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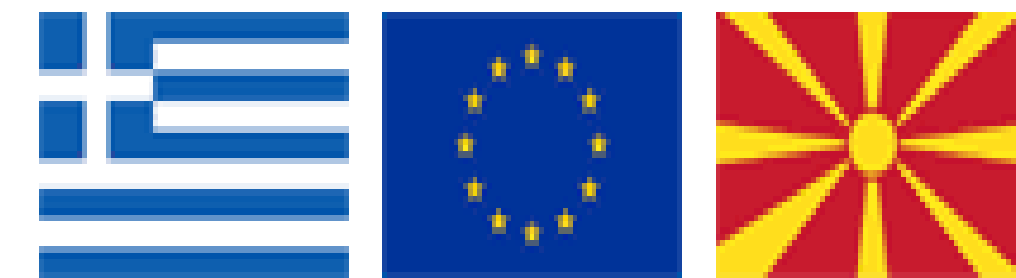
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SYMBIOSIS Project, Interreg-IPA CBC

Interreg - IPA CBC 
Greece - The former Yugoslav Republic of Macedonia

Greece-FYROM 2014-2020

«*Biowaste Treatment and Exploitation*»



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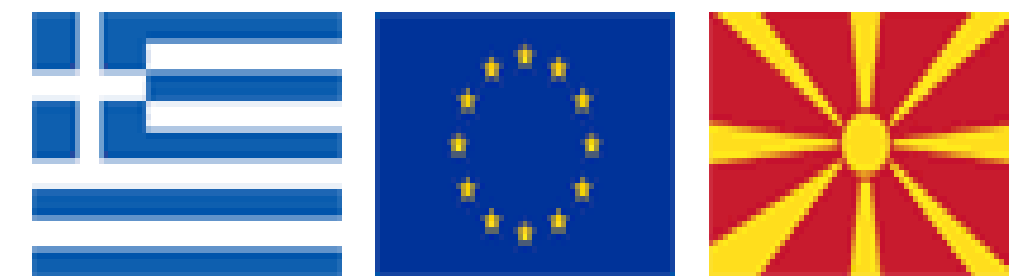
«*Applied Circular Economy: The example of BIOSOLIDS S.A.*»

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Chemist, MSc, PhD*



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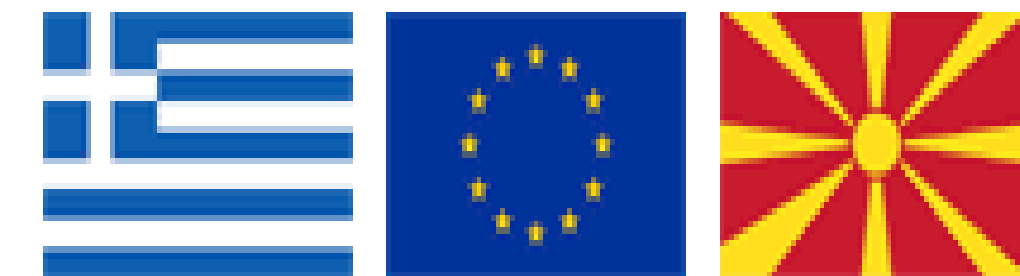
LINEAR ECONOMY



CIRCULAR ECONOMY



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A diagram illustrating the composting cycle. On the left, a vertical grey line connects four circular icons: a slice of pizza, a banana peel, a brown leaf, and a green leafy branch. A thick grey arrow curves from the top of this line, through a circular bin filled with brown and green organic matter, and points down to a pile of dark brown soil. The background is light blue with a stylized landscape at the bottom showing green hills, trees, and buildings.

COMPOSTING: RECYCLING ORGANIC MATTER



Biodegradable waste and climate change

All organic waste are biodegradable

The majority end up in controlled or uncontrolled landfills

Under anoxic conditions, large amounts of CH_4 , CO and smaller amounts of H_2S are released

The above gases are partly responsible for the “*Greenhouse effect*” and hence for the climate change



BIOSOLIDS S.A and Circular Economy



BIOSOLIDS S.A. operational principle:

«Collection and management of organic waste that returns to the primary sector as compost», based on the principles of the Cyclical Economy





Company profile and operational framework

- Biosolids S.A. was founded in 2012 in Skydra, Pella Region, based on four interconnected axes:
 - Institutional framework
 - Environmental protection
 - Social welfare
 - Economic development
- Purpose → Organic waste management based on the protection of the environment and the sustainability
- Production → Soil enhancers through the composting process of organic





BIOSOLIDS S.A.

