes7050265.
  21. Chantakun, K.; **Nilsuwan, K.**; Tagrida, M.; Sumpavapol, P.; Benjakul, S. Tender coconut water fortified with edible bird's nest protein hydrolysate subjected to sterilization and high hydrolytic pressure processes: Qualities, acceptability and changes during refrigerated storage. *Food Control* 2022, 140, doi:10.1016/j.foodcont.2022.109116.
  22. Chantakun, K.; **Nilsuwan, K.**; Sumpavapol, P.; Huda, N.; Benjakul, S. Effect of ultraviolet-C radiation and pasteurization on quality and shelf life of refrigerated tender coconut water fortified with edible bird's nest protein hydrolysate. *Journal of Food Processing and Preservation* 2022, 46, doi:10.1111/jfpp.16870.
  23. Chantakun, K.; **Nilsuwan, K.**; Sripradit, A.; Benjakul, S. House and cave edible bird's nest: Characteristics and quality of sterilised beverages containing the selected bird's nest. *International Journal of Food Science and Technology* 2022, 57, 2447-2458, doi:10.1111/ijfs.15606.
  24. Theerawitayaart, W.; Prodpran, T.; Benjakul, S.; **Nilsuwan, K.**; de la Caba, K. Storage stability of fish gelatin films by molecular modification or direct incorporation of oxidized linoleic acid: Comparative studies. *Food Hydrocolloids* 2021, 113, doi:10.1016/j.foodhyd.2020.106481.
  25. **Nilsuwan, K.**; Guerrero, P.; Caba, K.D.L.; Benjakul, S.; Prodpran, T. Fish gelatin films laminated with emulsified gelatin film or poly(lactic) acid film: Properties and their use as bags for storage of fried salmon skin. *Food Hydrocolloids* 2021, 111, doi:10.1016/j.foodhyd.2020.106199.
  26. **Nilsuwan, K.**; Chantakun, K.; Chotphruethipong, L.; Benjakul, S. Development of hydrolysis and defatting processes for production of lowered fishy odor hydrolyzed collagen from fatty skin of sockeye salmon (*Oncorhynchus nerka*). *Foods* 2021, 10, doi:10.3390/foods10102257.
  27. **Nilsuwan, K.**; Arnold, M.; Benjakul, S.; Prodpran, T.; de la Caba, K. Properties of chicken protein isolate/fish gelatin blend film incorporated with phenolic compounds and its application as pouch for packing chicken skin oil. *Food Packaging and Shelf Life* 2021, 30,

