

## The use of thermo-stable and thermo-labile lux fusions: A comparative study

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### Abstract

Two types of luciferase exist, namely thermo-labile, which is active at temperatures below 30C, and thermo-stable lux (37C), and originate from marine and terrestrial bacteria, respectively. In this study, both of these operons were fused to the promoters from several oxidative-damage responsive genes (*katG*, *sodA* and *pqi-5*) of *E. coli* and the response characteristics, *i.e.*, the basal and maximum bioluminescence, the relative bioluminescence, kinetics of bioluminescence production, and the post-maximum features, were compared between fusions of the two *lux* operons with the same promoter. Strains carrying fusions of the promoters to thermo-stable *lux* showed higher basal levels and maximum induced bioluminescent levels than strains carrying the same promoter fused to thermo-labile *lux*. The sensitivities of most of the strains were found to be similar, regardless of the luciferase used, but lower relative responses were seen from the thermo-stable strains. As well, using the two *katG::lux* fusion strains, the bioluminescence from strain DK1, the thermo-stable *lux* fusion strain, was found to be much more stable after reaching its maximum value, while the bioluminescence of strain DPD2511 was transient and decreased very rapidly.