

A EUROPEAN MARKET FOR CIRCULAR FERTILISERS



Waste Management Europe
FIERA DI BERGAMO - Room Colleoni
Via Lunga - 24125 Bergamo (IT)
10 April 2024

Common rules across Europe for circular fertilisers. State of the art and challenges for the application of the European Regulation:

Implementation of CEN standards

Mariangela Soldano

(CRPA)

Daria Orfeo, Patrizia Zaccheo

(AIPSA)

- The Fertilising Products Regulation (FPR) - Reg. EU 2019/1009, repealing Regulation (EC) No 2003/2003, is applicable from July 2022;
- Introduces new requirements related to quality, safety, and labelling of fertilizing products;
- Extends the scope to organic fertilizers, organo-mineral fertilizers, soil improvers, growing media, biostimulants, and other products;
- Harmonizes EU rules for products derived from waste organic materials and by-products and provides rules to recover nutrients into secondary raw materials;
- Defines the Component Material Categories (CMCs) that can be used for the production of fertilizer products;
- Introduces specific requirements for certain materials.

- How to evaluate compliance with the requirements?
- How to check compliance?
- How can you evaluate whether a component has the characteristics to be used to make a fertilizing product?
- How do manufacturers demonstrate that their products meet the requirements of the FPR before affixing the CE mark?

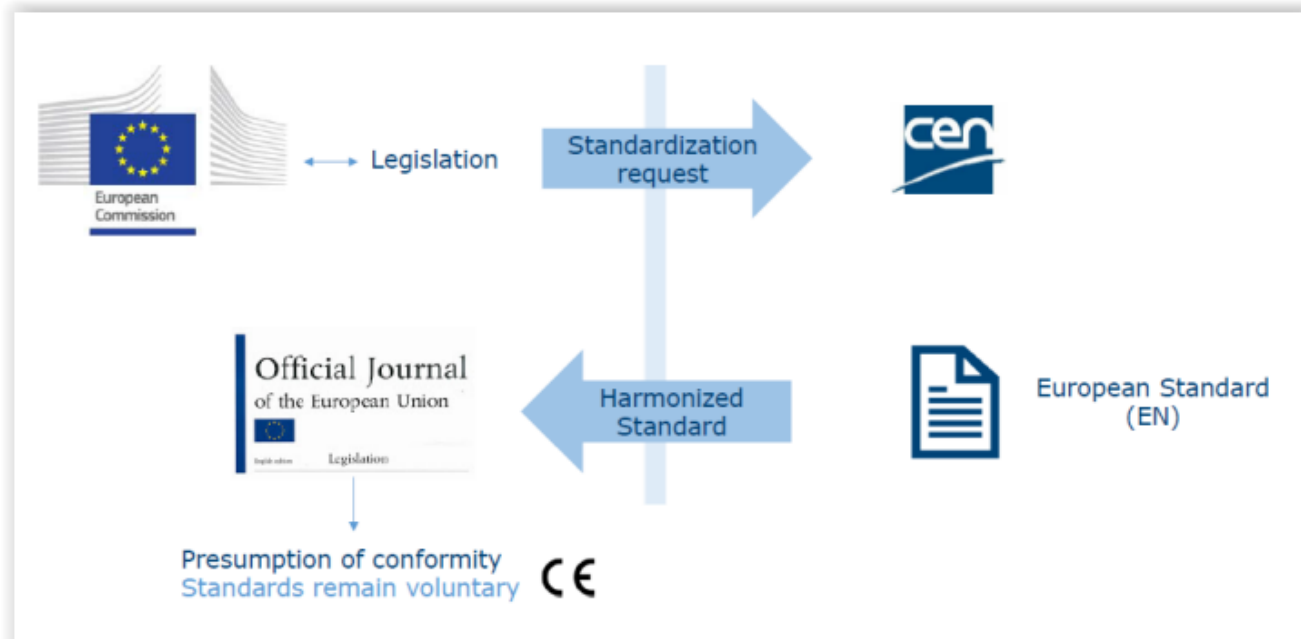
- February 2020: The European Commission notified CEN of a standardization request to support the FPR;
- The standardization request requires **European Standards** (ENs) and **Technical Specifications** (TSs) to provide the analytical methods that manufacturers must use to verify the compliance of their products, or components with the regulation;
- Products based on this standardization request will ensure the full harmonization of the single European market by providing manufacturers with access to CE marking.