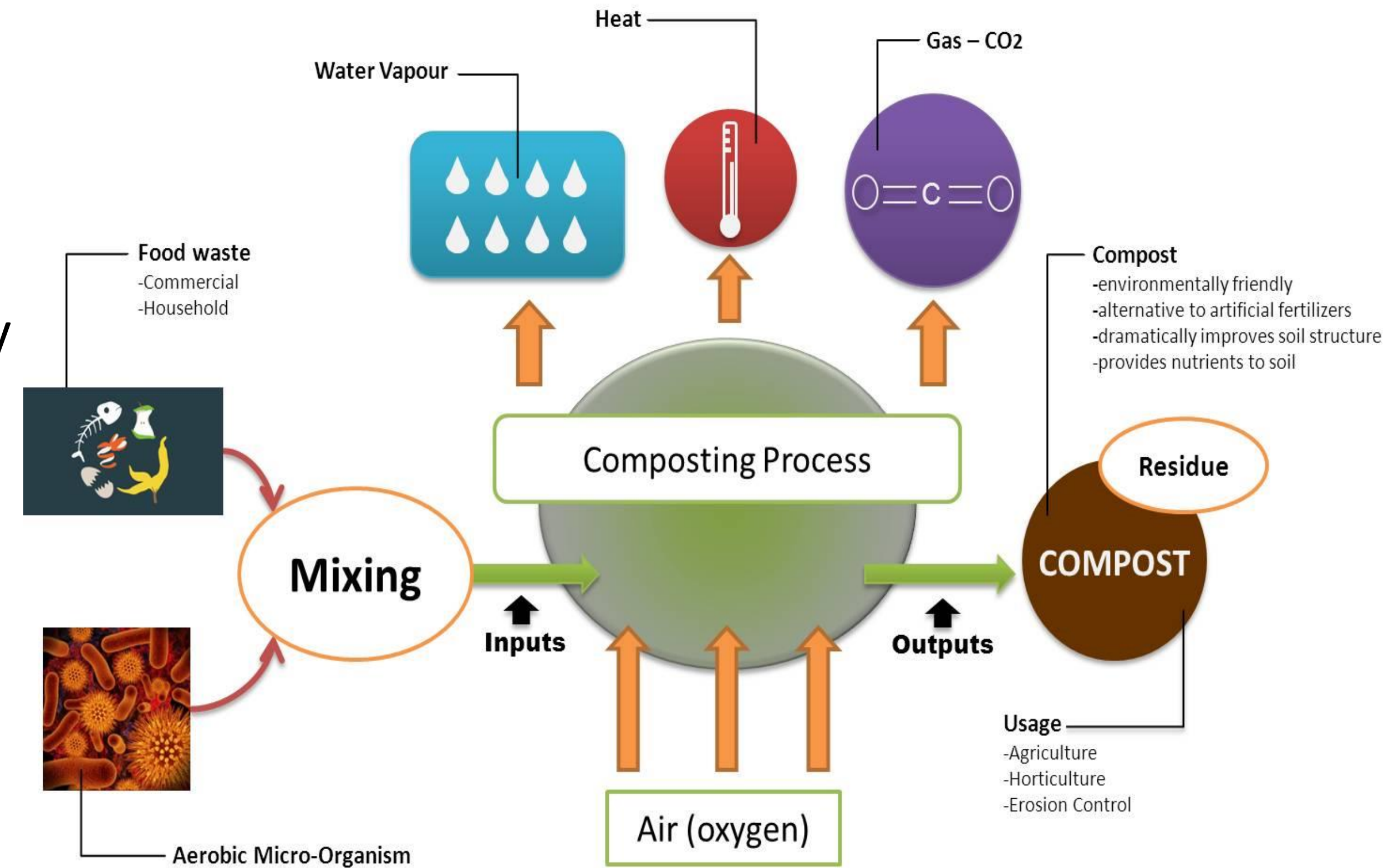
- ❑ Plant area: 25000 m²
- ❑ Capacity: 22000 tn of incoming waste
- ❑ Facilities include:
 - ❖ Incoming organic waste storage area
 - ❖ Two separate composting areas
 - ❖ Sinks for storage of auxiliary materials
 - ❖ Refinery and refreshment building
 - ❖ Rainwater treatment system
- ❑ Fully equipped laboratory with qualified staff
- ❑ Headquarters: Thessaloniki (Kalochori)
- ❑ Composting unit: Mavrovouni, Skydra





Composting process

- ❖ Direct and important way of prevention and recycling → **Circular economy**
- ❖ Controlled aerobic biodegradation of organic matter → **Humic substances** (mainly humic and fulvic acids)
- ❖ As with any organic process, high efficiency is ensured by maintaining optimal *moisture, aeration, temperature* and *pH*





