EQPH-2021
V. International Symposium
Proceedings Book of the Vth International Symposium–2021
"Environmental Quality and Public Health"
May 20, 2021 Óbuda University, Budapest, Hungary
ISBN: 978-963-449-238-2. **www.iceee.hu**
TL10.

THE USE OF MICROALGAE COMPOUNDS IN THE IMPROVEMENT OF AGRICULTURAL PRACTICES

Salma LATIQUE[1*], Doha Elalami[1], Abdellatif Barakat1[2], Abdallah OUKARROUM[1]

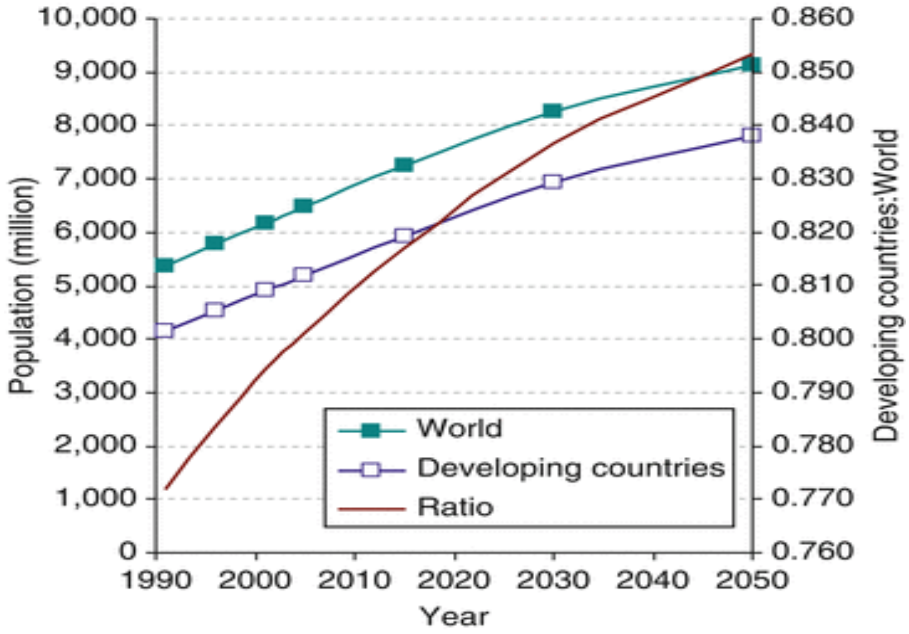
[1]AgroBioSciences Research Division, Mohammed VI Polytechnic University, Benguerir 43150, Morocco
[2]IATE, Montpellier University, INRAE, Agro Institut, 34060 Montpellier, France

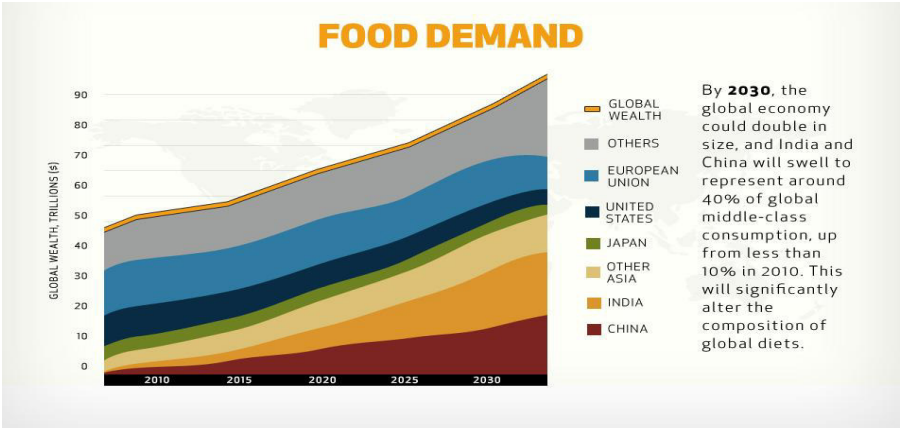
Abstract: *The increase in worldwide population observed within the last decades has contributed to an accrued demand for food supplies, which might solely be attained through an improvement in agricultural productivities. Moreover, agricultural practices should become more sustainable, because the overuse of chemically-based fertilisers, pesticides and growth stimulants will cause serious environmental problems (Gonçalves, 2021).*
One new approach for the development and extremely effective agriculture is the use of biological compounds like the extract of microalgae biomass.
Currently, microalgae are attracting the interest of agrochemical industries and farmers, because of their biostimulant (MBS) and biofertiliser (MBF) properties (Ronga et al., 2019). Until recently, microalgae were mostly investigated as a practical approach for the production of lipids and for environmental purposes, like the mitigation of greenhouse gas (CO_2) emitted by industrial processes, and for effluent treatments (Oancea et al.,2013; Gonçalves,2021).
On the opposite hand, investigations of microalgal product appropriate for crop productions stay largely unexploited.
In the light of this point, this study highlights a number of the present researches and future development priorities and examining the factors supporting the employment of MBS and MBF for managing crop productions and abiotic stresses.