- doi:10.1016/j.fpsl.2021.100761.
28. Mittal, A.; Singh, A.; Benjakul, S.; Prodpran, T.; **Nilsuwan, K.**; Huda, N.; Caba, K.D.L. Composite films based on chitosan and epigallocatechin gallate grafted chitosan: Characterization, antioxidant and antimicrobial activities. *Food Hydrocolloids* 2021, *111*, doi:10.1016/j.foodhyd.2020.106384.
  29. **Nilsuwan, K.**; Guerrero, P.; de la Caba, K.; Benjakul, S.; Prodpran, T. Properties and application of bilayer films based on poly (lactic acid) and fish gelatin containing epigallocatechin gallate fabricated by thermo-compression molding. *Food Hydrocolloids* 2020, *105*, doi:10.1016/j.foodhyd.2020.105792.
  30. **Nilsuwan, K.**; Guerrero, P.; Caba, K.D.L.; Benjakul, S.; Prodpran, T. Properties of fish gelatin films containing epigallocatechin gallate fabricated by thermo-compression molding. *Food Hydrocolloids* 2019, *97*, doi:10.1016/j.foodhyd.2019.105236.
  31. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T.; de la Caba, K. Fish gelatin monolayer and bilayer films incorporated with epigallocatechin gallate: Properties and their use as pouches for storage of chicken skin oil. *Food Hydrocolloids* 2019, *89*, 783-791, doi:10.1016/j.foodhyd.2018.11.056.
  32. Karnjanapratum, S.; **Nilsuwan, K.**; Benjakul, S.; Sumpavapol, P. Oil from Asian bullfrog (*Rana tigerina*) skin: Antimicrobial activity and its application in emulsion gelatin-based film. *Chiang Mai University Journal of Natural Sciences* 2019, *18*, 68-79, doi:10.12982/CMUJNS.2019.0006.
  33. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T. Physical/thermal properties and heat seal ability of bilayer films based on fish gelatin and poly(lactic acid). *Food Hydrocolloids* 2018, *77*, 248-256, doi:10.1016/j.foodhyd.2017.10.001.
  34. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T. Properties and antioxidative activity of fish gelatin-based film incorporated with epigallocatechin gallate. *Food Hydrocolloids* 2018, *80*, 212-221, doi:10.1016/j.foodhyd.2018.01.033.
  35. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T. Properties, microstructure and heat seal ability of bilayer films based on fish gelatin and emulsified gelatin films. *Food Biophysics* 2017, *12*, 234-243, doi:10.1007/s11483-017-9479-2.
  36. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T. Emulsion stability and properties of fish gelatin-based films as affected by palm oil and surfactants. *Journal of the Science of Food and Agriculture* 2016, *96*, 2504-2513, doi:10.1002/jsfa.7371.
  37. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T. Influence of palm oil and glycerol on properties of fish skin gelatin-based films. *Journal of Food Science and Technology* 2016, *53*, 2715-2724, doi:10.1007/s13197-016-2243-7.
  38. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T. Quality changes of shrimp cracker covered with fish gelatin film without and with palm oil incorporated during storage. *International Aquatic Research* 2016, *8*, 227-238, doi:10.1007/s40071-016-0138-x.
  39. **Nilsuwan, K.**; Benjakul, S.; Prodpran, T. Effects of soy lecithin levels and microfluidization conditions on properties of fish gelatin-based film incorporated with palm oil. *International Journal of Food Engineering* 2016, *12*, 647-660, doi:10.1515/ijfe-2016-0064.
  40. Tongnuanchan, P.; Benjakul, S.; Prodpran, T.; **Nilsuwan, K.** Emulsion film based on fish skin gelatin and palm oil: Physical, structural and thermal properties. *Food Hydrocolloids* 2015, *48*, 248-259, doi:10.1016/j.foodhyd.2015.02.025.

**Petty patent**

1. Phosphate and bi-carbonate replacer for improvement of water holding capacity and weight loss of shrimp (No. 1603002515).
2. Production process of biocalcium (No. 2103001061).
3. Production of protein hydrolysate from low grade edible bird's nest (No.2103002466)
4. Extraction of fish oil from fish processing by-products via enzymatic hydrolysis and mechanical separation (No.2103001568)
5. Production of collagen hydrolysate from skin from fatty fish (No.2203003379)

**Conferences/Meeting**

1. **Nilsuwan, K.**, Benjakul, S. and Prodpran, T. 2015. Effect of palm oil and surfactants on properties of fish gelatin-based film. The 17<sup>th</sup> Food Innovation Asia Conference, BITEC Bangna, Bangkok, Thailand. 18-19 June 2015.
2. **Nilsuwan, K.**, Benjakul, S. and Prodpran, T. 2017. Properties, microstructure and heat seal ability of bilayer films based on fish gelatin and poly(lactic acid). The 31<sup>st</sup> EFFoST International Conference, Melia Sitges, Sitges, Spain. 14 November 2017.
3. **Nilsuwan, K.**, Benjakul, S. and Prodpran, T. 2018. Properties and antioxidative activity of fish gelatin-based film incorporated with epigallocatechin gallate. COCSIT International conference, college of computer science and information technology, Latur, Maharashtra, India. 12-13 January 2018.
4. **Nilsuwan, K.**, Guerrero, P., de la Caba, K., Benjakul, S. and Prodpran, T. 2019. Properties of fish gelatin film containing epigallocatechin gallate fabricated by thermo-compression molding. The 20<sup>th</sup> Gums & Stabilisers for the Food Industry Conference, San-sebastian, Spain. 11-14 June 2019.

**Awards**

1. Second runner up poster presentation, The 17<sup>th</sup> Food Innovation Asia Conference, BITEC Bangna, Bangkok, Thailand. 18-19 June 2015.