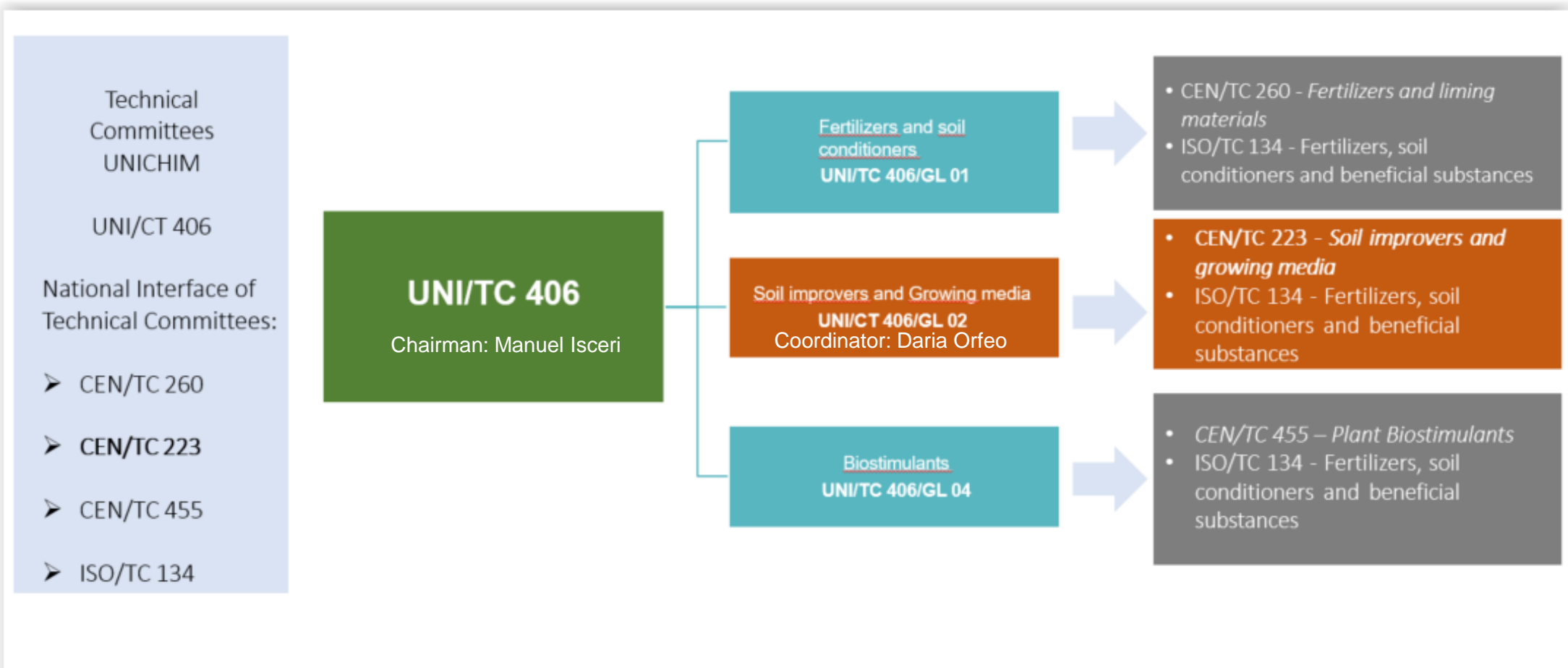
Characterizing products with standardized methods that are the same for all is an essential condition for qualifying the market

- ✓ allowing fair competition, contributing to the free circulation of quality community fertilizer products in the Union,
- ✓ simplifying production processes
- ✓ reducing production costs



- The Standardization Request is structured following a 'two-step approach': the TS describe the testing methods, which are then validated through interlaboratory studies and consolidated in subsequent European Standards (ENs);
- CEN published more than 80 Technical Specifications.

