

## **Development of bioherbicides combining essential oils and organic acids**

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As part of the European CONSERWA project (<https://conserwa.eu>), which aims to promote weed management strategies aligned with agroecological principles, the University of Liège is developing an innovative bioherbicide based on a synbiotic approach. This strategy leverages the synergistic combination of microbial and plant-derived compounds to optimize bioactive inputs while maintaining or even enhancing herbicidal efficacy, particularly against resistant weeds.

In this context, combinations of volatile aromatic compounds derived from essential oils (monoterpenes, phenylpropanoids and phenols) with organic acids either in their pure form (e.g., acetic, lactic, or citric acid) or in mixture from bacterial cultures were tested for their weed control activities. A series of essential oils compounds was first selected based on previous works for their herbicidal potential activities. Their efficacy was screened through in vitro germination assays and post-emergence trials on plants. Then, different combinations of the most active components and pure organic acids were evaluated to identify their potential synergisms. Synergistic effects were observed for certain combinations against weed models (*Lolium perenne*, ...). Moreover, various associations between cultures of a selected lactic acid bacterial strain and essential oils were tested. Significant results were obtained on ryegrass, clover and mustard.

Further investigations are underway on pure compounds from both lactic acid bacterial culture and essential oil compounds to get insight into the synergistic interactions among specific compounds

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