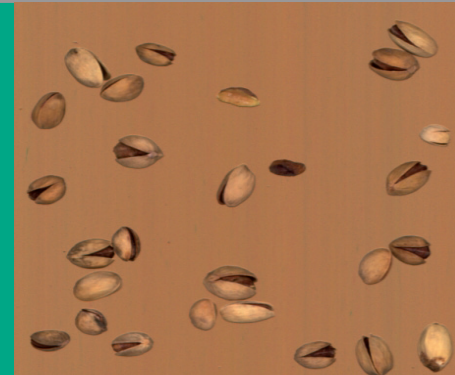




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FoodControl For a better Food Quality

**Fraunhofer Institute of Optronics,
System Technologies and Image
Exploitation IOSB**

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Tea e.g. promises enjoyment and well-being; this is confirmed by an annual consumption of approximately 17000 t/year in Germany. To ensure this enjoyment, it must be processed to meet the highest quality requirements. An important quality characteristic is the purity of the tea, which is assured by the removal of all foreign matter. A multitude of foreign particles which find their way into the tea during its long journey from the producer in far-away countries to the processor must be removed.

But even with modern processing technology, it is not possible to remove every last foreign particle from the products. The new opto-electronic sorter **FoodControl**, however, reliably removes all foreign matter from diversity of dried foods.

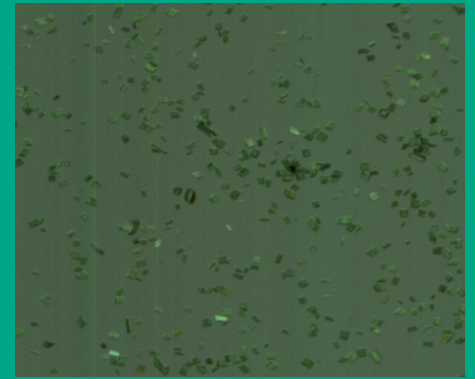
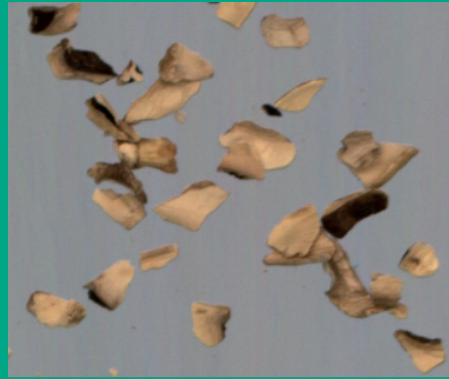
In cooperation with the Salus-Haus tea-processing company in Bruckmühl near Munich, a prototype was developed which has been in operation successfully since June of 2005.

Further sorters were delivered from then on to tea- and dried vegetables processing companies.

Additional experiments with dried vegetables and dried fruits proved equally successful. Thus, it is expected that the industrial application of the **FoodControl** will be extended for the corresponding products.

Process Description

A vibratory conveyor guarantees an even distribution of the dried foods which then flows onto a conveyor belt traveling at a rate of 2.9 m/s and is then released, well-separated, at the end of the belt. Directly behind the release roller, which is 700 mm wide, a continuous image is taken by a high-resolution color line-scan camera with over 4000 pixels.



The resolution achieved in this way corresponds to approx. 0.18 x 0.18 mm²/pixels or 3000 pixels/cm².

The background image consists of a self-adapting illumination (Chameleon), which takes on the color of the product.

The image interpretation, using 8 classifiers, guarantees the reliable identification of foreign particles.

A classifier combines

- a discrimination of 2.1 Mio. colors,
- a surface and length analysis as well as
- up to 4 morphological operations.

A high speed valve block with 256 nozzles ejects the detected foreign particles from the product stream. Depending on the product, the amount of unavoidable product loss comes to no more than 0.5 - 3%.



Advantages

- Continuous quality control and sorting
- Quality is kept constant
- Maximal use of color space due to chameleon
- Integration into process due to link to SPC

Specifications (exemplary)

Resolution: approx. 0.18 x 0.18 mm²
 Belt Speed: 2.9 m/s
 High Speed Valves: 128 with double nozzles
 Unavoidable Product Loss: 0.5 - 3%
 Illumination: High Power LEDs
 Color Resolution: 2.1 Mio
 Geometry: Surface and length analysis
 Operators: Morphology

Application

- Tea
- Herbs
- Fungus
- Fruit
- Cereal