

Table I Summary of Enzyme Activities of the C₄ Pathway and Location in the Leaf

	Intercellular and intracellular enzyme location ^a	NADP-ME	NAD-ME	PEP-CK
		Enzyme activity in whole leaf extract ($\mu\text{mol min}^{-1} \text{mg}^{-1}$ chlorophyll)		
PEP carboxylase ^{h,c}	M cyt	13~24	12~25	17~27
Pyruvate, Pi dikinase ^b	M chlt	4~8	4~9	2~4
Adenylate kinase ^d	M chlt >B	41~87	36~70	
Pyrophosphatase ^d	M chlt >B	37~57	52~74	
NADP-malate dehydrogenase ^b	M chlt >B	10~17	1~2	2~5
NADP-malic enzyme ^b	B chlt	10~16	<1	<1
NAD-malic enzyme ^b	B mit	<1	5~18	1~3
PEP carboxykinase ^b	B cyt	<1	<1	6~17
Aspartate aminotransferase ^b	M chlt >B	5~9		
	M cyt >B mit, cyt		27~46	44~60
Alanine aminotransferase ^b	M cyt =B cyt	3~8	30~63	38~45
RuBP carboxylase ^{e,f}	B chlt	1~4	1~3	1~4
Carbonic anhydrase ^a	M cyt	35~68	79~89	28

For values listed as <1, the activity was less than 1 or not detectable.

^a M, B, main localization in mesophyll or bundle sheath cell, respectively; M > B, more in mesophyll cell; M < B; more in bundle sheath cell; M = B, equally distributed; chlt, chloroplasts; cyt, cytoplasm; mit, mitochondria.

^b Hatch, 1987.

^c Gutierrez *et al.*, 1974a.

^d Hatch and Burnell, 1990.

^e Hatch and Osmond, 1976.

^f The lower activities in the range given are likely underestimates due to inactivation or loss of enzyme during extraction procedures because they are below rates of leaf photosynthesis.

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