

COMPOST PROPERTIES INFLUENCE ORGANO-MINERAL FERTILIZERS COMPOSITION

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Introduction

Organo-mineral fertilizers (OMF): organic fraction + mineral fertilizer.

The type of raw materials, processing, or process time, provide variability in the organic fractions characteristics; that could be transferred to the OMF.

Changes in the organic fraction can modify proportions of mineral fertilizers (OMF fractions) to achieve a standard OMF formulation.

Methods

Sixteen organic compounds produced in Italy, grouped as green compost, mixed compost, vermicompost, biochar, and peat, were collected and characterized.

Principal component analysis (PCA) to find similarities between materials.

Optimization to calculate fractions of organic material (OF), triple superphosphate (TSP), diammonium phosphate (DAP), ammonium sulfate (AS), and urea (U) for OMFs with a C-N-P ratio of 7.5-15-8.

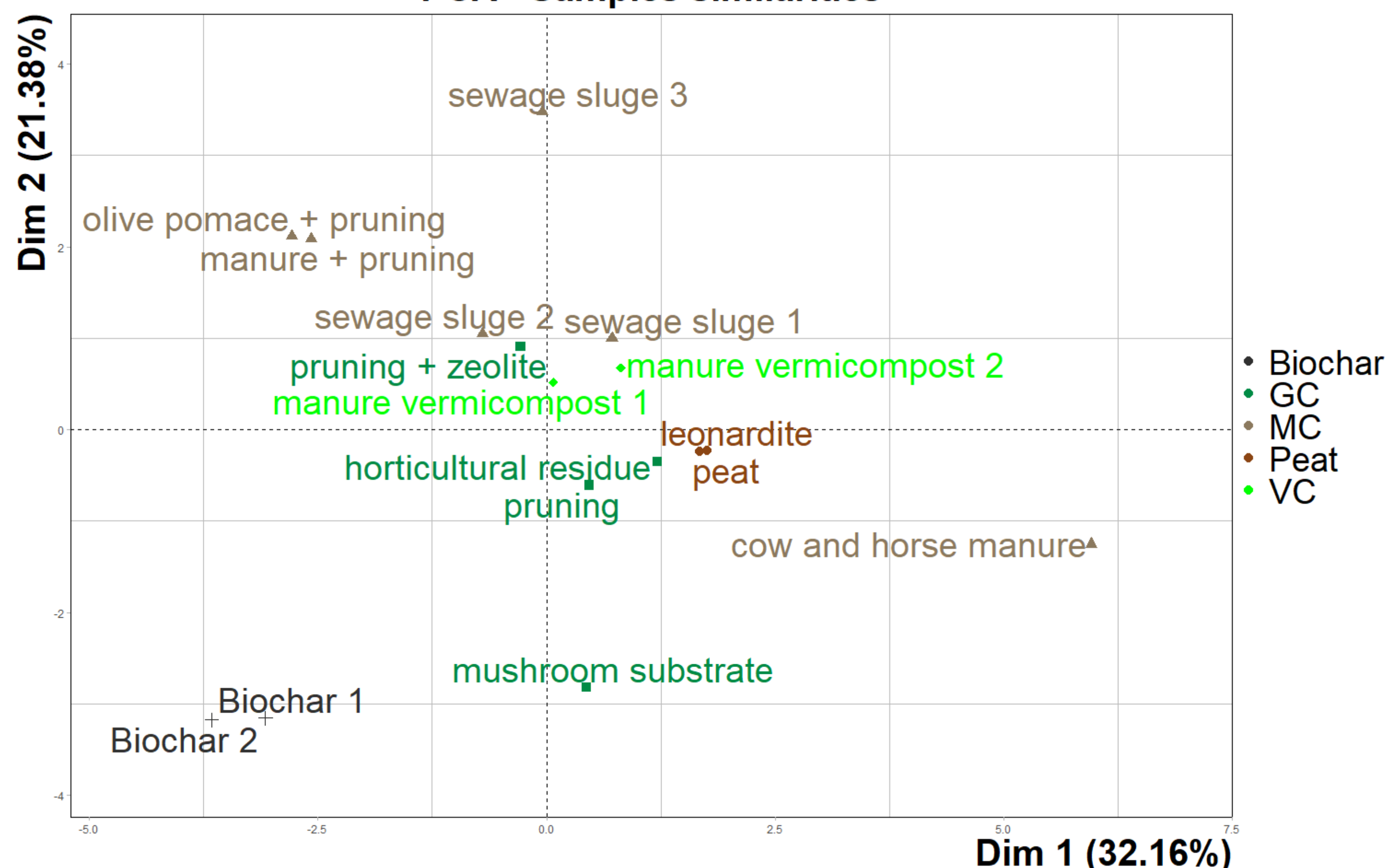
PCA with OF properties and OMF fractions to determine the best compost indicator for the OMF formulation.

