**Title** Laboratory assessment of insecticidal effectiveness of natural zeolite and diatomaceous earth formulations against three stored-product beetle pests

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**Abstract**

The insecticidal effectiveness of two natural zeolite formulations (Minazel plus and Minazel), applied to wheat at selected rates of 0.25, 0.50 and 0.75 g/kg, and a diatomaceous earth formulation (DE) (Protect-It™), applied at the recommended rates of 0.15 g/kg for *Sitophilus oryzae*, 0.20 g/kg for *Rhyzopertha dominica* and 0.30 g/kg for *Tribolium castaneum*, were tested under laboratory conditions (24 ± 1 °C temperature and 45 ± 5% relative humidity). The highest adult mortality was observed after the longest exposure period of 21 days and 7 days of recovery, when all three zeolite dosage rates and the recommended DE dosage caused 97–100% mortality of *S. oryzae* and 94–100% of *T. castaneum*. On the other hand, 100% mortality was not achieved in any test variant involving *R. dominica*; the highest (about 92%) was detected for DE, while 52% and 79% mortality was achieved with the zeolites at the highest rate of 0.75 g/kg. Progeny reduction by >90% was achieved after 21 days of contact of all three beetle pests with DE-treated wheat, while the same level of reduction was achieved for *S. oryzae* and *T. castaenum* only after contact with the highest rate of the zeolite product, Minazel. Thus the two zeolite formulations are comparable to diatomaceous earth in controlling adult *S. oryzae, R. dominica* and *T. castaneum*, but only the Minazel formulation could effectively protect wheat from attack by *S. oryzae* or *T. castaneum*, and only with a higher rate of application than for the DE formulation.