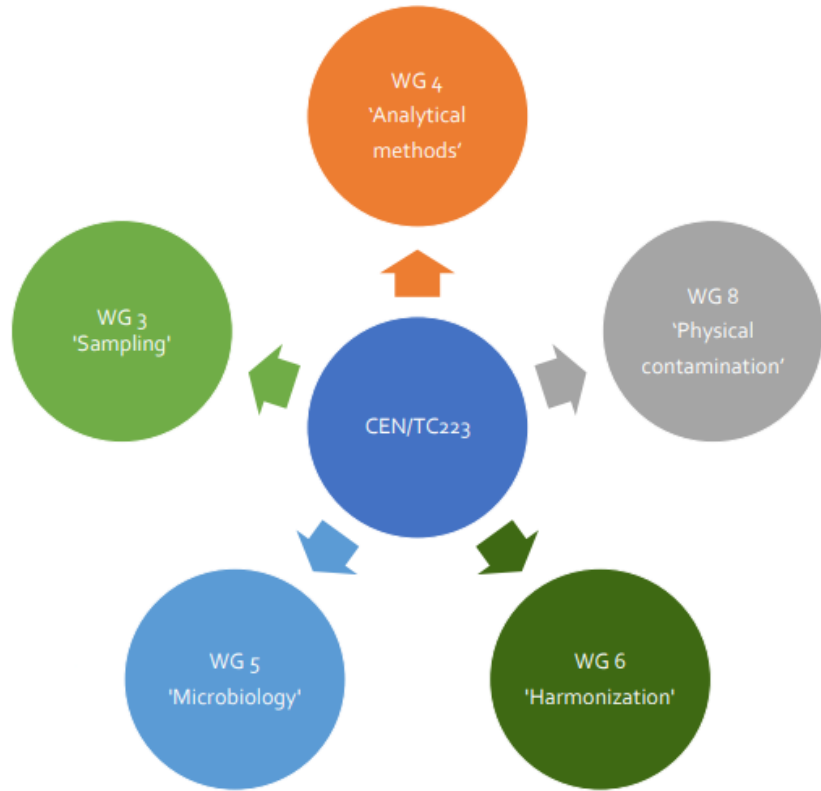




Standardization of three types of materials :

- Soil improvers (organic, inorganic) PFC 3A – PFC 3B, that is materials, which may have been composted or otherwise processed, added to soil mainly to improve its physical condition without causing harmful effects.
- Growing media PFC4, that is materials in which plants are grown.
- Other components: Compost CMC 3; Digestate CMC 4, CMC 5
- Struvite, biochar, ash...





CEN/TC223

Published Standards : 30

Work programme 35

TS published (WG 6): 5

Working group	Title	IT Experts
CEN/TC 223/WG 3	Sampling	-
CEN/TC 223/WG 4	Analytical methods	Patrizia Zaccheo (AIPSA) Laura Crippa (AIPSA), Mariangela Soldano (CRPA)
CEN/TC 223/WG 5	Microbiology	-
CEN/TC 223/WG 6	Harmonization	Alberto Confalonieri (CIC) Patrizia Zaccheo (AIPSA)
CEN/TC 223/WG 8	Physical contamination	Alberto Confalonieri (CIC) Tiziano Bonato (SESA)

