

Table 2 Refixation of  $^{13}\text{CO}_2$  by Rubisco in cultured *B. napus* embryos

Measured metabolite	Corresponding biosynthetic precursor	$^{13}\text{CO}_2$	Product fractional $^{13}\text{C}$ enrichment	
			Proffered labelled precursor [1- $^{13}\text{C}$ ]Ala	[U- $^{13}\text{C}_3$ ]Ala
$F_{\text{Phe}(1)}$	$F_{\text{PGA}(1)}$	$2.5 \pm 0.1$	$1.6 \pm 0.1$	$1.6 \pm 0.1$
$F_{\text{Tyr}(1)}$	$F_{\text{PGA}(1)}$	$3.0 \pm 0.3$	$2.2 \pm 0.3$	
$F_{\text{Val}(2-5)}$	$F_{\text{PGA}(2-3)}$	$0.2 \pm 0.04$	$0.08 \pm 0.05$	
$F_{\text{oleic acid}(1-18)}$	$F_{\text{PGA}(2-3)}$	$0.1 \pm 0.01$	$0.1 \pm 0.01$	
$F_{\text{Val}(1)}$	$F_{\text{Pyr}(1)}$ (internal $\text{CO}_2$ )*	$2.6 \pm 0.1$	$8.6 \pm 0.1$	$8.1 \pm 0.1$

$^{13}\text{CO}_2$  was provided as external labelled substrate or was produced inside the developing embryo by metabolism of [1- $^{13}\text{C}$ ]Ala or [U- $^{13}\text{C}_3$ ]Ala.  $^{13}\text{C}$  incorporated into different biosynthetic products from 3-PGA (compare with Fig. 1b) is presented. Fractional  $^{13}\text{C}$  enrichment is denoted as  $F_{\text{metabolite}(\text{carbon atoms})}$ . Values (means  $\pm$  s.d.,  $n = 4$ ) represent fractional  $^{13}\text{C}$  enrichment (above natural  $^{13}\text{C}$  abundance) in amino acids and fatty acids as determined by gas chromatography/mass spectrometry. Pyr, plastidic pyruvate. The biosynthetic precursor/product relations are taken from refs 6 and 9.

\* For labelling with [1- $^{13}\text{C}$ ]Ala and [U- $^{13}\text{C}_3$ ]Ala the label in C1 of Val was assumed to represent the  $^{13}\text{C}$  enrichment in internal  $\text{CO}_2$  (compare with Fig. 1b).