

## Engineering Plants with Novel Metabolic Pathways as a Production Platform for Bioproducts

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**Project Goals:** To engineer bioenergy crops with improved biomass and sustainability traits.

Metabolic engineering of plant pathways poses a great challenge due to limited understanding in plant metabolism and bioengineering approaches that can be applied in plant biology<sup>3</sup>. However, genetic engineering in plants has gained many interests in recent years as an alternative to create sustainable resources opposed to their microbial counterparts, like yeast and bacteria. In plants, only a small percentage of biosynthetic pathways are known and, by the same token, remain a pool of untapped resources and machinery to synthesize complex metabolites. As such, we explore the potential of using plant-based production of the chemical, muconic acid (MA), an intermediate molecule that can be derived into several bioplastics. However, existing biological approaches are mostly focused on producing MA from a glucose feedstock in microbes. Here, we exploit plant primary metabolism to test and optimize various metabolic routes<sup>1-2</sup>, enabling direct production of MA via photosynthesis. Plant-based metabolic engineering efforts may enable a more sustainable means of producing chemicals of interest and decrease our dependence on current practices that are heavily dependent on petroleum feedstocks.

### References

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