prEN 13037 rev(WI=00223103)	Soil improvers and growing media - Determination of pH
prEN 13038 rev(WI=00223102)	Soil improvers and growing media - Determination of electrical conductivity
prEN 13039 rev(WI=00223099)	Soil improvers and growing media - Determination of organic matter content and ash
prEN 13040-1 rev(WI=00223100)	Soil improvers and growing media - Sample preparation - Part 1: Sample preparation for chemical and physical tests, determination of dry matter content, moisture content and laboratory bulk density
prEN 13650 rev(WI=00223101)	Soil improvers and growing media - Extraction of aqua regia soluble elements
prEN 13651 rev(WI=00223107)	Soil improvers and growing media - Extraction of calcium chloride/DTPA (CAT) soluble nutrients
prEN 13654-1 rev(WI=00223108)	Soil improvers and growing media - Determination of nitrogen - Part 1: Modified Kjeldahl method
prEN 13654-2 rev(WI=00223106)	Soil improvers and growing media - Determination of nitrogen - Part 2: Dumas method
prEN 16086-1 rev(WI=00223143)	Soil improvers and growing media - Determination of plant response - Part 1: Pot growth test with Chinese cabbage
prEN 16087-1 rev(WI=00223109)	Soil improvers and growing media - Determination of the aerobic biological activity - Part 1: Oxygen uptake rate (OUR)
prEN 16087-2 rev(WI=00223104)	Soil improvers and growing media - Determination of the aerobic biological activity - Part 2: Self heating test for compost
prEN XXX(WI=00223111)	Soil improvers and growing media - Determination of total organic carbon by dry combustion
prEN XXX(WI=00223142)	Soil improvers and growing media - Determination of aqua regia soluble elements
prEN XXX(WI=00223123)	Soil improvers and growing media - Determination of mercury in aqua regia extracts
prEN XXX(WI=00223141)	Soil improvers and growing media - Determination of the chloride content
prEN XXX(WI=00223113)	Soil improvers and growing media - Determination of arsenic by inductively coupled plasma-atomic emission spectrometry (ICP-AES) after aqua regia dissolution
prEN XXX(WI=00223117)	Soil improvers and growing media - Determination of phosphonate content
prEN XXX(WI=00223122)	Soil improvers and growing media - Determination of chromium(VI)
prEN XXX(WI=00223116)	Soil improvers and growing media - Determination of polycyclic aromatic hydrocarbons (PAH) by gas chromatography (GC) and high performance liquid chromatography (HPLC)
prEN XXX(WI=00223115)	Soil improvers and growing media - Determination of organic nitrogen
(WI=00223120)	Soil improvers and growing media - Determination of the residual biogas potential in digestate



New!

[EN 17925:2024](#)

(WI=00223118)

Published 13/03/24

No interlaboratory study request

CMC 3, CMC 4, CMC 5

CEN

SIST EN 17925:2024

EN 17925:2024 (MAIN)

Soil improvers and growing media - Determination of temperature-time profiles during composting and digestion

This document specifies methods for determining temperature-time profiles during composting and anaerobic digestion for the production of compost and digestate.

The process monitoring is an organized check and recording of the temperature during a specific time of the composting and anaerobic digestion process.

This document **only** applies to composting and anaerobic digestion.

This document is intended to be used by manufacturers and enforcement agencies for the purpose of manufacturing control.

The requirements of this document can differ from national legal requirements for the production process of compost and digestate.

EN 13040 - 1rev

- New matrices: digestate (solid and liquid, pellets, chips, plugs ...)
- Heterogeneity of materials
- ILS

Reference	prEN 13040-1 rev
Title	Soil improvers and growing media - Sample preparation - Part 1: Sample preparation for chemical and physical tests, determination of dry matter content, moisture content and laboratory bulk density
Work Item Number	00223100
Abstract/Scope	This European Standard specifies a routine method for preparing a sample of soil improver or growing media prior to chemical analysis and physical testing. The procedures described herein apply only to those samples that are supplied to a laboratory in the form in which they will be used for their intended purpose. NOTE 1 This method is not applicable to liming materials and is not suitable for materials like rockwool and foam slabs. NOTE 2 The determination of the laboratory compacted bulk density is given in Annex A. NOTE 3 The results of an interlaboratory trial to determine moisture content are given in Annex B. NOTE 4 The results of an interlaboratory trial to determine compacted laboratory bulk density are given in Annex B. NOTE 5 Attention is drawn to the possible existence of national legislation for the declaration of specific products, which could differ from the general requirements of this European Standard.
Status	Under Drafting

EN 13651 rev

- New parameter for Italy
- ILS
- Nickel

Reference	prEN 13651 rev
Title	Soil improvers and growing media - Extraction of calcium chloride/DTPA (CAT) soluble nutrients
Work Item Number	00223107
Abstract/Scope	This European Standard specifies an extraction method for the routine determination of calcium chloride/DTPA (CAT-method) extractable nutrients and elements (as listed in annex B) in soil improvers or growing media. The method is not applicable to liming materials and preformed materials such as mineral wool slabs and foam slabs. NOTE The requirements of the standard may differ from the national legal requirements for the declaration of the products concerned.
Status	Under Drafting

