

PLANT METABOLISM FOR HUMAN HEALTH AND NUTRITION

Course organization:

- 5 CFU (lectures, 40 h) and 1 CFU (laboratory, 16 h)
- Lectures based on textbooks and scientific articles
- Experimental laboratory based on biochemical methodologies
- Exam: oral (two questions)
- Possible «addictives»: lab test and seminar (to be defined with the students)

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- The course is divided in two modules:
 - **Module 1** (Prof. Zaffagnini): 16 h lectures
 - **Module 2** (Prof.?): 24 h lectures plus 16 h laboratory

What about the content?

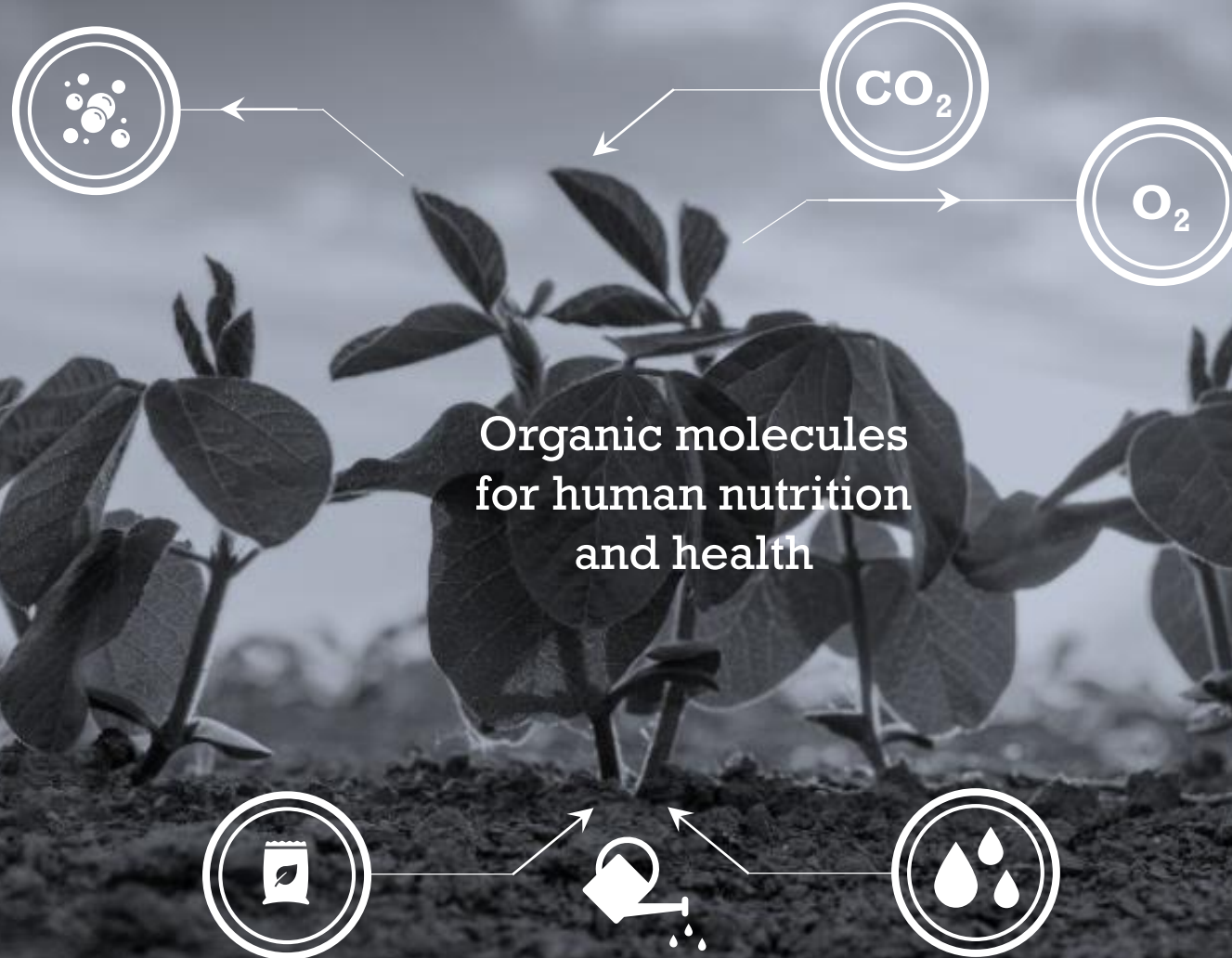
PLANT METABOLISM FOR HUMAN HEALTH AND NUTRITION

Plants are a fundamental source of food and high-value products

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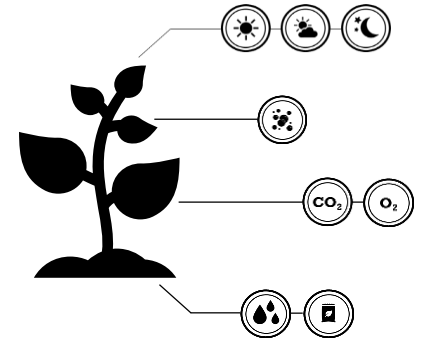


PLANT METABOLISM FOR HUMAN HEALTH AND NUTRITION

A photograph of several small green seedlings with multiple leaves growing out of dark brown soil. The background is a bright blue sky with soft, wispy white clouds. The sun is low on the horizon, creating a warm, golden glow that illuminates the scene from behind the plants.

