CARBON DIOXIDE GAS SORPTION IN STORED WHEAT

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Controlled and modified atmosphere storages are being used to control insects in stored grain. Elevated carbon dioxide (CO_2) and depleted oxygen (O_2) levels have been found to control many species of stored-product insects. Maintenance of a suitable CO_2 concentration is vital to the effective control of stored-product insects. Previous experiments have indicated that CO_2 gas is sorbed by stored-grain.

Amounts of CO_2 sorbed by 350 g of wheat in 500-mL flasks flushed with a range of CO_2 concentrations were measured in a controlled-temperature chamber. There was a strong linear correlation (R^2=0.98) between the initial concentration of the gas and the concentration after 24 h. Between 60 and 78% of the gas sorption occurred in 4 h.

Both temperature and moisture content were found to influence the amount of gas sorbed. Sorption decreased with increasing temperature from 0 to 30°C. At 20°C, significant differences (a = 0.05) were observed in sorption between 7.5, 14.8, and 18.2% moisture contents (wet basis). The greatest amount of gas was sorbed in wheat of 14.8% m.c. and the least in wheat of 7.5% m.c.