EN 16087-1rev

- CMC 3, CMC 4, CMC 5

- Criterion: max
25 mmol O₂/kg organic
matter/h

- ILS

Reference	prEN 16087-1 rev
Title	Soil improvers and growing media - Determination of the aerobic biological activity - Part 1: Oxygen uptake rate (OUR)
Work Item Number	00223109
Abstract/Scope	This European Standard describes a method to determine the aerobic biological activity of growing media and soil improvers or constituents thereof by measuring the oxygen uptake rate (OUR). The oxygen uptake rate is an indicator of the extent to which biodegradable organic matter is being broken down within a specified time period. The method is not suitable for material with a content of particle sizes > 10 mm exceeding 20 %.
Status	Under Drafting



Title: Determination of the residual biogas potential in digestate

Work Item 00223120

Under Drafting

ILS

Introduction

The anaerobic digestion is a biological process leading, in absence of oxygen, to the degradation of organic carbon and to the production of biogas, a gas mixture composed mainly by methane (CH_4) and carbon dioxide (CO_2). The degradation process is carried out by a wide range of mesophilic or thermophilic microorganisms and applied in industrial scale for the exploitation of crops, livestock manure, agro-industrial by-products, biowaste and sludges. The digestate obtained is a stabilized material, rich in nutrients and a suitable component for soil improvers and growing media.

When the organic material is not efficiently converted in biogas, the digestate coming out from the plant is unstable and continue to produce biogas in the final storage tank.

The assessment of the digestate's stability can be carried out through the RBP test (Residual Biogas Potential) which represents the amount of biogas that could still be produced from the organic material present at the end of the anaerobic digestion process.



Fertilising Products Regulation (FPR) - Reg. EU 2019/1009

CMC 4: FRESH CROP DIGESTATE

CMC 5: DIGESTATE OTHER THAN FRESH CROP DIGESTATE

6. Both the solid and the liquid part of the digestate shall meet at least one of the following stability criteria:

(a) Oxygen uptake rate:

- Definition: an indicator of the extent to which biodegradable organic matter is being broken down within a specified time period. The method is not suitable for material with a content of particle sizes > 10 mm that exceeds 20 %.
- Criterion: maximum 25 mmol O₂/kg organic matter/h; or

(b) Residual biogas potential:

- Definition: an indicator of the gas released from a digestate in a 28 day period and measured against the volatile solids contained within the sample. The test is run in triplicate, and the average result is used to demonstrate compliance with the criterion. The volatile solids are those solids in a sample of material that are lost on ignition of the dry solids at 550 °C.
- Criterion: maximum 0,25 l biogas/g volatile solids.



PR-FESR EMILIA ROMAGNA 2021-2027

Priorità 1: RICERCA, INNOVAZIONE E COMPETITIVITÀ

Obiettivo specifico 1.1: Sviluppare e rafforzare le capacità di ricerca e di innovazione e l'introduzione di tecnologie avanzate

Azione 1.1.2 "Supporto a progetti di ricerca collaborativa dei laboratori di ricerca e delle università con le imprese"