Light-dependent production of energy and reducing power is crucial to synthesize organic molecules (sugars, proteins, etc.)

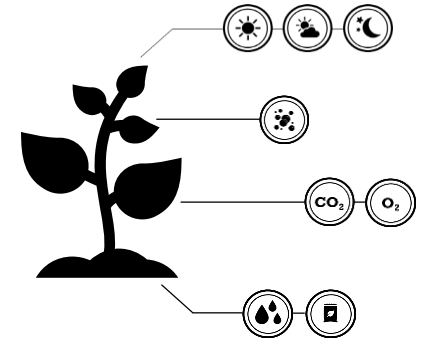
PLANT METABOLISM FOR HUMAN HEALTH AND NUTRITION (lectures)



PLANT METABOLISM:

1. General overview of photosynthetic organisms
2. The undisputed fascination of **photosynthesis**: light phase and metabolic phase
3. **Carbon, nitrogen** and **sulphur** assimilation for the synthesis of all organic molecules

PLANT METABOLISM FOR HUMAN HEALTH AND NUTRITION (lectures)



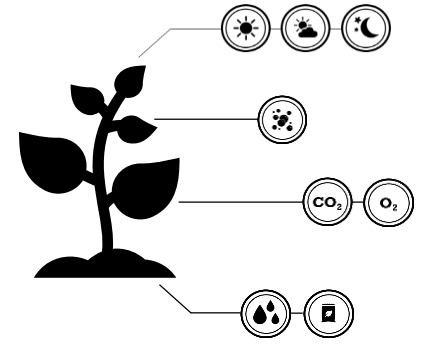
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PLANTS FOR HUMAN HEALTH AND NUTRITION

1. **Carbohydrates** from plants but not only...lipids and proteins (essential AAs)
2. Plants as an unmatched source of **vitamins** and **antioxidants**
3. Alternative food sources: **Spirulina** and **Chlorella**

PLANT METABOLISM FOR HUMAN HEALTH AND NUTRITION (lectures)



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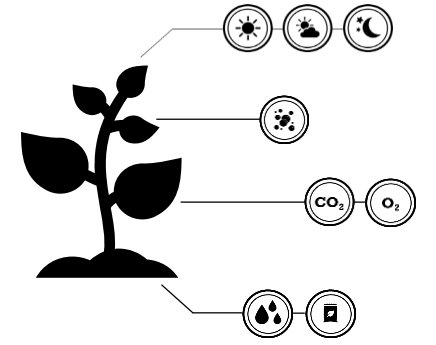
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BIOFORTIFIED «PLANTS»:

1. Seminar on genetically modified organisms (GMOs) : origin and molecular basis
2. Astaxanthin: the most powerful antioxidants (microalgae as biofactories)
3. Golden rice: generation and impact on human health
4. Purple tomato as a new source of antocyanins
5. Vitamin D-enriched tomato plants
6. Artemisinin: from *Artemisia annua* to a bioenergy crop (tobacco)

PLANT METABOLISM FOR HUMAN HEALTH AND NUTRITION (lab and seminars)



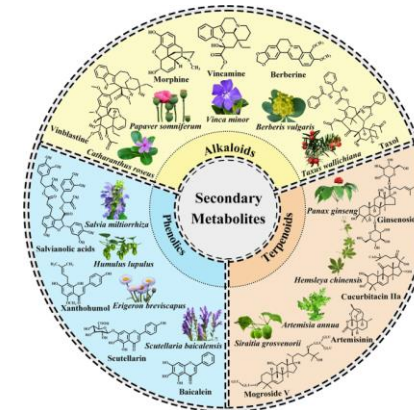
EXPERIMENTAL ACTIVITY (plants at your choice):

1. Extraction and quantification of **plant proteins**
2. Extraction and quantification of **photosynthetic pigments**
3. The hidden fascination of **anthocyanins**
4. Laboratory test...



SEMINARS ON SECONDARY METABOLITES (students):

1. Terpenes/Terpenoids (carvacrol, limonene, pinene, etc.)
2. Phenolics (flavonoids, gallic acid, catechin, etc.)
3. N-containing compounds (morphine, caffeine, taxol, etc.)
4. S-containing compounds (methionine, glucosinolates, etc.)



Contacts:

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