Title : Development of Antimicrobial Hydrogel Wound Dressing Enriched with *Terminalia arjuna*

Author(s) : **1.** Ms. Sasiwan Humthong **Student ID :** 650510191
2. **Student ID :**
3. **Student ID :**

Major : Biochemistry and Biochemical Innovation

Advisor(s) : **1.** Assistant Professor Dr. Woraanong leewattanapasuk
2.
3.

Type of presentation* ***(choose 1)*** **:**
☐ **Oral Presentation** (เฉพาะ ตัวแทนนศ.ที่สาขาเลือกให้นำเสนอแบบบรรยาย)
☑ **Poster** (กรณี นำเสนอผลงานปัญหาพิเศษ/การค้นคว้าอิสระ)
☐ **Cooperative Education** (กรณี นำเสนอผลงานสหกิจศึกษา)

ABSTRACT

Hydrogels are a type of wound dressing that has gained increasing popularity and widespread application due to their ability to maintain a moist wound environment, minimize tissue damage upon removal, and promote wound healing. Recently, hydrogels have been further developed to possess antimicrobial properties through the incorporation of natural plant extracts. Previous studies report that *Terminalia arjuna* and *Terminalia chebula* fruit extracts exhibit anti-inflammatory activity and growth inhibitory effects against pathogenic microorganisms. Therefore, this study aims to develop a hydrogel wound dressing incorporating *Terminalia arjuna* fruit extracts, with a focus on evaluating its antimicrobial efficacy against common wound-associated pathogens. The target microorganisms include Gram-positive bacteria *Staphylococcus aureus* and *Staphylococcus epidermidis* and Gram-negative bacteria *Escherichia coli* and *Pseudomonas aeruginosa*, all of which are known to cause skin and wound infections. The study began with aqueous extraction of *Terminalia arjuna* fruits and *Terminalia chebula* fruits, followed by evaluation of antimicrobial activity using the agar disc diffusion method. Gentamicin was used as the positive control, while ultrapure deionized (DI) water served as the negative control. A total of ten extract concentrations ranging from 0.39 to 200 mg/mL were tested. From the overall results, it's demonstrated that the aqueous from *Terminalia arjuna* fruit extracts exhibited inhibitory activity better than *Terminalia chebula* against the target microorganism. *Staphylococcus epidermidis*, with zones of inhibition ranging from 26.83 ± 3.59 to 11.42

**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.*

± 2.01 mm, compared to 32.90 ± 1.45 mm for gentamicin. For *Staphylococcus aureus*, inhibition zones ranged from 21.11 ± 1.97 to 11.67 ± 1.44 mm, while the gentamicin control produced a zone of 26.00 ± 1.42 mm. In case of *Pseudomonas aeruginosa*, inhibition zones ranged from 30.08 ± 1.70 to 10.11 ± 0.96 mm; however, the inhibition was incomplete when compared to the gentamicin control (24.04 ± 0.72 mm). No inhibition zone was observed for *Escherichia coli*, whereas gentamicin produced a zone of 22.79 ± 1.83 mm. Notably, no inhibitory effect of gentamicin was detected in *E. coli* isolate 3, which may be attributed to resistance against aminoglycoside antibiotics. In future work, the extract will be further evaluated to determine the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). These parameters will be used to optimize the extract concentration in the hydrogel formulation, ensuring maximal antimicrobial efficacy for wound-dressing applications.

**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.*

Title name guide.

ADVISOR title name / แปลไทย	
Professor Dr.	ศาสตราจารย์ ดร.
Professor	ศาสตราจารย์
Associate Professor Dr.	รองศาสตราจารย์ ดร.
Associate Professor	รองศาสตราจารย์
Assistant Professor Dr.	ผู้ช่วยศาสตราจารย์ ดร.
Assistant Professor	ผู้ช่วยศาสตราจารย์
Dr.	ดร.
Lecturer	อาจารย์
Mrs.	นาง
Ms.	นางสาว
Mr.	นาย

Major name guide.

SCIENCE MAJOR name / แปล	
Biology	ชีววิทยา
Microbiology	จุลชีววิทยา
Zoology	สัตววิทยา
Biochemistry and Biochemical Technology *or* Biochemistry and Biochemical Innovation	ชีวเคมีและชีวเคมีเทคโนโลยี *หรือ* ชีวเคมีและชีวเคมีนวัตกรรม
Chemistry	เคมี
Industrial Chemistry	เคมีอุตสาหกรรม
Materials Science	วัสดุศาสตร์
Physics	ฟิสิกส์
Computer Science	วิทยาการคอมพิวเตอร์
Data Science	วิทยาการข้อมูล
Mathematics	คณิตศาสตร์
Statistics	สถิติ

**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.*

Gemology	อัญมณีวิทยา
Geology	ธรณีวิทยา
Environmental Science	วิทยาศาสตร์สิ่งแวดล้อม

**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.*