Abstract:

Differences in the regulatory properties of PEPC extracted from non-photosynthetic (mesocarp) and photosynthetic (peel) tissues from cherimoya fruit have been observed. The enzyme extracted from peel had a similar apparent Km value (140 ± 6 µM) to mesocarp PEPC (120 ± 8 µM for PEP), but Vmax was 2.2 times lower (0.57 ± 0.01 µkat•mg-1 protein) than that measured for non-photosynthetic tissues (1.26 ± 0.02 µkat•mg-1 protein). These special kinetic characteristics point to a high rate of re-assimilation of respired CO2 into keto-acids in this fruit non-photosynthetic tissues. The kinetic behaviour of PEPC from cherimoya fruit stored in air or treated with high CO2 levels (20%) was also studied. PEPC from CO2-treated cherimoyas yielded a similar Vmax (1.12 ± 0.03 µkat•mg-1 protein), a lower apparent Km (68 ± 9 µM for PEP) and a higher I50 of L-malate (5.95 ± 0.3 mM), with respect to the enzyme from fruit stored in air. These kinetic values showed the increase in the affinity of this enzyme toward its substrate, PEP, by elevated external CO2 concentrations. The lower Km value and lower sensitivity to L-malate are consistent with the higher in vivo carboxylation reaction efficiency in CO2-treated cherimoyas.