

## **PHYTOCHEMICALS OF MEDICINAL PLANTS (MD04600304)**

<b>Course offering faculty</b>	: Faculty of Medicine
<b>Course coordinator</b>	: Dr. Ade Arsianti, S.Si., M.Si.
<b>Online course platform link</b>	: <a href="https://emas.ui.ac.id/course/view.php?id=15458">https://emas.ui.ac.id/course/view.php?id=15458</a>
<b>Prerequisites</b>	: None
<b>Language of Instruction</b>	: English
<b>Course date</b>	: 6 September 2021 – 1 October 2021
<b>Course description</b>	:

This elective module provides the basic phytochemistry of plants that have the potential to be developed as medicine. The subject of this elective module includes active compounds or constituents of plants that are able to be developed as medicine as well as the search for new bioactive compounds from plants. This module also includes discussions on phytochemical compounds in plants that have the potential to be medicinal, the basic principles of plants that have the potential as medicine, the physical properties and chemical properties of active compounds, and the activity of compounds from plants as antihistamines, antibacterials, anticancers, antifungals, antihypertensives, antiprotozoals, antivirals, antispasmodials, and immunostimulants. In addition, this module discusses the principle of preparation of compounds from plants and their testing in vitro and in vivo. From all the subjects studied, it is expected that students can have knowledge on the rational basis of medicinal plant use, furthermore can explore the benefits obtained from medicinal plants in the discovery of new drugs

### **Course objective :**

Students are able to identify the presence of bioactive compounds and the solubility of medicinal plant compounds, explain about herbal medicine dosage forms, as well as explain about several in silico, in vitro, and in vivo bioactive tests of medicinal plants

### **Course topics and subtopics :**

1. Classification of medicinal plant compounds
  - Flavonoid
  - Alkaloid
  - Terpenoid
  - Glicoside
  - Steroid
2. Medicinal plant extraction and purification
  - Principle of extraction and purification
  - Extraction and purification methods

3. Compound's solubility in medicinal plant extraction
4. Identification of medicinal plant compounds
  - Qualitative methods
  - Quantitative methods
5. Bioactivities of medicinal plant compounds
  - Antioxidant
  - Antiinflammation
  - Antidiabetic
  - Anticancer
  - Antimicrobial
6. Herbal medicine dosage forms
  - Classification of herbal medicine in Indonesia
  - Herbal medicine dosage forms
  - Formulation of Herbal medicine dosage forms
7. In silico assay of herbal medicine compounds
8. In vitro assay of herbal medicine
  - Cell types for *in vitro* assay
  - Cytotoxicity test using *in vitro* assay
9. In vivo assay of herbal medicine
  - Principle of *in vivo* assay using animal
  - Animal model for *in vivo* assay

**Teaching and learning techniques :**

No	Activities	Methods	Platform	Notes
1	Interactive lectures and Practical laboratory	Synchronous	Zoom / Ms. Teams	Lecture or practical laboratory use a video conference-based platform (Microsoft Team, Zoom) , and materials / presentations (ppt slides) can be uploaded in advance on the EMAS platform.
		Asynchronous	EMAS	Lecture or practical laboratory materials (videos) are uploaded on the EMAS platform (emas.ui.ac.id) before the class schedule. The question and answer session is carried out according to the class schedule using the Zoom / Ms. Teams and EMAS.
2	PBL	Synchronous / Asynchronous	Determined by facilitator and	The Module Team gives the facilitator to determine the desired method and platform based on an

No	Activities	Methods	Platform	Notes
			students (EMAS, Ms. Team, Zoom, Whatsapp, line)	agreement with the student group, with the following conditions: <b>Discussion-1</b> can be conducted on a chat basis (at EMAS, microsoft team, whatsapp, line) with the help of an online collaborative whiteboard (eg Miro etc.). <b>Discussion-2</b> should use a video conference-based platform (Microsoft Team, Zoom) so that discussions and presentations can run well and interactively. During the discussion process in various media, the facilitator is expected to continue to encourage group dynamics and good participation from students.
3	Plenary	Synchronous	Zoom	The plenary will be held in synchronous with the Zoom platform. The plenary session will be guided by the lecturers.

**Evaluation** :

- Last-term test : 40 %
- Discussion : 10 %
- Presentation : 10 %
- Practical laboratory : 10 %
- Project Manuscript : 30 %

**References** :

1. Cordell, G.A. (2011). Phytochemistry and traditional medicine. *Phytochemistry Letters*, 4(4), pp. 391 – 398.
2. Kemenkes RI. (2010). Peraturan Menteri Kesehatan Republik Indonesia Nomor : 003/Menkes/Per/I/2010 Tentang Saintifikasi Jamu Dalam Penelitian Berbasis Pelayanan Kesehatan
3. Tiwari, P., Kumar, B., Kaur, M., Kaur, G., Kaur, H. (2011). Phytochemical screening and extrcation : A Review. *Intern. Pharm. Sci.* **1** (1): 98 - 106.
4. Eric Yarnell, ND. (2004) "*Phytochemistry and Pharmacy for Practitioners of Botanical Medicine*. Healing mountain publishing: Wenatchee, WA
5. Aviva Romm, Lisa Ganora, David Hoffmann, Eric Yarnell, Kathy Abascal and Mitch Coven. (2010). *Fundamental Principles of Herbal Medicine*. dalam: *Botanical Medicine for Women's Health*. Aviva Romm (editor). Churchill Livingstone : St. Louis, Missouri

6. John M Pezzuto, Cindy K Angerhofer, Haider Mehdi. (1998). *In vitro Models of Human Disease States*, dalam: *Studies in Natural Products Chemistry*. Atta-ur-Rahman (editor). Elsevier Science: Imprints in USA
7. Benam, K.H, et al. (2015). Engineered in vitro disease models. *Annu. Rev. Pathol. Mech. Dis.* 10:195–262.
8. Kar, B., Subbiah, S. (2013). Zebrafish: An in vivo model for the study of human diseases. *International Journal of Genetics and Genomics*, 1(1): 6-11