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BIOSECURITY APPLICATIONS OF ETHANEDINITRILE (C₂N₂) FUMIGATION

B.J. SMITH, AND R. REUSS

*CSIRO, GPO Box 1700, Canberra, ACT, 2601, Australia
E-mail: Brendan.Smith@csiro.au*

ABSTRACT

Ethanedinitrile (C₂N₂) has been developed and patented as fumigant by CSIRO. C₂N₂ has the potential to replace methyl bromide in a number of applications. In a new project funded by Meat and Livestock Australia (MLA), CSIRO has been exploring the use of C₂N₂ to render feed grain, exotic seeds and plant pathogens non-viable (devitalisation). Devitalisation with C₂N₂ requires an understanding of how a number of technical factors, such as water activity, temperature, fumigation chamber material, variability in the response of different grain varieties and application method, affect fumigation. Initial research has focused on what dose is required to devitalise four target commodities; wheat, maize, sorghum and barley. Exotic weed seeds were then challenged with doses that affect commodities. Our research is also targeting the resilient propagules of several groups of pathogens which are considered potential quarantine risks to Australian Agriculture. Studies to date have shown that C₂N₂ is more effective in devitalising grain than methyl bromide. The efficacy of C₂N₂ is enhanced by higher water activity. While further work is needed to demonstrate successful application at a commercial scale, it is becoming clear that C₂N₂ has the potential to replace methyl bromide in many biosecurity applications.