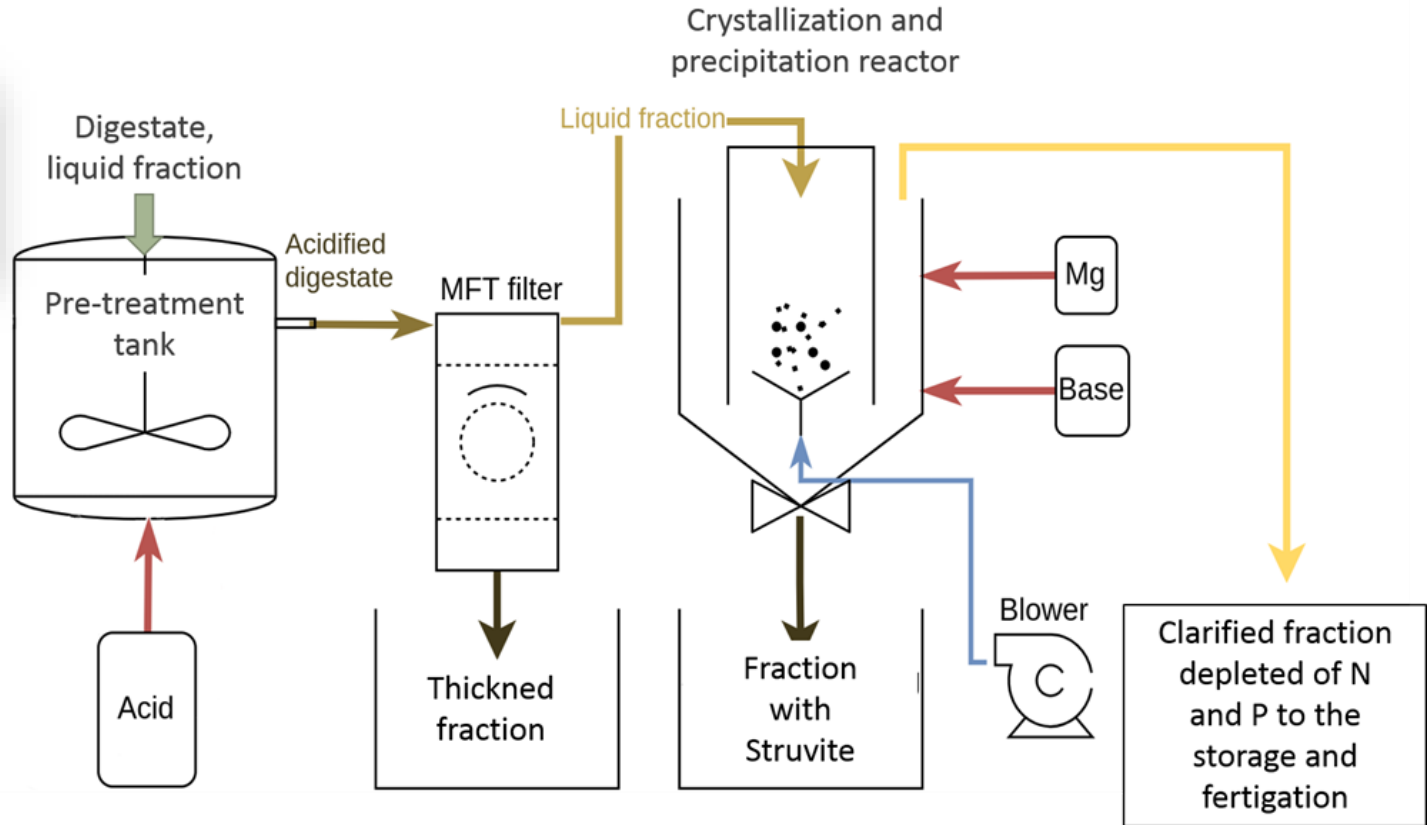
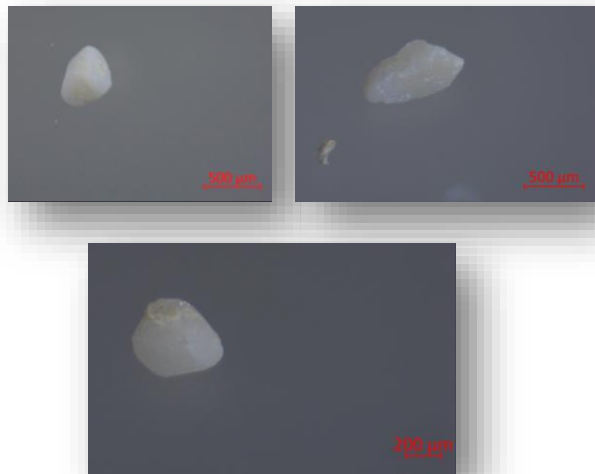
Activity period: M1 (02/2024) - M30 (08/2026)

The **SCOPE** of the project is: to produce the fertiliser **Struvite** through the recovery of nitrogen and phosphorus in agro-livestock and OFMSW digestates and, in order to reduce atmospheric emissions of ammonia, methane and nitrous oxide from both the storage and spreading phase.

