

## The best from each biomass: enzymatic pre-treatments of vegetable biowaste to obtain value-added products

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**Abstract:** The organic fraction of urban waste is mainly composed of edible and non-edible waste from cereals and vegetables. Along with a strong effort to decrease edible food waste, the valorisation of non-edible biomass (peel, seeds, petals) is essential to produce value and decrease the problems connected to landfilling and burning.

In this work, we focus on finding alternative greener processes to create value-added materials from vegetable biowaste and introduce the discards of the process into biotechnological fermentations.

The conventional process involves i) pre-treatment of the biowaste; ii) acidic mild hydrolysis; iii) blending with plasticizers to obtain a film. We are studying ways to replace the organic acids-based hydrolysis with an enzymatic approach, to avoid the environmental issues connected with the waste disposal of acidic liquids. In particular, we are analysing the differences in composition among different vegetable biowaste, comparing both the mechanical properties of the resulting film and the hydrolytic soluble products.

These data are useful to evaluate the possibility to employ the soluble discards from the hydrolysis, rich in sugars, as growth media for yeasts of biotechnological interest, with the aim to produce value-added compounds such as organic acids and plasticizers. This would allow to create a process where organic acids are generated alongside the other raw materials of the process, in line with the supported concept of circular economy.