

Expression for Caffeine Biosynthesis and Related Enzymes in *Camellia sinensis*

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Caffeine (1,3,7-trimethylxanthine) is a purine alkaloid that is present in high concentrations in the tea plant *Camellia sinensis*. Caffeine synthase (CS, EC 2.1.1.160) catalyzes the *S*-adenosyl-L-methionine-dependent *N*-3- and *N*-1-methylation of the purine base to form caffeine, the last step in the purine alkaloid biosynthetic pathway. We studied the expression profile of the tea caffeine synthase (TCS) gene in developing leaves and flowers by means of northern blot analysis, and compared it with those of phenylalanine ammonia lyase (PAL, EC 4.3.1.5), chalcone synthase (CHS, EC 2.3.1.74), and *S*-adenosyl-L-methionine synthase (SAMS, EC 2.5.1.6). The amount of TCS transcripts was highest in young leaves and declined markedly during leaf development, whereas it remained constant throughout the development of the flower. Environmental stresses other than heavy metal stress and plant hormone treatments had no effect on the expression of TCS genes, unlike the other three genes. Drought stress suppressed TCS gene expression in leaves, and the expression pattern mirrored that of the dehydrin gene. The amounts of TCS transcripts increased slightly on supply of a nitrogen source. We discuss the regulation of TCS gene expression.

Key words: Caffeine Synthase Gene Expression, Environmental Stress, Leaf and Flower Development, Dehydrin Transcripts