**Title :** Preparation and Characterization of Nisin-conjugated Liposome as a Drug Delivery System

**Author(s) :** **1.** Pantawas Kiatpongphan **Student ID :** 640510055

**Major :** Biochemistry and Biochemical Innovation

**Advisor(s) :** **1.** Associate Professor Dr. Panchika Prangkio

**Type of presentation*** ***(choose 1)*** **:**

- ☐ **Oral Presentation** (เฉพาะ ตัวแทนนศ.ที่สาขาเลือกให้นำเสนอแบบบรรยาย)
- ☑ **Poster** (กรณี นำเสนอผลงานปัญหาพิเศษ/การค้นคว้าอิสระ)
- ☐ **Cooperative Education** (กรณี นำเสนอผลงานสหกิจศึกษา)

# ABSTRACT

This research focuses on the preparation and characterization of liposomes conjugated with nisin peptide to enhance efficiency and specificity for targeted drug delivery applications. Nisin, a naturally occurring antimicrobial peptide with positive charges, was selected as a ligand for conjugation to improve specificity to cancer cells. Key properties of the liposomes, including particle size, stability, nisin conjugation efficiency, drug encapsulation efficiency, and drug release rate, were evaluated to demonstrate the suitability of the system for medical applications under simulated physiological conditions. This study aims to compare two bioconjugations methods for peptide and liposomes, including 1) carbodiimide conjugation and 2) thiol-maleimide methods. Liposomes were mainly composed of soy phosphatidylcholine and cholesterol and encapsulated with doxorubicin via the remote loading method. Particle size of non-conjugated liposomes analyzed using dynamic light scattering (DLS) were in the range of 120-130 nm and increased after conjugation. Nisin-conjugated liposomes via both methods exhibited slightly negative values of zeta potential, suggesting tendency of aggregation. Drug release of liposomes was analyzed over 15 days using the dialysis method under optimized conditions and fitted into Korsmeyer-Peppas kinetic model. Nisin conjugation efficiency and drug encapsulation efficiency were comparable, but the drug release rate was lower in thiol-maleimide conjugation method. Thus, the thiol-maleimide conjugation at 1:20 ratio was chosen as overall it demonstrated superior performance in terms of physicochemical properties and drug release. However, conditions need to be further optimized for the stability and long-term release behavior in the delivery system.

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*