Prototype system on a farm scale consisting of:

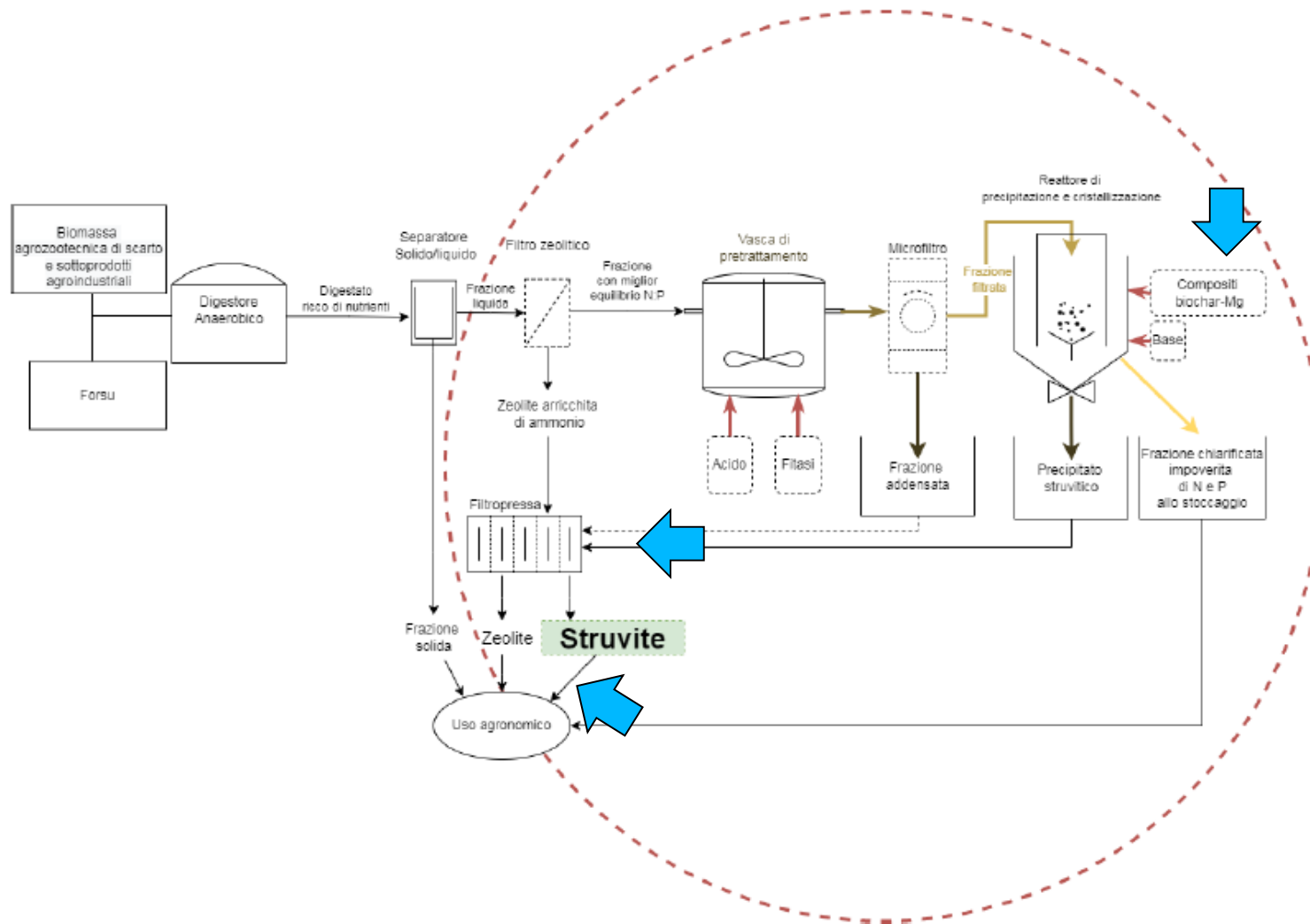
- **zeolitic filters** to reduce the ammonia concentration of the digestate, bringing it closer to an optimal stoichiometric N:P ratio for the precipitation/crystallisation of Struvite
- **micro-filters** to reduce the presence of suspended organic matter that would hinder the precipitation of Struvite
- **biochar-Mg composites** as slow-release magnesium additives and Struvite catalysts
- **filter press** to dehydrate and compact the Struvite precipitate produced by the prototype and spent zeolites

Prototype layout



GOI Struvite

Prototype layout : implementation



Struvite: PROTOTYPE



A EUROPEAN MARKET FOR CIRCULAR FERTILISERS



Waste Management Europe
FIERA DI BERGAMO - Room Colleoni
Via Lunga - 24125 Bergamo (IT)
10 April 2024



STRUVITE



Thanks for your attention

m.soldano@crpa.it