Quality assurance of BIOSOLIDS products

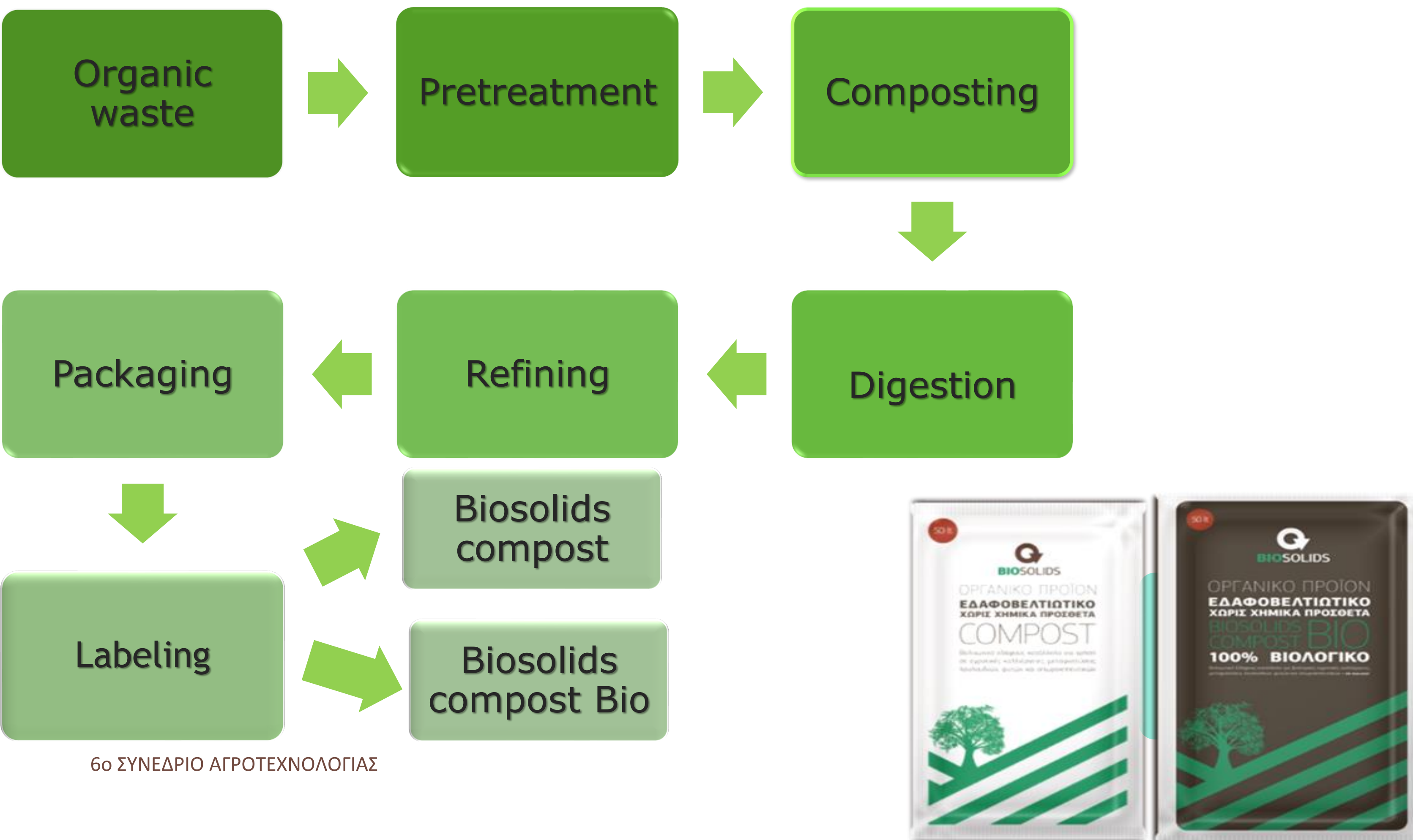


- ❖ BS EN ISO 14001: 2015 & BS EN ISO 9001: 2015 from Lloyd's Register
- ❖ Member of ECN (European Compost Network)
- ❖ Certification from ΔΗΩ for the use of BIOSOLIDS COMPOST BIO in organic farming
- ❖ Tested by Accredited Laboratories: Environmental Laboratory of the National Technical University of Athens and Benaki Phytopathological Institute
- ❖ Collaboration with Perrotis College of the American Farm School in research programs for BIOSOLIDS product performance





Production chain





BIOSOLIDS COMPOST/BIOSOLIDS COMPOST BIO



Certified by ΔΗΩ for use in organic farming

Physicochemical parameters	
pH	6,9-7,7
Organic matter	30-50%
C/N rate	14-17



Physicochemical parameters	
pH	6,5-7,7
Organic matter	30-50%
C/N rate	12-18



Participation in Research Programs

From 2015 **BIOSOLIDS S.A.** collaborates with **Perrotis College**, American Farm School, conducting multi-year studies evaluating the effectiveness of Biosolids compost



