

# A NEW ANAEROBIC FERMENTATION PROCESS TO PRODUCE DIGESTATE WITH LOW AMMONIUM CONTENT

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## INTRODUCTION

Ammonia is a major problem in anaerobic digestion of municipal biowaste, manure and wastewater treatment (WWT). Depending on source, concentration ranges from < 0.1 g/L to > 5 g/L. Ammonia poses problems for disposal and/or use of wastewater and digestate from urban and agriculture source. The [91/676/EEC](#) Nitrate Directive restricts input of mineral nitrogen on farmland, aiming to protect the ground and surface water from pollution. A number of processes for ammonia removal have been developed to meet stringent discharge norms. Among these, the Anammox process removes ammonia in absence of oxygen, but requires supplying nitrogen oxide and anammox bacteria difficult to cultivate. These processes have high CAPEX and OPEX costs. Recently, soluble biobased polymeric substances (SBO) isolated from the alkaline hydrolysates of municipal biowaste compost have been reported to decrease ammonia content in the anaerobic digestate from urban biowastes and cow manure, when added at 0.05-0.2 % concentration in the fermentation slurry feed (Francavilla et al., 2016; Riggio et al., 2017). Compared to the control fermentation producing ammonia in excess of the initial content, the SBO assisted fermentation yields a digestate slurry containing 90 % lower ammonia production or lower ammonia than that in the feed slurry. Based on these findings, and within the funded LIFECAB LIFE16 ENV/IT/000179 project, SBO will be prepared from different origin composts and added to biogas production plants in order to check their capacity to reduce the ammonia content in both digestate and biogas. In this first part of the project the cross-country variation of the composition of raw biowaste, compost and the resulting SBO have been investigated.

## MATERIALS AND METHODS

### Composts

Two different compost were considered:

- compost A prepared by ACEA pinerolese from an anaerobic digestate mixed with gardening wastes;
- compost B prepared by SBLA (Cyprus) from a mixture of leaves, pruning, grass, soil and saw dust over four seasons.

Each compost preparation lasted 12 weeks and was replicated four times (from September 2017 to April

