

Title Diatomaceous earth enhances the toxicity of garlic, *Allium sativum*, essential oil against stored-product pests

Author Feng-Lian Yang, Guang-Wen Liang, Yi-Juan Xu, Yong-Yue Lu and Ling Zeng

Citation Journal of Stored Products Research, Volume 46, Issue 2, April 2010, Pages 118-123

Keywords Diatomaceous earth; Garlic essential oil; Stored-product pests; Additive effect

Abstract

Laboratory bioassays were carried out to determine the efficacy of garlic, *Allium sativum* L. (Amaryllidaceae), essential oil applied alone or with diatomaceous earth (DE) against adult rice weevils, *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae) and red flour beetles, *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae). The results showed that the combination treatment was significantly more effective than either treatment alone. In addition, the results also showed that the simultaneous application of essential oil plus DE significantly reduced the concentration of essential oil alone required for an effective treatment and the application rate of DE can be reduced when combined with essential oil. Moreover, the activity of the combination treatment lasted longer than that of essential oil alone and the survival of eggs or larvae to adult stage was significantly inhibited in the combined treatments against both species, compared with the use of essential oil alone. Our results suggested that garlic essential oil combined with DE has a strong additive effect, and therefore may have potential as an alternative to synthetic insecticides for the control of insect pests of stored products.