Capacity of Enzymes of the Euphorbiacea *Aleurites montana* Involved in CO₂-Fixation, Compared to Plants Having C₃-, C₄- and Crassulacean Acid Metabolism

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Dedicated to Professor Wilhelm Menke on the occasion of his 90th birthday

*Aleurites montana*, Phosphoenolpyruvate Carboxylase, Malic Enzyme, Malate Dehydrogenase, Ribulose Bisphosphate Carboxylase

Capacities of phosphoenolpyruvate carboxylase (PEP-Co), ribulose bisphosphate carboxylase (Rubisco), NADP⁺ malic enzyme (ME) and of malate dehydrogenase (MDH) were measured in the Euphorbiacea *Aleurites montana*, grown under 700 ppm CO₂ for four weeks prior to enzyme extraction. For comparison *Bryophyllum daigremontiana* (CAM), *Saccharum officinarum* (C₄) and *Capsicum frutescens* (C₃) were treated in the same way. PEP-Co capacity of *Aleurites* was in the range of 12⁻, that of *Capsicum* approx. 26 nmol × min⁻¹ × mg protein⁻¹, without significant influence of the light period or CO₂-treatment. In contrast, the activity of the enzyme from *Saccharum* was, depending on the duration of light, 160⁻ respectively 96 times higher than that of the tung-oil tree. In *Bryophyllum* a rather low activity in the morning was increased during the day to approx. 230 nmol × min⁻¹ × mg protein⁻¹ in plants grown in the greenhouse and to approx. 115 nmol × min⁻¹ × mg protein⁻¹ in those from the growth chamber. Malate was hardly detectable in extracts of *Aleurites*, whereas it was high in *Bryophyllum*, depending on the light period. The ratio of average PEP-Co to Rub-Co capacity was high for the CAM-plant (20:1), somewhat lower for sugar cane (10:1), but almost at equality for *Aleurites* (0.9:1) and chilli (0.8:1). For the NADP⁺ malic enzyme, low capacity (20 to 28 nmol × min⁻¹ × mg protein⁻¹) was found for *Aleurites* and for *Capsicum*, whereas it was 10 to 17 times higher in *Saccharum*. In *Bryophyllum* the activity was up to 80 nmol × min⁻¹ × mg protein⁻¹, dependent on light period. MDH capacity was extremely high in all plants investigated. Highest rates (10–20 µmol × min⁻¹ × mg protein⁻¹), were obtained for *Bryophyllum*, followed by sugar cane and *Capsicum* with 5–8 µmol × min⁻¹ × mg protein⁻¹. Again, the lowest capacity was found in extracts of *Aleurites* with approx. 1.3 to 1.6 µmol × min⁻¹ × mg protein⁻¹. Thus, in *Aleurites montana* no indication for C₄⁻ or Crassulacean acid metabolism was obtained. Therefore, the earlier observed very efficient uptake of CO₂ cannot be explained by a high expression of the PEP-Co protein, known to occur in CAM- and C₄- plants.