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| Title | Fumigation trials on the application of ethyl formate to wheat, split faba beans and sorghum in small metal bins |
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**Abstract**

Field trials were carried out in Australia with ethyl formate for insect control in wheat (Harden, NSW), split faba beans (*Vicia faba*) (Two Wells, SA) and sorghum (milo) (Warwick, Qld) in unsealed metal bins normally used to store grain on farms. Liquid ethyl formate was applied as a split dose (a first dose of 85 g $t^{-1}$ and after 4 h another dose of 85 g $t^{-1}$) to the top of the grain through a PVC probe (4 cm i.d.×1.2 m). This method of application was chosen to maintain ethyl formate concentrations below the flammability level, reduce vaporisation, maintain an effective concentration of ethyl formate for >10 h and to avoid liquid ethyl formate accumulating at the bottom of the bin. With wheat, the concentration of ethyl formate was maintained at effective levels for about 2 days, all insects at all stages were killed rapidly, and in 5–7 days the residues were reduced to natural levels without aeration. Split faba beans sorbed ethyl formate strongly, the residues persisted longer and complete insect control was achieved. Control was high but not 100% in the sorghum trials. Residues in the sorghum at 10 °C persisted significantly longer than at 20 °C. During application and fumigation, the levels of ethyl formate in the working environment did not exceed a threshold limit value (TLV) of 100 ppm. The field trials have shown that ethyl formate has good potential as a fumigant in unsealed small metal bins as it kills insects rapidly. Residues decreased to natural levels even without aeration after 7 days for wheat and sorghum and 26 days for split faba beans.