

Thesis Title            Oxidative stress response in *Xanthomonas*  
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### ABSTRACT

The regulation of oxidative stress protective enzymes, catalase (KAT) and superoxide dismutase (SOD) was investigated in *Xanthomonas*. Both enzymes showed an atypical growth phase regulation. The highest enzyme levels were detected during the early log phase and subsequently declined as growth proceeded. High oxygen tension may be an inducing signal for both enzymes. The KAT and SOD activities gels revealed only a single monofunctional KAT and a SOD isozymes. The KAT and SOD response to paraquat and H<sub>2</sub>O<sub>2</sub> were investigated. Paraquat was a potent inducer (4 to 10 fold) of the *Xanthomonas* KAT while H<sub>2</sub>O<sub>2</sub> was comparatively a poor inducer (less than 2.5 fold). SOD activities were not significantly changed by both treatments. However, methyl methanesulfonate, a mutagen was found to be a potent KAT inducer. The pattern of KAT induction by various stresses was observed in all *Xanthomonas* strains tested, excepted that paraquat did not induce KAT in the highly paraquat resistant strains.

A putative gene for alkyl hydroperoxide reductase (*ahpX*) was also isolated from a *X.c. pv phaseoli* DNA library by complementation of a *ahp* mutant of *E.coli*. The gene conferred a high level resistance to both cumene and tert-butyl hydroperoxides in *E.coli*. The expression of *ahpX* was highly inducible with cumene hydroperoxide in *X.c. pv phaseoli*.