

Technical Reports

Low-cost disinfestation of food grains

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Health and environmental concerns, as well as issues of cost and availability, mean that small-scale producers do not use chemical treatments and fumigation to control insects and other pests in stored grains. Alternative cheap and fast control methods are to expose grains to low oxygen/high carbon dioxide concentrations or to expose them to high temperatures. The simplest way to reduce oxygen levels and increase carbon dioxide levels is to place a burning candle in an airtight grain container or store after it has been filled with grain, and immediately before it is sealed. The flame continues burning until it has exhausted the supply of oxygen, by which time the level of carbon dioxide has increased in the store to a level that is lethal to insects and other pests. It is essential that the container or store is airtight (e.g. a 200-litre oil drum or a traditional construction using baked clay).

Exposure of grains to temperatures above 45°C effectively kills insects in all developmental stages within a few hours: the higher the temperature, the

faster that mortality occurs. An acceptable temperature is around 55°C with an exposure time of 1 hour to achieve total pest mortality. This can be achieved in tropical climates using 'solarisation', in which the heat from the sun is used to raise the temperature of the grain. Two methods involve either placing grain into a large black plastic bag so that the grain depth is around 10 cm when the bag is laid flat in direct sunlight, or by using a solar tent, similar to a solar dryer. The solar radiation increases the temperature of the black plastic material and the heat is contained within the bag or tent. This increases the temperature of the enclosed air and the grain surfaces.

Further information

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Traditional grain store that can be made airtight.