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PRACTICE ABSTRACT

TECHNICAL REPORT CAP

Nutrient release potential from fruit and vegetable waste using a Carboxylic Acid Platform

SHORT SUMMARY FOR PRACTITIONERS

EN version

The RUSTICA project aims to develop an adaptable, ecofriendly bio-based fertiliser. This fertiliser will consist out of 6 different building blocks, each with their own specific properties. These building blocks will be produced by 5 ecofriendly technologies. Furthermore, these building blocks will be derived from agricultural side streams. This to upcycle otherwise unused side streams and bringing back nutrients to the soil.

DRANCO nv developed the Carboxylic Acid Platform (CAP): a new adaptable process based on anaerobic fermentation technology. Using the CAP, a nutrient- and carboxylic acid rich solution can be derived from all types of organic waste streams. Within the first stage of the RUSTICA project, all parameters involved in this process were tested with the goal to find an optimal set of parameters which can convert organic waste streams, derived from agriculture, into a CAP solution with a carboxylic acid spectrum which is rich in nutrients and has an organic fraction, which can easily be converted in useful building blocks by other (RUSTICA) technologies.

SHORT SUMMARY FOR PRACTITIONERS

NATIVE version

The RUSTICA project aims to develop an adaptable, ecofriendly bio-based fertiliser. This fertiliser will consist out of 6 different building blocks, each with their own specific properties. These building blocks will be produced by 5 ecofriendly technologies. Furthermore, these building blocks will be derived from agricultural side streams. This to upcycle otherwise unused side streams and bringing back nutrients to the soil.

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Demonstration of circular bio-based fertilisers and implementation of optimized fertiliser strategies and value chains in rural communities

RUSTICA

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N. 101000527

rusticaproject.eu

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TECHNICAL REPORT CAP

Nutrient release potential from fruit and vegetable waste using a carboxylic acid platform

CONTEXT

One of the 5 technologies is the Carboxylic Acid Platform (CAP), an anaerobic fermentation process which allows the conversion of organic materials like fruit and vegetable waste into a nutrient and carboxylic acid rich solution. This solution can than be used to separate the nutrients or as a starting material to produce microbial proteins, a building block which boost microbial diversity and activity in the soil.

PROBLEM

Different agricultural side streams have different proportions and nutrient contents. Furthermore, the RUSTICA technology CAP is rather new, and the quality of the produced CAP solution can vary depending on the type of fruit and vegetable waste used. The suitability of the agricultural side streams for the CAP process needs to be tested and the most optimal conditions optimal for the CAP process, which depend on the used substrate, should be determined.

SOLUTION

DRANCO nv developed lab scale test to determine the feasibility different organic substrates to be converted into CAP solution. Over 25 different agricultural side streams, derived from different regions in Europe and one region in Columbia, were tested. Furthermore, these tests were modified allowing to test the effect of different operational parameters on the CAP process. For the most promising substrates, continuous tests were set up, allowing to optimise the CAP process and stabilise the qualitative of the CAP solution.

OUTCOME

1. Over 25 different agricultural waste streams, from all over Europe and one region from Columbia, were tested.
2. The final composition of the CAP-solution strongly depends on the type of fruit and vegetable waste used.
3. Pre-fermented substrates are less feasible
4. Optimal pH and temperature ranges were determined
5. Optimal continuous parameters were determined
6. The CAP process was optimised

PRACTICAL RECOMMENDATIONS

- Homogeneous side streams give more stable results. When using heterogenous substrates, the quantities should be high to reduce batch variations.
- Pre-fermented substrates lost a lot of their nutrient value and should be avoided.
- The optimal parameters for the CAP process should be adjusted depending on the substrate used and on the technologies which will convert the CAP solution.

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