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Soft X-Ray Image Analysis to Detect Foreign Materials in Foods

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Soft X-ray images were recorded using a super metal image intensifier camera to detect foreign materials in foods, and were analyzed by a computer with an image processor. The basic characteristics of the soft X-ray image were determined using a vinyl chloride and acrylic plate. Steel screws, aluminum rivets, staples, aluminum foil, glass and plastic fragments in a loaf of bread and a hamburger steak were identified, as well as a grasshopper under cabbage leaves. In the original soft X-ray image, it was possible to detect metallic and non-metallic foreign materials more than 1mm in size except for plastic fragments. However, as the original images of the bread and hamburger steak were not clear, it was not easy to detect such foreign materials visually. The unsharped masking treatment of a soft X-ray image was used to detect foreign materials in foods, and various image treatments were applied to detect the grasshopper under the cabbage leaves. The method is believed to be widely applicable for identifying the various kinds of foreign materials and foods.

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