EFFECT OF RELEASE RATE OF CARBON DIOXIDE ON ITS DISTRIBUTION IN CONCRETE SILO

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In Taiwan, pest infestation is the principal factor that adversely affects the quality of stored corn. In order to prevent the damage from pests, an experiment was conducted by applying carbon dioxide to concrete silos containing 600 tons of corn. Liquified carbon dioxide in a tank-truck passed through an evaporator into the silo via the ventilation system at the base. The gas moved upward through the grain mass as the air was expelled from the top of the silo. Throughout the testing period, the concentration of carbon dioxide in the silo was measured by a carbon dioxide analyzer.

The distribution of carbon dioxide in a silo for the first 48 h was greatly affected by the rate of release. At between 1.3 - 1.5 m^3/min. over 90% carbon dioxide on the surface of corn mass was obtained at 30 h. Nearer to the base, the concentration of carbon dioxide increased.

The average number of live insects per 800 ml of corn in the check silo was 7.0 at the start: after 41 days the number increased to 16.7. In the carbon dioxide treated silo, the number was 10.6 at the start, and 0.2 at the end. Free fatty acid of corn in check silo decreased from 13.1 to 19.2 mg KOH/(g of corn oil): in treated silo, it only increased from 17.6 to 20.2. The temperature of the corn in carbon dioxide treated silo was lower than that at the corresponding points in the check silo.