



## PARTNERS ROLE

**University of Bologna** will coordinate the Cross Life project, set up the entire sludge-to-crotonic acid pathway, perform LCA analysis and measure the technology impact.

[site.unibo.it/greenchemistry](http://site.unibo.it/greenchemistry)

**B-Plas SBRL** will lead the engineering and manufacturing of the two DEMO plants foreseen in the project that will be realized at the Unigrà and AqA sites.  
[b-plas.it](http://b-plas.it)

**Unigrà SRL** will use its industrial sludge from food processing as feedstock to produce bio-based crotonic acid, and host the first DEMO plant.  
[unigra.it](http://unigra.it)

**AqA SRL** will host the second DEMO plant fed with sludge coming from the treatment of municipal wastewater.  
[aqamantova.it](http://aqamantova.it)

**University of Pavia** will design a novel photochemical strategy to co-polymerize vinyl acetate and crotonic acid.  
[unipv.it/photogreenlab](http://unipv.it/photogreenlab)

**Vinavil SPA** will polymerize bio-based crotonic acid with vinyl acetate to produce poly(vinyl acetate-co-crotonic acid).  
[vinavil.com](http://vinavil.com)

## CROSSLIFEPROJECT.COM



### KEY GOALS

**To reduce** the amount of sludge produced by wastewater treatment plants, decreasing the **cost of sludge management and the environmental impact**.

**To produce** bio-based crotonic acid and poly(vinyl acetate-co-crotonic acid) from sludge, applying an **industrial symbiosis approach**.

### PARTNERS



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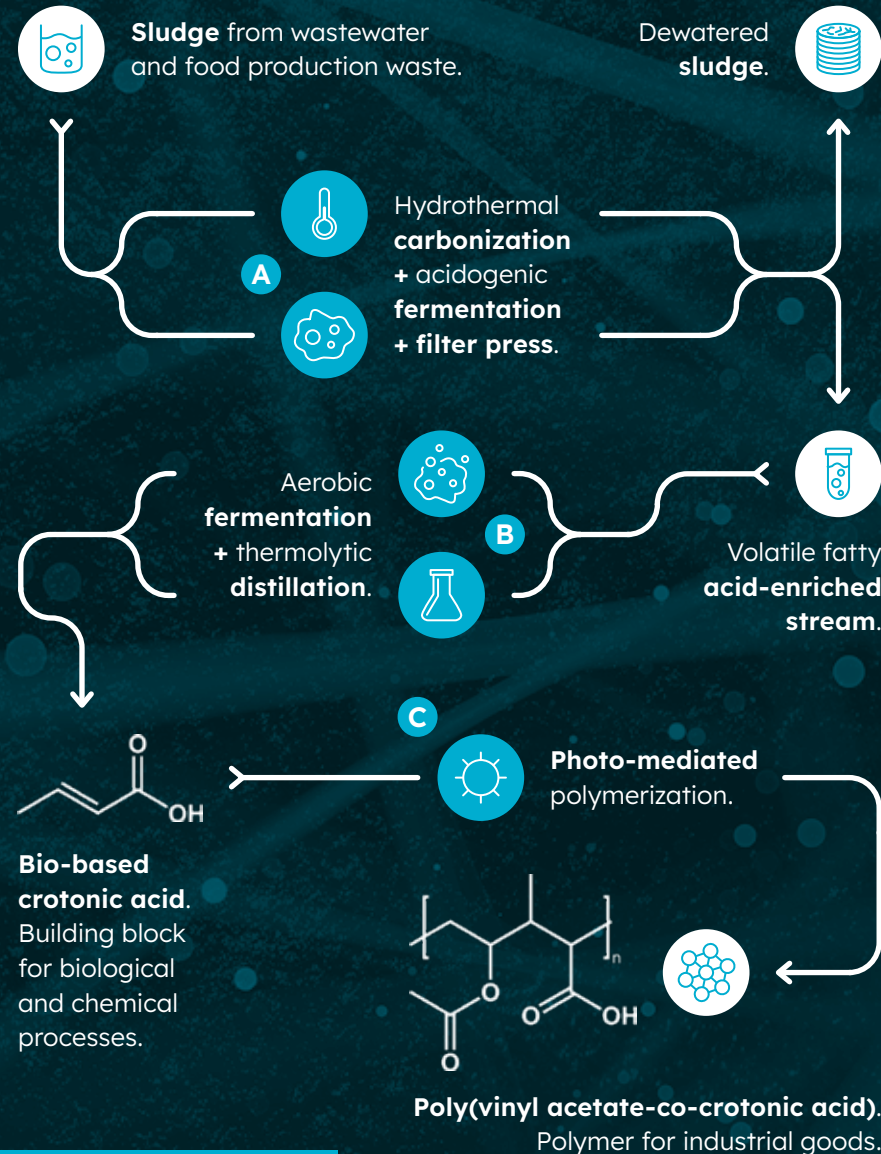


# Cross Life

## When less is even more



## THE PROCESS



[crosslifeproject.com](http://crosslifeproject.com)



**Sludge treatment and management are complex and costly operations** that cover 20-60% of the total operation cost of wastewater treatment plants. After stabilization and dewatering, sludge is either directly reused in agriculture/composted, incinerated or sent to landfill.

**The valorisation of sludge as feedstock for the synthesis of renewable chemicals/polymers is still lacking** but it would be valuable in terms of circular

## VALORIZING SLUDGE WITH A DUAL GOAL

economy and reduction of fossil resources exploitation.

**The Cross Life project proposes an integrated technology for sludge management** oriented to the dual aim of **decreasing the volume of sludge** to be treated at end-of-life and **exploiting the sludge** as a feedstock to produce bio-based crotonic acid and its co-polymer poly(vinyl acetate-co-crotonic acid) instead of using fossil sources.



**1. TO REDUCE the amount of sludge produced by wastewater treatment plants, decreasing the cost of sludge management and the environmental impact associated with such practices.**

This objective will be achieved through an innovative hybrid thermochemical-biological technology that will be integrated in two DEMO plants, one fed with sludge from the food sector (Unigrà), and the other with sludge from the treatment of urban wastewater (AqA).

The Cross Life technology will increase by 30-40% the sludge dehydration result, allowing the reduction of sludge to be disposed of by 50-80% by volume.



**2. TO PRODUCE crotonic acid and poly(vinyl acetate-co-crotonic acid) from sludge, applying an industrial symbiosis approach.**

This objective will be realized through the integration of a hybrid thermochemical-biological process that will convert a waste (Unigrà and AqA sludge) into a chemical (crotonic acid).

The Cross Life technology will increase the bioavailability of carbon atoms of sludge, making them exploitable for biological and chemical transformations. Bio-based crotonic acid will be lastly polymerized by Vinavil into poly(vinyl acetate-co-crotonic acid), introducing a renewable monomer in a 100% fossil-based co-polymer.

## CROSS LIFE ROADMAP