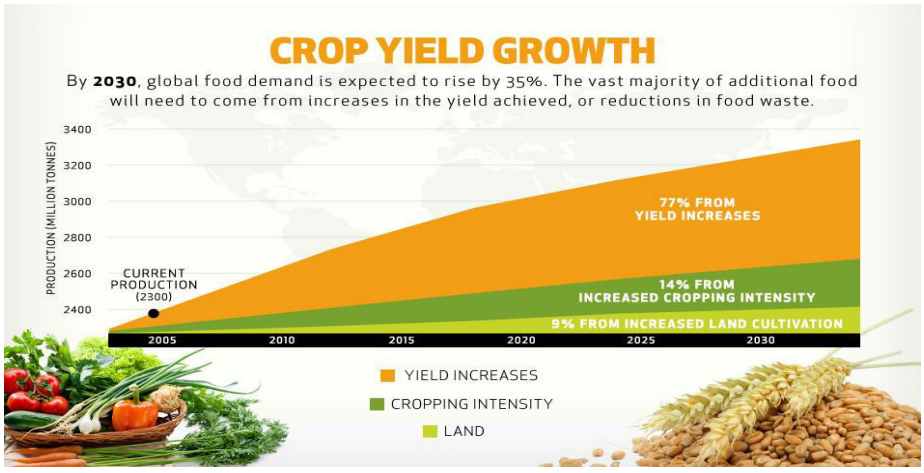
Keywords: *Abiotic stresses, Biofertiliser, Biostimulant, Microalgae, Crop productions.*

INTRODUCTION

The increase in worldwide population observed within the last decades has contributed to an accrued demand for food supplies, which might solely be attained through **an improvement in agricultural productivities.**



