Thesis Title	Regulation of *Xanthomonas* Catalase Gene in *Escherichia coli* and *Xanthomonas oryzae*
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ABSTRACT

Regulation of *Xanthomonas catalase* gene was studied in *Escherichai coli* and *Xanthomonas oryzae* pv. *oryzae*. pKSkatX contained a functional *katX* could restore catalase production in *E.coli* catalase mutants. (UM255, UM2, UM258) only at 28°C. At 37°C, no Kat activity was observed. At 28°C, UM255 harbouring *katX*, Kat activities were highest during late logarithmic phase and declined as growth progressed. Temperature dependent expression of *katX* gene at 37°C was not due to temperature sensitive enzyme but likely to be due to the effect

of temperature on Kat synthesis. For *katX* expression in *Xanthomonas* spp., increase expression was observed in *Xanthomonas* harbouring the cloned *katX* gene. This increase expression confered protection to *Xanthomonas* from the killing effect of H_2O_2. No protection against *tert*-butylhydroperoxide or menodione was observed. Transcription regulation analysis by chloramphenicol acetyltransferase gene (*cat*) fusion was studied. At all stages of growth phase and at 28°C or 37°C, Cat activity revealed no difference in level of expression which indicated that the *katX* regulation in *E. coli* was at posttranscription level. The transcription terminator in the coding portion between the *Cla*I-*Pst*I region of *katX* gene was observed and studied. The terminator activity was monitored by using *cat* or *gus* gene fusions. *katX* gene did not have a functional promoter but instead used the *lacZ* promoter for expression both in *E.coli* and *Xoo*. Analysis of regulation of *katX* expression using Tn*5*-*gusA* transposons were performed. In *E.coli*, transcriptional and translational *gusA* fusions were studies. Transcriptional *gusA* fusion transposon supported previous results that there was no transcription regulation of *katX* and the regulation is likely to be at posttranscriptional level. Also, the quantity of blue colour of GusA activity was used to analysed transcription terminator activity. For translational gusA fusion transposon, 136 kDa GusA fusion protein was observed at 28°C and at late logarithmic phase. This confirmed the previous results that *katX* expressed only at 28°C and at late

logarithmic phase. This suggested that translational regulation may be involved in Kat synthesis.

In *Xoo*, the 136 kDa GusA fusion protein from Kat translational fusion was also detected at mid logarithmic phase. Indicating that the growth phase regulation was only observed in *E. coli* and not in *Xanthomonas*.