

Project Title: "Conducting Research with Researchers/Scientists" Program, 15th Edition of Benjamarachuthit School, Nakhon Si Thammarat

The "Conducting Research with Researchers/Scientists" program, 15th Edition of Benjamarachuthit School, Nakhon Si Thammarat, is an ongoing initiative supported by Walailak University. This program represents an academic service collaboration between Walailak University and Benjamarachuthit School, Nakhon Si Thammarat. The research topics and researchers/scientists from Walailak University are coordinated through the Center for Scientific Equipment and Technology at the university. The program includes a variety of projects based on the students' interests. Notably, two of these projects focus on herbal remedies from mangrove forests in Nakhon Si Thammarat province, aligning with the research conducted by Assistant Professor Dr. Boonsong Wungsintaweekul. The two research projects include a comparative study of the antioxidant activity of extracts from *Rhizophora apiculata* (Rhizophoraceae) leaves from different mangrove forest areas and an investigation into the antimicrobial activity of leaf extracts from the plant *Sonneratia ovata* (Lythraceae) leaves. The samples were collected during excursion in Pakphanang district (April 2024) supported by Mangrove Management Center (Nakhon Si Thammarat), Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment, Thailand. Both projects were conducted and done at B6 Laboratory building, CSE, WU.

Research Project Procedures:

1. Students draft a proposal and research related information.
2. Present the proposal and information to their advisor.
3. Revise the proposal and refine the research methodology.
4. Plan and execute the research according to the specified steps.
5. Summarize and discuss the research findings.

Throughout these steps, students learn about the research process, including planning, expressing opinions, and critiquing research. They also gain hands-on experience with research techniques such as preparing herbal samples, extracting key compounds from herbs, and testing the biological activities of herbal extracts. The students completed the projects and presented their academic work in various forums, receiving guidance from their advisors.

Research Outcomes:

1. Comparative Study of Antioxidant Activity of *Rhizophora apiculata* (Rhizophoraceae) leaves

Extracts from Different Mangrove Forest Areas:

- Samples from brackish and saline mangrove forests showed similar major chemical compositions but differed in minor chemicals.
- The extracts from both areas did not exhibit antimicrobial activity in the tested microbes.
- Antioxidant activity (analyzed using DPPH assay) revealed that both extracts had better activity than L-ascorbic acid. The brackish mangrove forest extract showed significantly higher activity compared to the saline mangrove forest extract (%SC50 of L-ascorbic acid = $6.10 \pm 1.66 \mu\text{g/mL}$; %SC50 of Sample 1 (brackish) = $1.94 \pm 0.06 \mu\text{g/mL}$; %SC50 of Sample 2 (saline) = $2.74 \pm 0.21 \mu\text{g/mL}$).

2. Study of Antimicrobial Activity of *Sonneratia ovata* (Lythraceae) leaves Extracts:

- Methanol extract of *Sonneratia ovata* leaves had %SC50 = $3.58 \pm 0.26 \mu\text{g/mL}$, better than L-ascorbic acid (%SC50 = $6.10 \pm 1.66 \mu\text{g/mL}$), indicating superior antioxidant activity.

- The methanol extract exhibited antimicrobial activity against *S. aureus* (MIC = 250 µg/mL), *A. baumannii* (MIC = 250 µg/mL), *P. aeruginosa* (MIC = 125 µg/mL), and *E. faecalis* (MIC = 500 µg/mL), suggesting the presence of antimicrobial compounds.

Project Objectives Achieved:

1. Students learned the research process and planning, and developed problem-solving skills with guidance from researchers.
2. Students gained the knowledge about the potential of Mangrove plants as the natural medicines
3. Students gained experience with various research techniques.
4. Students practiced discussing experimental results and presenting scientific ideas.
5. Walailak University's School of Pharmacy provided academic services to high school institutions.

This academic service activity aligns with SDG 4.3.4 by promoting educational outreach activities beyond campus, where students engage in research within the university's collaborative framework. Additionally, the program addresses SDG 3.3.2 by conducting health-related community projects, benefiting disadvantaged groups and refugees. It also supports SDG 17.2.1 by collaborating with government agencies and NGOs in shaping sustainable development policies, emphasizing the cultivation and use of herbal medicine for health among future generations.