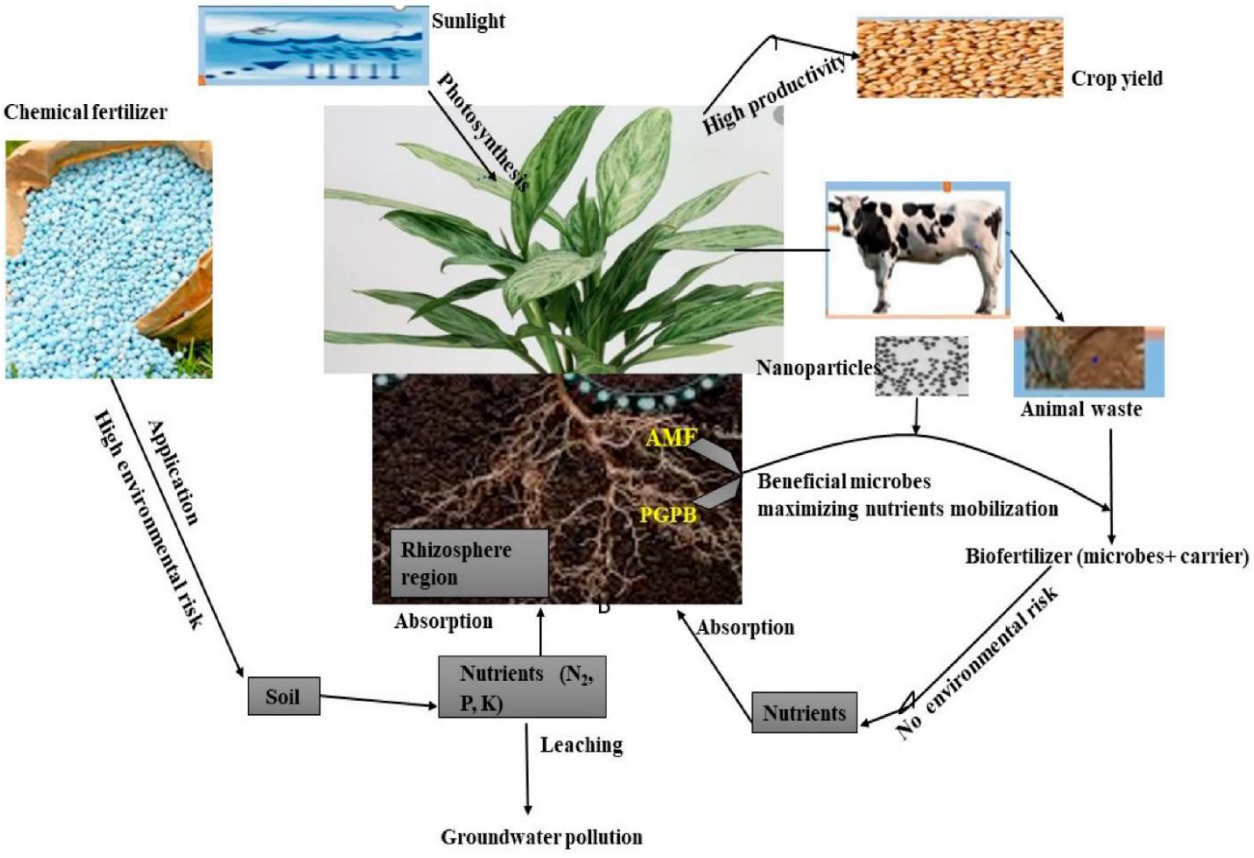


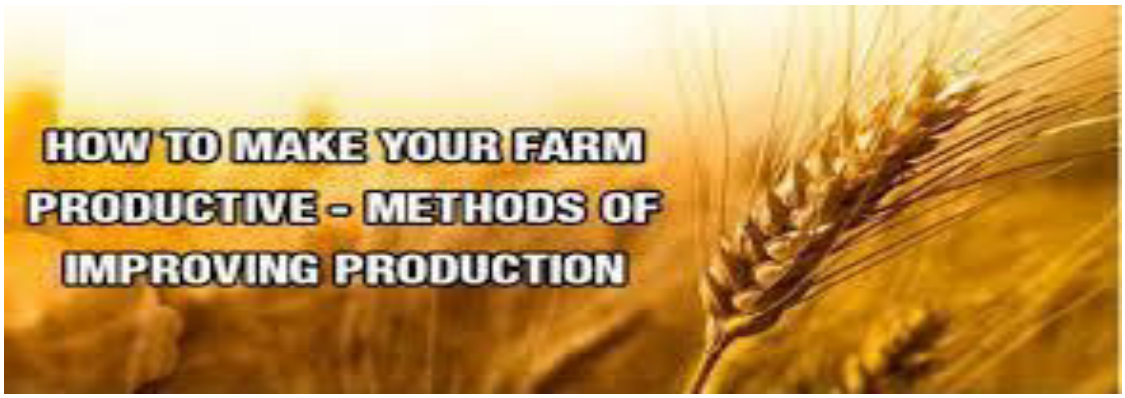


Moreover, agricultural practices should become more sustainable, because the **overuse of chemically-based fertilisers**, pesticides and growth stimulants will cause **serious environmental problems** (Gonçalves, 2021).






