Feasibility Study of X-ray Computed Tomography and Magnetic Resonance Imaging to Detect Pest Infestation in Agricultural Products

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Non-destructive testing (NDT) technology is one of the widely used inspection methods for agricultural products. Compared with the conventional inspection method, the sample preparation process is relatively straightforward, and there is a great advantage that the sample is not damaged. Furthermore, One of the main purposes of NDT technology is marketability evaluation. Information directly related to marketability, such as sugar content and acidity, can be easily known through NDT technology. In particular, NDT technology is used to investigate the internal structure of agricultural products damaged by pests. The introduction of foreign pests during the import process can cause great damage to the agricultural environment. Until now, pests damaged agricultural products have been difficult to classify through external inspection methods. However, NDT technology is very advantageous in these inspection situations. In this study, live weevil and fruit fly larva were inserted into mango, tangerine, grape, cherry, blueberry, and pumpkin using a drill. Subsequently, pests damaged agricultural products were inspected by X-ray computed tomography (X-ray CT) and magnetic resonance imaging (MRI). Using state-of-the-art NDT technology, we confirmed the feasibility of identifying traces of pest infestation.
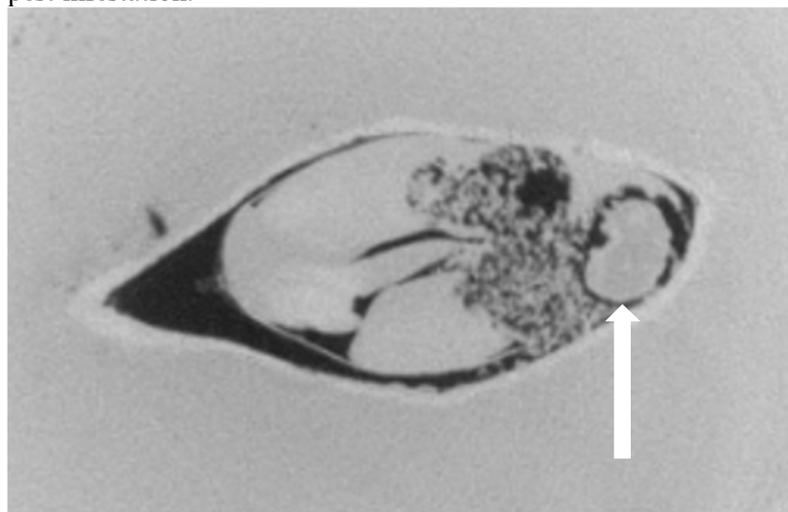
Fig. 1. Mango X-ray micro CT image. The white arrow indicates a Sternochetus mangiferae.