

# Synthesis of Methyl Salicylate: Hands-on and Minds-on Workshop

Institute of Molecular Biosciences, Mahidol University, Salaya

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## 1. Overview

This workshop introduces upper-secondary students to the principles and practice of organic chemistry through the synthesis of methyl salicylate. Participants will work in a real laboratory environment and gain first-hand experience in carrying out an authentic organic synthesis experiment. The session combines practical laboratory work with explanation of the chemical reasoning that underpins each operation.

Students will conduct the synthesis step-by-step under close guidance, learning how chemists heat reaction mixtures, perform extractions, monitor reaction progress, and isolate products in a controlled and safe research setting. The consolidation session provides an opportunity to examine the reaction mechanism using arrow-pushing and to discuss how methyl salicylate is used as a topical analgesic compared with related compounds such as aspirin.

Laboratory safety instruction and demonstration are fully integrated into the programme, together with other safety control measures.

The workshop is delivered in English and is designed to support both hands-on experimentation and minds-on interpretation, encouraging students to understand not only how organic reactions are performed but also why each step matters.

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## 2. Learning Outcomes

By the end of the workshop, participants will be able to:

1. Perform the laboratory synthesis of methyl salicylate using esterification techniques.
2. Explain the purpose and underlying logic of key laboratory operations (e.g. heating, extraction, evaporation, thin-layer chromatography).
3. Interpret reaction pathways using fundamental arrow-pushing conventions.
4. Describe the pharmaceutical relevance of methyl salicylate in topical analgesic applications.
5. Demonstrate safe and responsible conduct in a chemistry laboratory.
6. Engage in reflective discussion linking experimental work to underlying principles of organic chemistry.

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### 3. Schedule

**Round 1:** Thursday, 5 March 2026

**Round 2:** Wednesday, 8 April 2026

**Venue:** Lecture Room C405 and Laboratories C410–411, Institute of Molecular Biosciences, Mahidol University, Salaya

**08:30 – 08:50** Registration

**08:50 – 09:00** Welcome and Introduction

*Prof. Dr Banthit Chetsawang, Deputy Director for Academic Affairs*

**09:00 – 10:30** Lecture on “Methyl Salicylate: The Experiment and Laboratory Safety Practices”

*Asst. Prof. Dr Sirirat Kumarn*

**10:30 – 12:00** Laboratory Session on “Synthesis of Methyl Salicylate” (Part 1)

*Asst. Prof. Dr Sirirat Kumarn and team*

**12:00 – 13:00** Lunch

**13:00 – 15:30** Laboratory Session on “Synthesis of Methyl Salicylate” (Part 2)

*Asst. Prof. Dr Sirirat Kumarn and team*

**15:30 – 17:00** Consolidation Session on “Understanding the Synthesis of Methyl Salicylate, its Mechanism, and Role in Drug Delivery”

*Asst. Prof. Dr Sirirat Kumarn*

**17:00 – 17:15** Certificate Presentation and Closing Ceremony

(Please note that the schedule is subject to minor adjustments.)

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### 4. Learning Format

- English-medium instruction
- Interactive teaching, guided practical work, and mechanistic explanation
- Small-group supervision by trained demonstrators
- Step-by-step support appropriate for students new to organic synthesis
- Emphasis on both procedural skills and conceptual understanding

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### 5. Safety Requirements

All participants must adhere to laboratory safety protocols at all times.

#### Personal Protective Equipment (PPE):

- Laboratory coat (provided)
- Safety spectacles (provided)
- Disposable gloves (provided)
- Closed-toe shoes

- Long trousers
- Long hair securely tied back

#### **General Rules:**

- Food and drink are not permitted inside the laboratory.
- Jewellery, loose accessories, and open sleeves should be avoided.
- Safety instructions issued by the instructor and demonstrators must be followed at all times.

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#### **6. What to Bring**

- Stationery
- Water bottle/flask
- Personal medication if required
- Optional: warm clothes (the lecture room may get quite cold)

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#### **7. Lead Instructor**

##### **Asst. Prof. Dr Sirirat Kumarn**

Institute of Molecular Biosciences, Mahidol University

Assistant Professor Dr Sirirat Kumarn received her BA and MSci degrees in Natural Sciences from the University of Cambridge (St Catharine's College) and subsequently obtained her PhD, during which she worked on organocatalysis and its application in natural product synthesis under the supervision of Professor Steven V. Ley CBE FRS FMedSci at the Department of Chemistry, University of Cambridge.

Her research interests span organic synthesis, materials chemistry, and food chemistry, with applications in drug discovery, delivery systems, and sustainability. Her work focuses on plant-derived bioactive compounds, their structure–function relationships, and delivery mechanisms relevant to metabolic, neurological, and gastrointestinal health. She also leads hands-on outreach activities and mentors students in scientific communication and presentation skills.

(Group demonstrators will also support participants during laboratory sessions.)

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#### **8. Contact Information**

For enquiries, please contact:

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