Sunlight
Photosynthesis
High productivity
Crop yield
Chemical fertilizer
Nanoparticles
Animal waste
AMF
PGPB
Rhizosphere region
Beneficial microbes maximizing nutrients mobilization
Biofertilizer (microbes+ carrier)
High environmental risk
Application
Absorption
Absorption
Soil
Nutrients (N_2, P, K)
Nutrients
No environmental risk
Leaching
Groundwater pollution



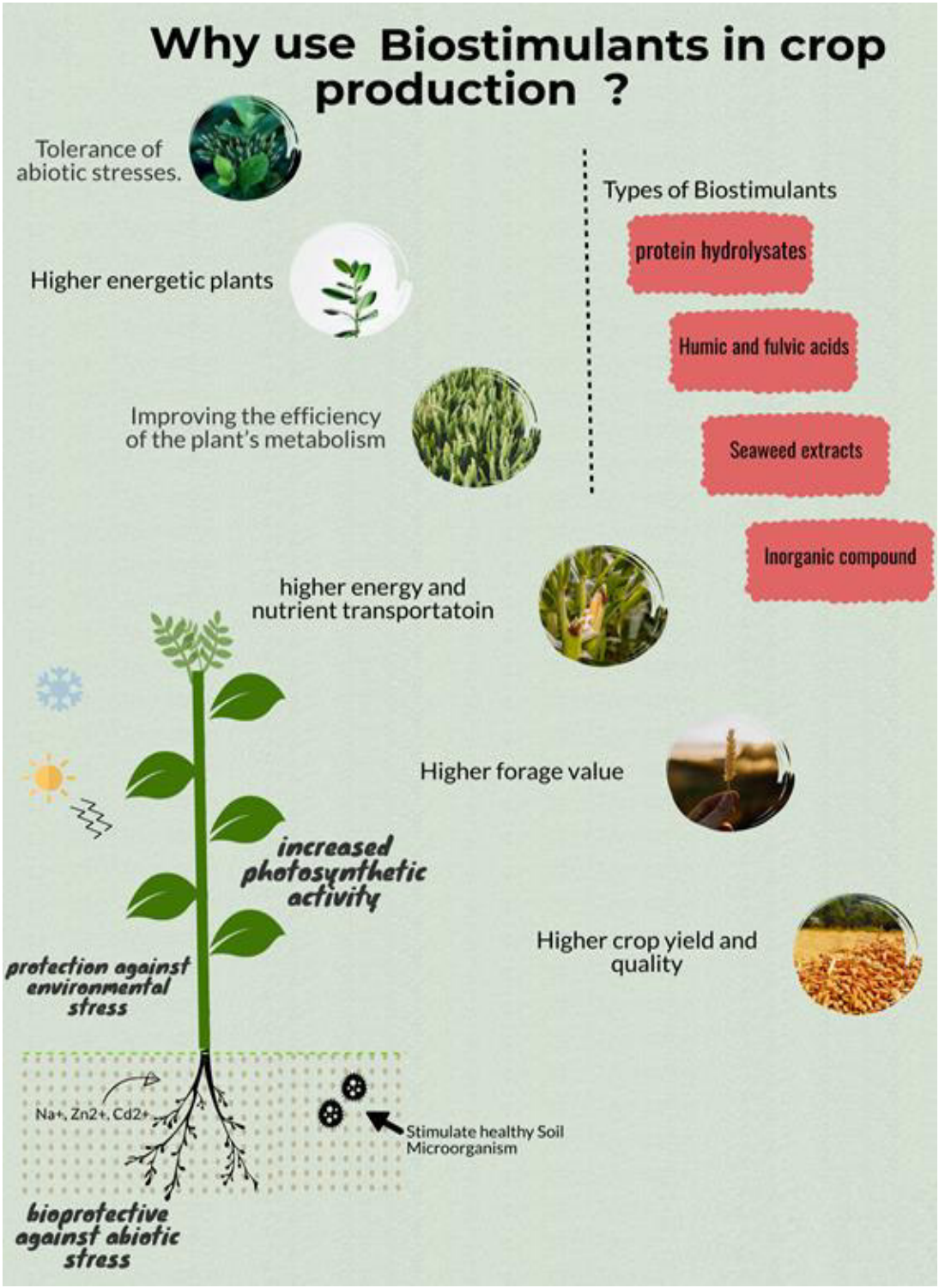
One new approach for the development and extremely effective agriculture is the use of **biological compounds** like **the extract of microalgae biomass**. Currently, microalgae are attracting the interest of agrochemical industries and farmers, because of their biostimulant (MBS) and biofertiliser (MBF) properties (Ronga et al., 2019).



