

Biosynthetic Pathways of Caffeine in *Coffea arabica* Leaves

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SUMMARY

The levels of endogenous caffeine and theobromine in buds and young leaves of *Coffea arabica* L. cv. Kent were much higher than in fully developed leaves. Biosynthesis of caffeine from ¹⁴C-labelled adenine, guanine, xanthosine and theobromine was observed but there was no detectable incorporation of label into caffeine when theophylline and xanthine were used as substrates for in vivo feeds. The capacity for caffeine biosynthesis, especially from guanine and xanthosine, was reduced markedly in both fully-developed mature and aged leaves. Data obtained in pulse-chase experiments with young leaves indicate the operation of an AMP → IMP → XMP (or GMP → guanosine) → xanthosine → 7-methylxanthosine → 7-methylxanthine → theobromine → caffeine pathway. The data obtained provide strong evidence against recent proposals by Nazario and Lovatt (Plant Physiology 103, 1203-1210, 1993) on the independence of caffeine and theobromine biosynthesis pathways.