

# Assessing the available evidence of biosecurity risks associated with slurry processing

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**Project overview**

- Synthesise scientific literature detailing the fate of key pathogens through slurry processing methods
- Evidence gathered through systematic literature review, augmented with additional microbiological information where appropriate

- Pathogens considered:** *Salmonella* spp., *Clostridium botulinum*, *Escherichia coli*, *Mycobacterium bovis*, *Mycobacterium avium* subspecies *paratuberculosis*
- Processing methods considered:** Thermophilic and mesophilic anaerobic digestion (AD), slurry storage, slurry separation

	<div>Thermophilic AD</div> <div></div>	<div>Mesophilic AD</div> <div></div>	<div>Storage methods</div> <div></div>	<div>Separation methods</div> <div></div>
<div>Evidence supports kill of these pathogens:</div> <div></div>	<i>Salmonella</i> , <i>E. coli</i> , <i>C. botulinum</i> bacteria, <i>Mycobacterium avium</i> subspecies <i>paratuberculosis</i> (MAP), <i>M. bovis</i>	None	<u>None</u> Some evidence of inactivation/reduction of <i>Salmonella</i> , <i>E. coli</i> , MAP, <i>M. bovis</i> , dependant on storage conditions	None
<div>Evidence suggests potential for survival of:</div> <div></div>	<i>C. botulinum</i> spores	<i>Salmonella</i> , <i>E. coli</i> , MAP, <i>C. botulinum</i> bacteria, <i>C. botulinum</i> spores	<i>C. botulinum</i> spores	<i>Salmonella</i> , <i>E. coli</i> , <i>C. botulinum</i> spores
<div>Residual risk</div> <div></div>	No available evidence for the response of <i>C. botulinum</i> toxins	No available evidence for the response of <i>C. botulinum</i> toxins, or <i>M. bovis</i>	No available evidence for the response of <i>C. botulinum</i> bacteria & toxins	No available evidence for the response of <i>C. botulinum</i> bacteria & toxins, MAP or <i>Mycobacterium bovis</i>
<div>Options for mitigation</div> <div></div>	Validation of processing parameters for pathogen inactivation	Heat treatment prior to digestion, or of the digestate following AD process	Monitoring of temperatures throughout the process to ensure they remain within critical parameters	Heat, UV or ultrasonic treatment applied prior to separation. Liming of separated solids, but will increase ammonia emissions

**Conclusions**

- There is a paucity of scientific literature on which to base our understanding of pathogen survival parameters
- It is therefore difficult to derive practical management advice regarding on-farm biosecurity
- Mitigation measures will involve further costs to producers

**Looking forward**

- There is a clear need for more empirical studies to redress knowledge gaps
- Additional disease surveillance in animals from which feedstocks are derived is recommended
- AFBI colleagues will be investigating survival of *M. bovis* in slurries