Novel pathways from plant sugars to isoprenoid-based fuels

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Several isoprenoid products are being considered for development as biofuels as they possess attractive properties as either diesel- or petroleum-like fuel components. Isoprenoids may be synthesized via either the mevalonate or the DXP pathway, depending on the host organism and on any engineering performed in that organism. Both pathways rely on central metabolites as starting materials, and competition with other metabolic pathways for these metabolites is perceived to be one of the rate limitations on achieving high product titers. Furthermore, in the case of the DXP pathway, two 3-carbon precursors are combined to form the 5-carbon DXP intermediate, losing one carbon as CO_2 in the process. Here, we report on two novel metabolic pathways that provide a more direct route from the sugar feedstock to the isoprenoid product. These novel pathways are described, along with the potential impact on isoprenoid pathway flux.

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