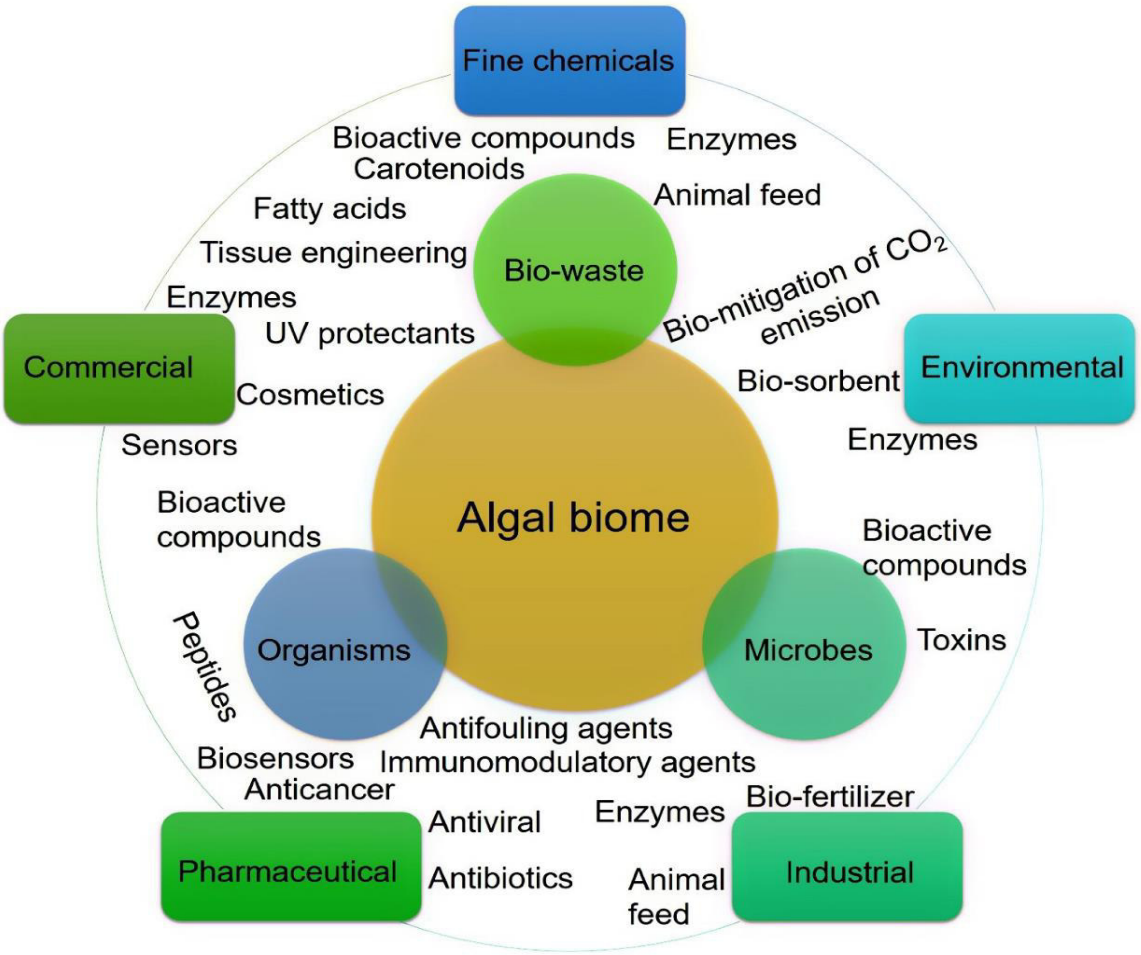


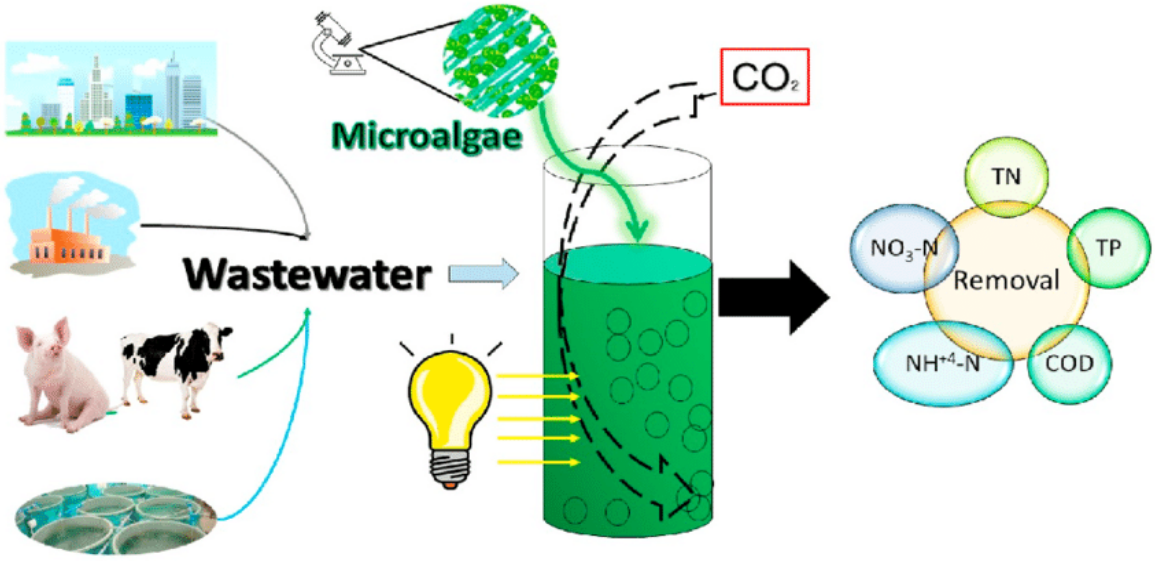


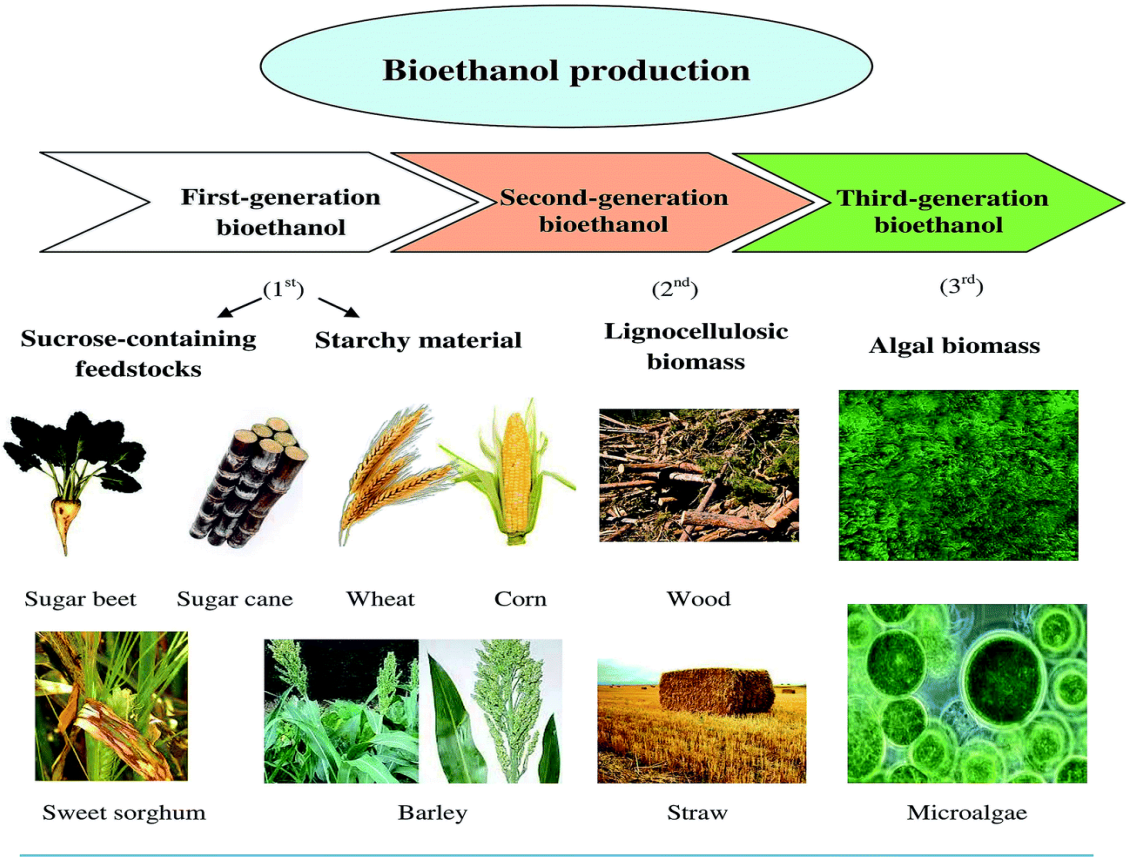




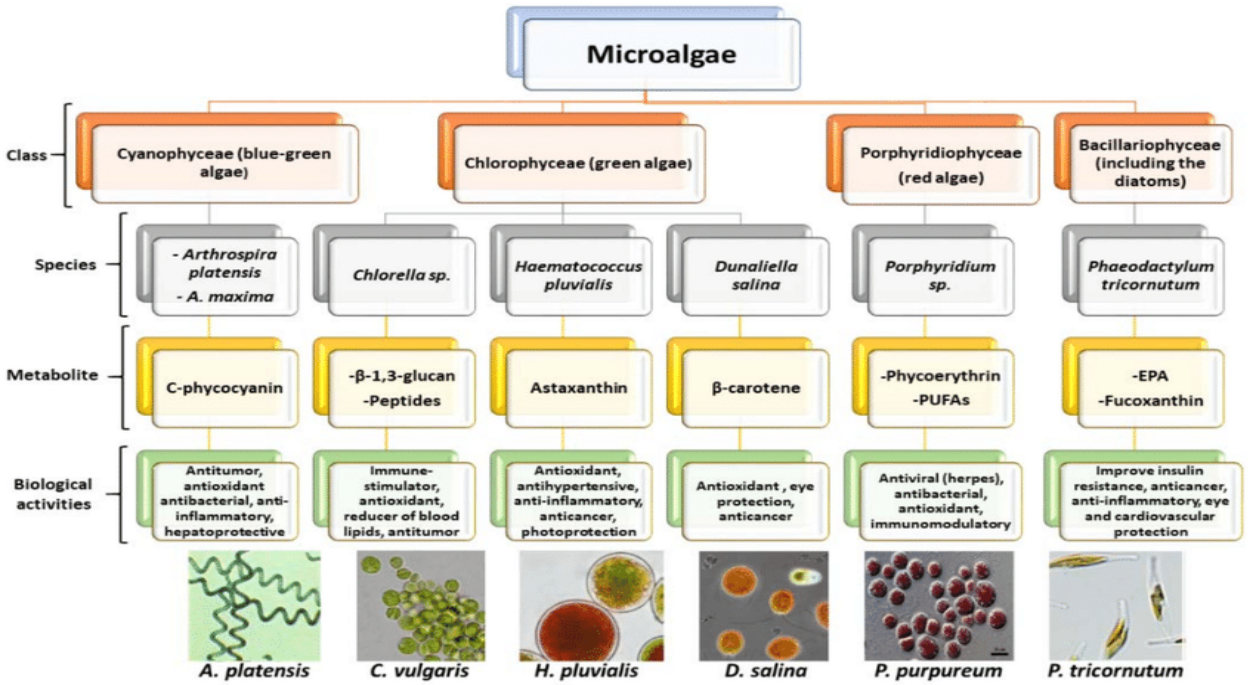
Until recently, **microalgae** were mostly investigated as a practical approach for the **production of lipids** and for environmental purposes, like the **mitigation of greenhouse gas (CO_2)** emitted by industrial processes, and for **effluent treatments** (Oancea et al., 2013; Gonçalves, 2021). On the opposite hand, investigations of microalgal product appropriate for **crop productions** stay largely unexploited.


