

Project: The efficacy of hydrogen peroxide as a fumigant on pathogens and vectors handled at The Pirbright Institute (Ref: PIR4)

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Research Group: Health Safety & Biosafety

Project Summary:

The Pirbright Institute (TPI) currently utilises formaldehyde as a fumigant in many applications but fundamentally it is used as the final stage of a thorough decontamination process, usually following cleaning and surface disinfection as a mitigation measure against the release of infectious material as fomites that may pose a threat to human or animal health. Examples include fumigating MBSCs prior to servicing, animal units between studies and fumigation lobbies used to transfer material out of high containment. However, the classification of formaldehyde as a Class 1B carcinogen (presumed carcinogen) and guidance from the HSE in July 2015 recommending “that users [of formaldehyde] start to look into the development of alternative gaseous disinfectants for rooms and equipment, whilst there is time to do so” it would be prudent for TPI to do so. Should formaldehyde be banned as a fumigant in laboratory applications, the Institute will have to utilise alternative methods.

There is a lack of published data and in-house evidence as to the efficacy of hydrogen peroxide as a fumigant on the survival of the pathogens handled at Pirbright, in particular Foot-and-Mouth Disease Virus (FMDV). In addition, the Institute has an emerging programme working on arthropod-borne pathogens, therefore understanding the effectiveness of fumigants to knock-down these vectors would provide a useful control measure.

Details:

The scope of the study would include:

- developing a method to successfully present, recover and quantify virus from different substrates (i.e. stainless steel and paper),
- exposing virus(es), including FMDV, to (vapourised) hydrogen peroxide at different concentrations and exposure times, in parallel with commercial indicators to determine efficacy and correlation,
- running chemical indicators alongside to determine the threshold at which such indicators could be used operationally and,
- exposing arthropod vectors (i.e. mosquitoes) to fumigant to determine the lethality.

Furthermore, such data would be of value to other similar organisations therefore would be worthwhile presenting at a biosafety conference or contribute towards a peer-reviewed paper enhancing the Institutes reputation in evidence-based biosafety control. The student would have a unique opportunity to work in a high containment environment with training in basic virological methods, and may have the opportunity to spend a short training period at the HSE laboratories in Derbyshire.

References for Suggested Reading:

- Comparison of Multiple Systems for Laboratory Whole Room Fumigation. (2011) Bestwick, AJ, Farrant, J, Makison, C, Gawn, J, Frost, G, Crook, B and Pride J *Applied Biosafety* **16** 139-157.