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# Chemical pre-treatment for polylactic acid packaging (PLA) anaerobic digestion valorisation

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## Résumé

Polylactic acid (PLA) is a promising bio-based packaging material alternative to conventional petrol-based plastics. In the aim to ease the waste treatment of biowastes and to help households in the sorting of wastes, it could be interesting to dispose packaging still containing some food leftovers or packaging which is intrinsically linked with the food, such as coffee capsules, together with the food in the biowaste bin.

PLA is biodegradable in industrial composting conditions which imply thermophilic aerobic conditions. However, a large effort is made actually to foster anaerobic digestion units which degrade biowastes and produce biogas. Most such units are working in mesophilic conditions, and the degradation of PLA in such a process is slow and incomplete. Therefore, it is not, as it is, adapted to such a waste treatment.

Some reports have already shown that pretreatments of compostable plastics can be applied, which speed up their degradation in the anaerobic process. Among different types of pretreatment, thermo-alkaline methods seemed to be the most promising (1). This study focuses on impact of this ester hydrolysis thermo-alkaline pre-treatment, to discern morphological properties and a possible a critical molar mass that fosters PLA conversion in anaerobic digestion.

The kinetics of hydrolysis of PLA in thermo-alkaline conditions were tested for different morphologies and geometries. The changes of the glass transition and the crystallinity degree were analyzed to get insight of the influence of induced crystallization during the hydrolysis on the kinetics.

(1) Guillaume Cazadehore. Thèse de doctorat. Méthanisation des plastiques biodégradables : performance et diversité microbienne. Université de Pau et Pays de l’Adour, 11/03/2022

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