



**3rd-6th, 10th, 11th  
and 19th of MAY**

**VIRTUAL**

**THE EUROPEAN UNIVERSITY OF THE SEAS SEA-EU, THE UNIVERSITY OF CADIZ (SPAIN) AND THE UNIVERSITY OF SPLIT (CROATIA) INVITE GRADUATE STUDENTS TO THE ON-LINE COURSE:**

## **BIOCHEMICAL ECOLOGY AND TERPENES FROM THE ESSENTIAL OILS**

**Dr. Igor Jerkovic, Faculty of Technology and Sciences, Dept. of Organic Chemistry,  
University of Split (Croatia).**

**Dr. Juan Carlos García Galindo, Faculty of Sciences, Dept. of Organic Chemistry,  
University of Cadiz (Spain).**



**Duration: 10 h + 15 h of team-  
work (international paired  
teams)  
In english on google Meet**



**Target students:  
Master students and Ph.D. students  
from the areas of chemistry, biology,  
and environmental sciences.**



**Evaluation: final presentation  
of hands-on projects results to  
an international panel of  
academics from SEA-EU (5 h)**

# **You can apply until April 30th**

**[juancarlos.galindo@uca.es](mailto:juancarlos.galindo@uca.es)**



# BIOCHEMICAL ECOLOGY AND TERPENES FROM THE ESSENTIAL OILS

## Contents:

### Section 1: Biochemical basis of chemical interactions among living beings.

Biochemical co-adaptation and co-evolution theories. Static and dynamic chemical defense strategies. Induced chemical defense.

Adaptation to environmental stress: heat, cold, humidity, draught, salinity, metal toxicity.

Influence of growth conditions in volatiles production: the case of *Mentha pulegium*.

### Section 2: Biochemistry of pollination. The role of color and scent.

Biochemical bases of the color in the flowers.

Biochemical bases of the scent in the flowers: role of volatiles.

Role of the nectar and pollen.

### Section 3. Biosynthetic pathway of terpenes-typical compounds of essential oils.

The formation of isopentenyl pyrophosphate (IPP) building blocks of terpenes in the mevalonate pathway (MVA).

The formation of isopentenyl pyrophosphate (IPP) building blocks of terpenes in the deoxyxylulose pathway (DXP).

### Section 4. Typical monoterpenes and sesquiterpenes in essential oils:

The isoprene rule.

Biological activity and ecological roles.

### Activities:

On-line classes: 2.5 h per session.

Hands-on projects done by internationally paired students from Cadiz and Split (10 h. work).

Language: English

Evaluation: final presentation of hands-on projects results to an international panel of academics from SEA-EU (5 h).





The European University of the Seas SEA-EU, the University of Cadiz (Spain) and the University of Split (Croatia) invite graduate students to the on-line course:

## “Biochemical Ecology and Terpenes from the Essential Oils”

The European University of the Seas SEA-EU was launched in 2020 under the first call of European Universities of the European Commission in the framework of the Erasmus+ Programme.

SEA-EU is formed by the Universities of Cadiz (UCA, coordinator), Split (UNIST, Croatia), Bretagne Occidentale (UBO, France), Kiel (CAU, Germany), Gdansk (UG, Poland), and Malta (UM, Malta).

<https://sea-eu.org>

Cadiz is a 3.000 y. o. the city considered as the oldest continuously inhabited city in Europe. Its rich history has left behind a remarkable imprint reflected in its streets, squares, monuments, bastions, and museums.  
<https://www.uca.es/?lang=en>

The University of Split is located in the second-largest city of Croatia and has been included by UNESCO in the list of World Heritage Sites.  
<https://www.unist.hr/en/>