Results

Most of green compost can be grouped together. Most of mixed compost can be grouped together.

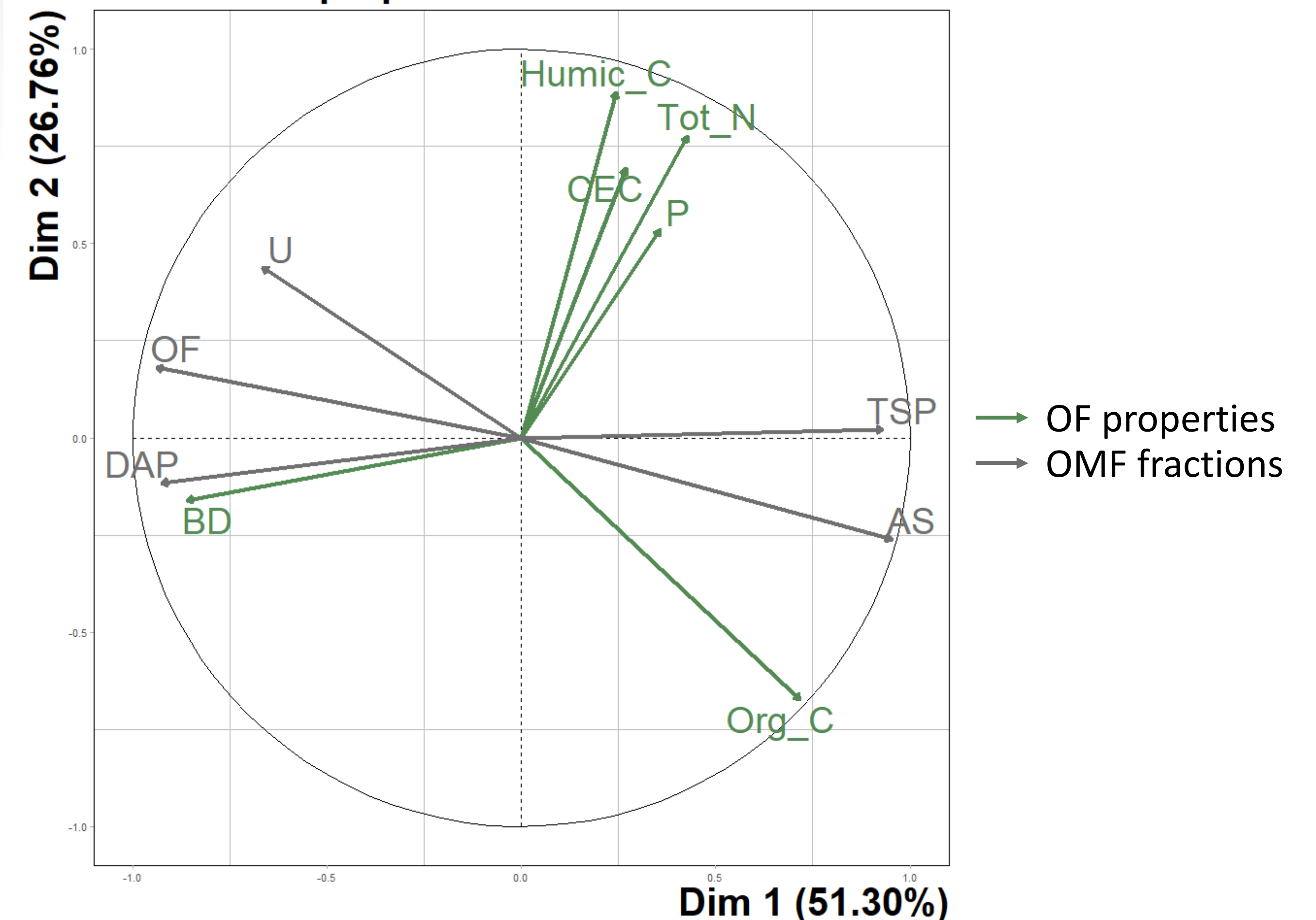
Pruning compost, horticultural residues compost, and vermicompost are the materials most similar to peat and leonardite.

PCA - Samples similarities



The organic C concentration in compost works as the best indicator of the fractions needed to create an OMF. If the compost has low organic C, a higher amount of compost is required to achieve the OMF C target; it is also necessary to use rich N mineral sources as U, and DAP, reducing the use of AS and TSP. The concentration of N and P in the OF does not influence mineral fertilizers' proportions because they count for less than 1% of the total OMF.

PCA - OF properties and OMF formulation



Conclusions

Materials as vermicompost or green compost can be used to replace peat in OMFs. Knowing the influence of chemical and physical properties of organic materials on mineral fertilizers helps design optimal OMFs based on the availability of materials.

References

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Acknowledgment

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No.860127"



Ammonium sulfate

Urea

Triple-superphosphate Diammonium phosphate

Peat

OMF