

Title Detection techniques for stored-product insects in grain
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Abstract

Cereal grains are the major source of food for humans and most domesticated animals. In many developing countries, overall post-harvest losses of cereals and legumes of about 10–15% are fairly common. Consumption of cereals and legumes by pests such as insects during storage and microbial spoilage or contamination may make these totally inedible. On farms, manual samples, traps, and probes have been used to determine the presence of insects. Manual inspection, sieving, cracking-floatation and Berlese funnels are being used at present to detect insects in grain handling facilities. These methods are not efficient and are time consuming. Acoustic detection, carbon dioxide measurement, uric acid measurement, near-infrared spectroscopy, and soft X-ray method have the potential for use at the industry level to detect insects in grain samples as their usefulness has been demonstrated in the research laboratories. Researchers have developed image analysis programs to automatically scan X-ray images to detect insect infestations. The use of near-infrared (NIR) spectroscopy has been investigated to detect hidden insects in wheat kernels. X-ray and NIR spectroscopy methods are cost prohibitive and current NIR instrumentation requires complex operating procedures and calibrations. The advantages and limitations of these insect detection methods are evaluated and the advantages of one technique over the other are described in this paper.