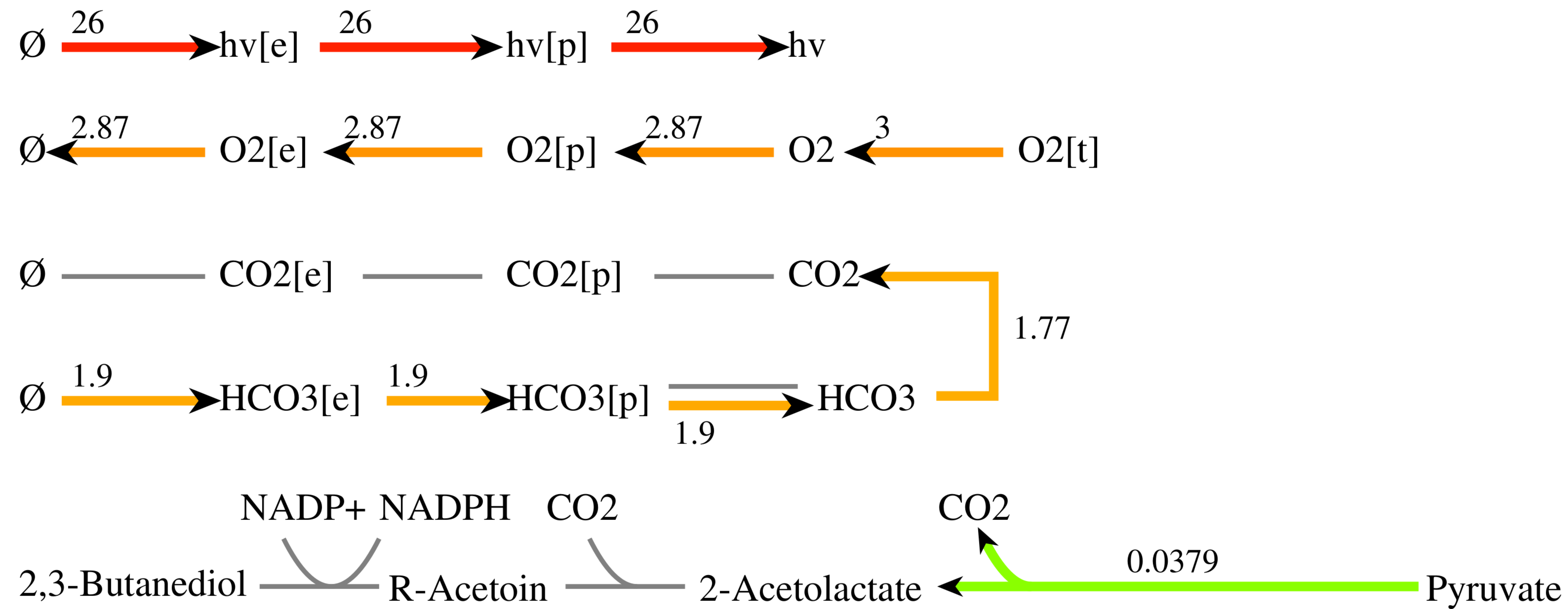


## A Biomass



## B Biofuel

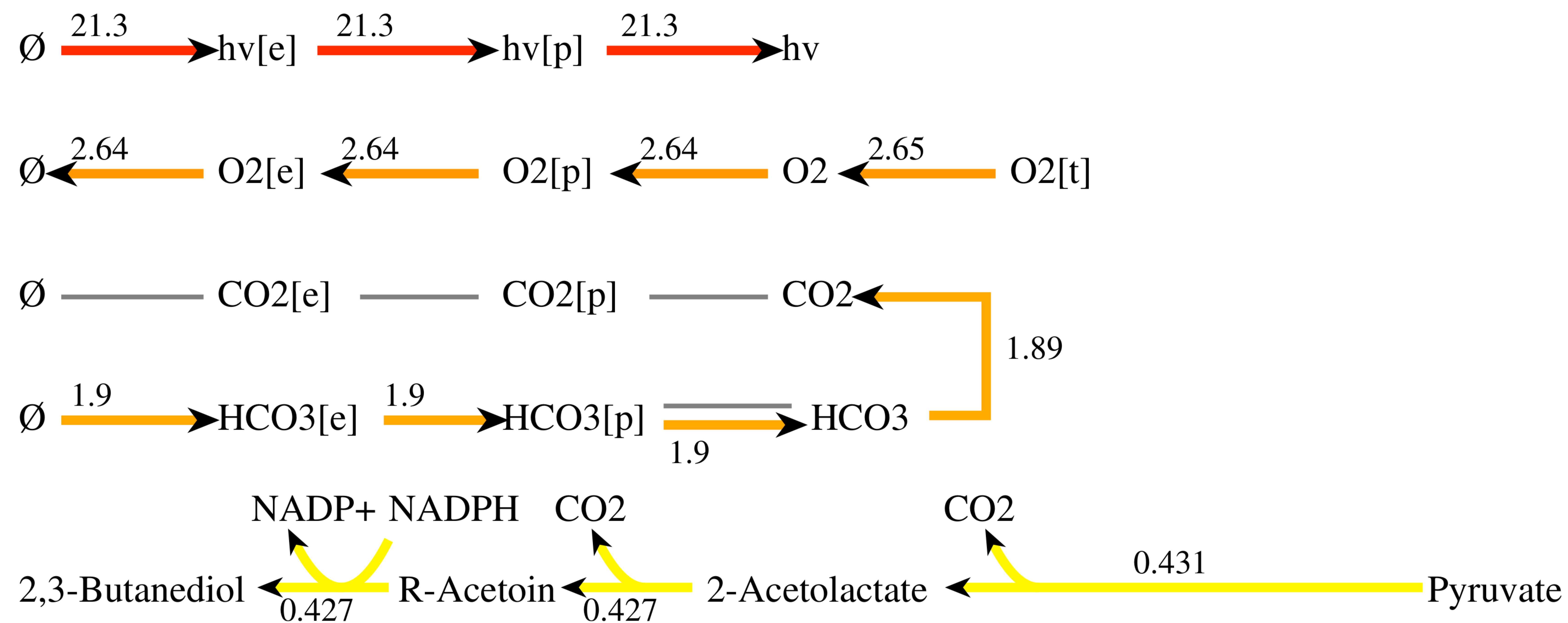


Figure S3: Our tool allows for simple identification of factors that contributed to the  $J_{RuBisCo}/J_{hv}$  difference between optimization of biomass (A) and 23BD production (B). To be specific: (1)  $HCO_3^-$  is not entirely converted to  $CO_2$  when biomass synthesized, (2) fewer photons are necessary to optimize the biofuel pathway, and (3) additional  $CO_2$  is released, which is subsequently fixed in the Calvin cycle. In addition, a different oxygen evolution is predicted.