

The potential applications of SOS-lux biosensors for rapid screening of mutagenic chemicals

Hani A. Alhadrami^{1,2} and Graeme I. Paton^{1,3}

¹University of Aberdeen, UK

²University of Dammam, Saudi Arabia

³Remedios Limited, Balgownie Technology Centre, UK

The environmental fate and potency of mutagenic compounds is of growing concern. This has necessitated the development and application of rapid assays to screen large numbers of samples for their genotoxic and carcinogenic effects. Despite the development of biosensors for genotoxicity assessment, these have not been calibrated against traditional microbial bioassays. In this study, assays using the SOS-*lux* marked microbial biosensors *E. coli* K12C600 and *E. coli* DPD1718 were refined and optimised to screen selected mutagenic chemicals. The response of the biosensors was compared to the mutagenic response of the traditional *Salmonella* mutagenicity assay. For the chemicals tested (acridine, B[a]A, B[a]P, chrysene, MMC and sodium azide), *E. coli* DPD1718 was consistently more sensitive than *E. coli* K12C600. The biosensors were of comparable sensitivity to the *Salmonella* assay but were more rapid, reproducible and easier to measure. These data validate the adoption of optimised assays making use of microbial biosensors for routine screening of test chemicals.

Biography

Hani Alhadrami is reading for the degree of doctor of philosophy in Microbiology and Biotechnology. He has recently passed his PhD viva with minor corrections and he is expecting to be graduated in September 2013. The PhD is a sharing degree between the University of Aberdeen, United Kingdom and the University of Dammam, Saudi Arabia. The title of the thesis is Development and Applications of *Mutagenicity and Carcinogenicity Bioassays for Human Health Risk Assessment*. Hani was obtained his MSc in Environmental Microbiology (with Commendation) from the University of Aberdeen, UK in 2008. The project title for the master degree was: *Assessing the Potential of Flow Bioreactors to Minimise Human Health and Environmental Impacts of Landfill Leachates Using Microbial Biosensors*. Hani obtained his BSc (Honours) in Medical Technology, King Abdulaziz University, Saudi Arabia. He worked as a co-supervisor for two master students during his PhD period, and taught undergraduate students at both the University of Aberdeen and the University of Dammam. Hani's research interest is development of biosensors for mutagenicity and carcinogenicity assessment. Hani has published three scientific papers in peer-reviewed international journals as well as two book chapters in the applications of biosensors for environmental monitoring.

vicmok@vtc.edu.hk