

Effects of amino acid substitutions on CHS protein structure in  
Gesneriaceae plants

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*Chalcone synthase (CHS)* is present in all green plants, usually as a small gene family. Analysis of the enzyme has combined genetic, molecular, biochemical and evolutionary approaches and CHS function is the best understood of any plant enzyme. *Gesneria rupincola* contains two *CHS* genes (*CHS A* and *B*). The proteins differ by 44 amino acids which are dispersed throughout the protein, including some that may alter the active site. Previous studies have shown that single amino acid substitutions can inhibit CHS function and as few as three amino acid substitutions can cause a change of function. Models of the two protein structures were made based on the known crystal structure of *Medicago sativa* (alfalfa). Molecular dynamics simulations on the models indicate that the two proteins have novel structures. Expression studies using RT-PCR indicate that each protein has a unique tissue expression.