

Balance between pH
and itaconic acid yield

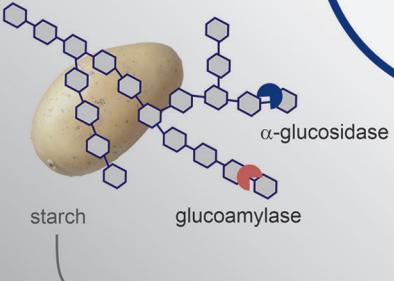
Yield	Low base & acid use
Titer	Low saline waste
Productivity	Efficient DSP
pH conditions	

ENGINEERING
Morphology
Metabolism
Process

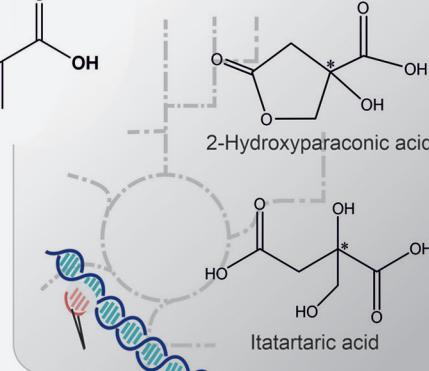
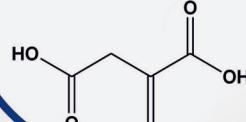


Optimization of
itaconic acid production

2nd generation feedstock
for itaconic acid production



Circular bioeconomy
Itaconic acid
(bio-based and bio-degradable)



Downstream products
of itaconic acid

Exploring the process window for production of itaconic, 2-hydroxyparaconic, and itatartaric acid with engineered *Ustilago* strains

Philipp Ernst

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