Fine chemicals
Bioactive compounds
Carotenoids
Enzymes
Animal feed
Fatty acids
Tissue engineering
Bio-waste
Bio-mitigation of CO_2 emission
Enzymes
UV protectants
Commercial
Environmental
Bio-sorbent
Cosmetics
Sensors
Enzymes
Algal biome
Bioactive compounds
Bioactive compounds
Peptides
Organisms
Microbes
Toxins
Antifouling agents
Biosensors
Immunomodulatory agents
Anticancer
Bio-fertilizer
Enzymes
Antiviral
Pharmaceutical
Antibiotics
Animal feed
Industrial


Microalgae
CO_2
Wastewater
TN
NO_3-N
TP
Removal
NH^{+4}-N
COD



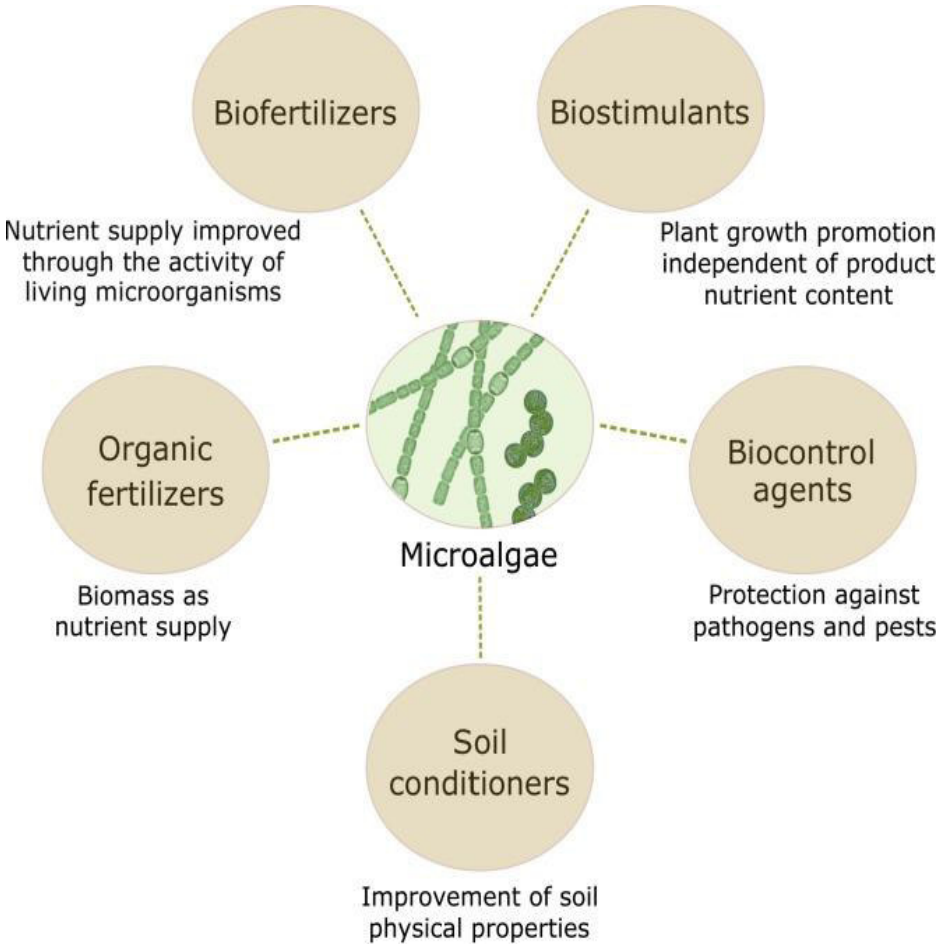
Many studies demonstrated the remarkable potential of compounds extracted from algae and cyanobacteria such as **phenols, terpenoids, free fatty acids, polysaccharides, and carotenoids** in crops production.



Main microalgae classes, their most important species, and associated biological activity "microalgae images were obtained from the "Microalgae strain catalogue", second edition, published in the Enhance Microalgae Project".

Furthermore, **microalgal metabolites** can play an important role in **soil decontamination and fertilization**; **plant protection** against biotic and abiotic stress factors; and plant development. Moreover, microalgae and cyanobacteria also present **phytohormones**, which are known for their activity as **plant-growth promoters.**





As **algal biomass represents an important resource for developing sustainable and environmentally friendly approaches to agriculture** besides forming the base of food webs, a definite need exists to create greater awareness and facilitate in-depth research to diversify and intensify their applications in the years to come.












جامعة محمد السادس
متعددة التخصصات التقنية
MOHAMMED VI POLYTECHNIC UNIVERSITY
UNIVERSITÉ MOHAMMED VI POLYTECHNIQUE