BIOSOLIDS products have been applied to different types of cultivation:

- Tree crops (olive, vines, peaches)
- Vegetable species (lettuce, anise, spinach, celery, etc.)
- Strawberries
- Organic culture of Stevia



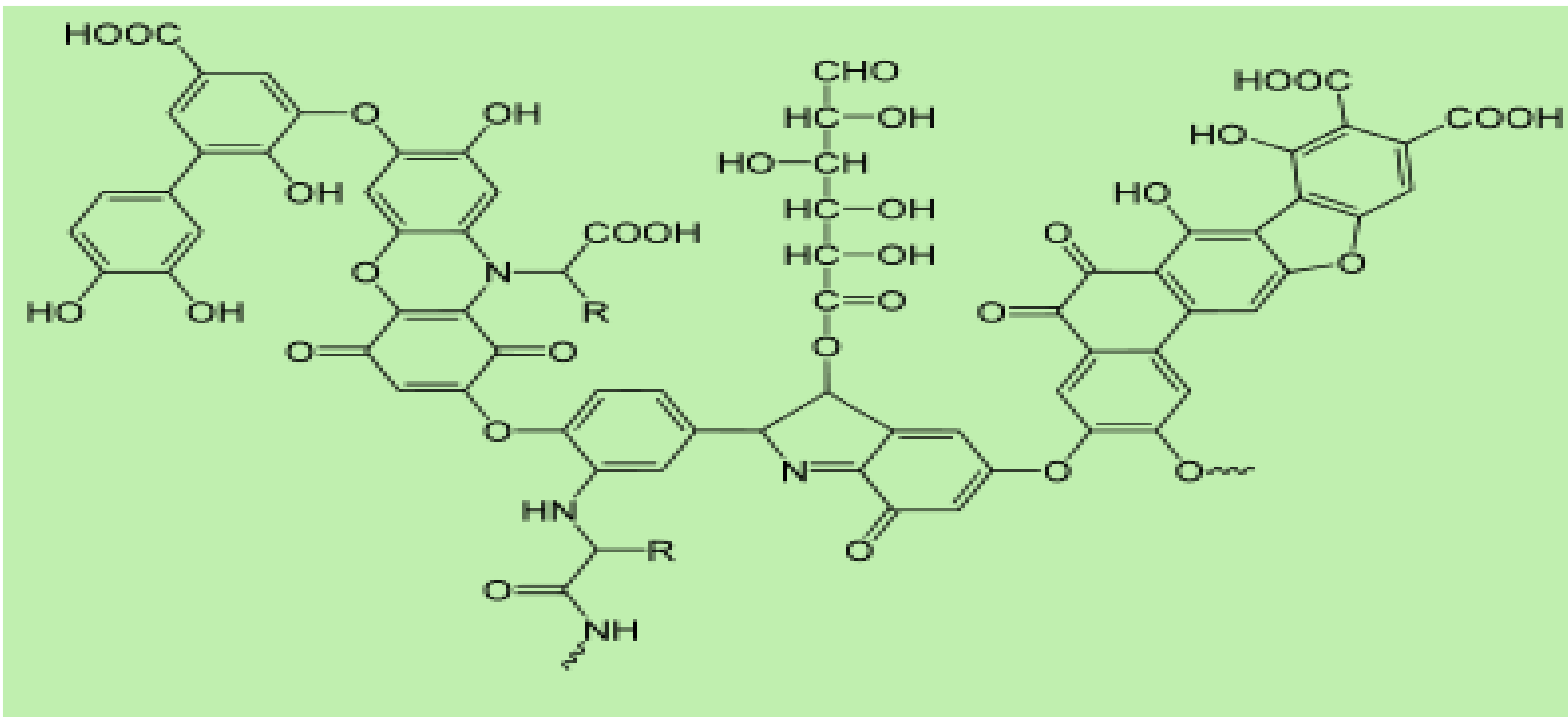
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Properties and benefits

- Improving soil properties → **Field capacity, pH and others**
- Increase nutrients → **N, P, K, Fe, Mg, Ca**
- Increase of **organic matter** in the soil





Compost vs Fertilizers

Compost: *Improving physical and chemical properties of the soil (structure, water capacity, invasiveness, increase in organic matter and microorganisms, reduction of apparent density and increase of porosity, addition and more direct intake of inorganic and organic nutrients in the soil, etc.)*

Chemical fertilizer: *It adds inorganic nutrients to the soil system, in many cases also has negative effects in cases, e.g. overflow and run-off causes eutrophication in lakes and rivers and possible phytotoxicities*



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