

One-page Summary for Publication and Research

Integrated Innovation and Application of Controlled Nitrogen for Grain Storage, nicknamed GRAIN GUARDIAN, is self-developed by China Grain Reserves Group LTD. Company (SINOGRAIN GROUP), and applied in large numbers of grain depots in China. GRAIN GUARDIAN can automatically fill high concentration nitrogen into storage and reduce oxygen in low level that can effectively kill all stages of insects in enclosure, and postpone grain quality change. It has been proved that GRAIN GUARDIAN is an effective alternative to phosphine fumigation which is a current method to control insects around the world, but the increasing insect-resistance must be faced. Along with Total Quality Management (TQM), SINOGRAIN GROUP has utilized the quality management tools such as PDCA and DOE and invested 70 million US dollars to carry out a series of research and development, which includes control low oxygen on insect killing, development on high ability nitrogen generator system with pressure swing adsorption (PSA), field trial with high concentration nitrogen in stored grain, research and test air-tight materials on warehouse sealing, measurement and improvement on air tightness methods, improvement on nitrogen concentration monitoring and maintaining, development on automatic control system of nitrogen generating, and integrated application in large-scale of grain depots. GRAIN GUARDIAN is praised by world-renowned experts as a technological revolution of grain storage in the world. So far, GRAIN GUARDIAN has been promoted by SINOGRAIN GROUP to over 12 million tons of grain capacity in its own enterprises around China, and been extended to other enterprises in China for more than 8 million tons of grain storage. The estimated value involved in stored grain may be more than 7 billion US dollars. The implementation of GRAIN GUARDIAN has significantly reduced grain loss, and is closely conformed to the UN sustainability development high priority goals '2 Zero Hunger'.

