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Ethanedinitrile (EDN) – a new broad-spectrum fumigant for biosecurity applications

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ABSTRACT

EDN (active ingredient - Ethanedinitrile C₂N₂) is a new broad-spectrum fumigant, highly toxic to insects, nematodes and fungal pathogens of timber and logs. EDN is neither an ozone-depleting substance nor it is a green-house gas. It is currently registered in Australia, South Korea and in the Czech Republic under permit. It is in the process of approval in a number of countries. ISPM-28 for treatment of wood for insect pests is currently in the approval process.

EDN has a number of advantages for post-harvest application. The boiling point of EDN is -21°C and can be applied as a gas, and it is efficacious at low temperature. EDN is a smaller molecule and has a high vapour pressure; hence it can penetrate quickly along and across the grain of the timber and achieve equilibrium quickly in a fumigation environment resulting in higher efficacy. Hence, EDN has potential as a phytosanitary alternative to methyl bromide for treatment of pallets, sawn timber and logs.

Lab and field studies were conducted by the New Zealand PFR on three timber pests – burnt pine longhorn beetle, *Arhopalus fesus*; Black pine bark beetle, *Hylastes ater*; and Golden-haired pine bark beetle, *Hylurgus ligniperda*. Results shown 100 g/m³ for 20 h was efficacious to all timber pests.

Efficacy studies conducted at FPInnovation Canada, on Pinewood nematode (*Bursaphelenchus xylophilus*) and four fungal pathogens (*Heterobasidion annosum*, *Geosmithia morbida*, *Phytophthora ramorum*, and *Ceratocystis fagacearum*) at two dose rates and temperatures between 1 and 24 h exposure shown that EDN was efficacious to all the target nematodes and fungal pathogen.

USDA and the University of Tennessee study on Pinewood nematode in artificially infested wood showed that EDN was highly effective and provided complete mortality at 40 g/m³ for 24 h treatment than other alternative fumigants available.

Keywords: EDN, Pinewood nematode, Timber pests, Timber pathogens, Quarantine treatment