In the course of the production of the signaling hormone jasmonate in chloroplast, gamma-ketol is released in the 13-LOX pathway. This highly reactive compound can damage lipids, proteins and DNA. Therefore it must be reduced. The chloroplast envelope Quinone OxidoReductase Homolog (ceQORH) from *Arabidopsis thaliana* represents 1 to 2 % of the protein envelope. It binds NADPH, lacks a classical N-terminal and cleavable chloroplast transit peptide. It is transported through the chloroplast envelope by an unknown alternative pathway without cleavage of its internal chloroplast targeting sequence [1], [2]. We showed that this enzyme binds NADPH and reduces gamma-ketol [3]. Therefore, it has been renamed gamma-ketol reductase. It is inhibited by the ketodiens 13-KOTE and 13-KODE [3].

Using X-ray crystallography and analytical ultracentrifugation, we showed that the gamma-ketol reductase displays several oligomerization states [4]; the apo enzyme is a dimer, holoenzyme is a monomer and the enzyme bound to inhibitor is a tetramer. Structure analysis also revealed that the ligand binding site is large and hydrophobic allowing the enzyme to bind a broad range of ligands with a high affinity for gamma-ketol. By dimerizing by making a 12 stranded beta-sheet, the gamma-ketol reductase dimerizes through interaction of 2 alpha-helices from the Rossmann fold. These structural characteristics and the enzyme properties make ceQORH a new class distinct from the quinone oxydoreductases.


**Keywords:** ceQORH, Chloroplast, gamma-ketol, X-ray crystallography, analytical ultracentrifugation, oligomerization states