

## **Developments in solar drying using forced ventilation and solar regenerated desiccant materials**

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### **Abstract**

In many countries, grains are naturally sun dried in the field, resulting in large-scale spoilage. Purpose-built solar grain dryers are being introduced with some success, but to be effective, their performance must be carefully controlled to prevent cracking of grains, fungal growth and aflatoxin production during storage. This paper describes some of the performance aspects of an autonomous solar desiccant maize dryer developed for village use in Kenya. Since most commercial desiccants are expensive, a low cost solid desiccant was fabricated from bentonite clay and calcium chloride materials. This desiccant is capable of regeneration at 45°C, has high moisture sorption of 45% (dwb), significantly extends the drying process at night and reduces aflatoxin contamination of the grain. Laboratory and field testing took place to determine the drying performance and allow conclusions to be drawn. This showed the prototype dryer had the capability of drying 90kg of fresh maize from 38% (dwb) to 15% (dwb) within 24 hours.

**Keywords: Solar Drying; Bentonite-CaCl<sub>2</sub> Desiccants; Solar Desiccant Regeneration; Crop Drying; Aflatoxin; Transparent Insulation Material**