



IRIS VA 400 > Visual Analyzer

Advanced Color & Shape Analysis



- > Control of visual conformity
- > Stability & shelf life monitoring through appearance
- > Visual benchmarking of competitive products
- > Identification of out-of-specification ingredients
- > Analysis of consumer visual likings



Working Principle

■ Controlled and consistent image acquisition system

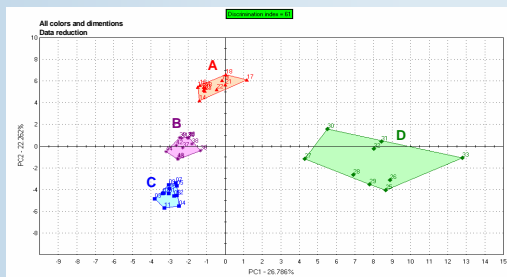
- ▶ Automated color calibration with a certified color checker
- ▶ Picture acquisition of samples with a CMOS camera in a closed light cabin
- ▶ Pre-processing of the picture to remove the background
- ▶ Detection of color and shape parameters of the product surface: Colors surface, primitives, circularity, aspect ratio, Hu moments, etc.



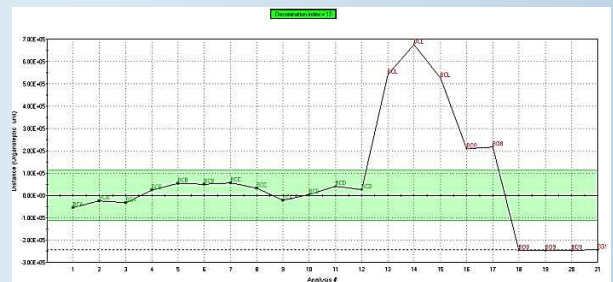
■ Powerful data processing software

Multivariate statistics processing can be applied to color & shape parameters for an easier data interpretation through:

- ▶ Qualitative models: Principal Component Analysis (PCA), Discriminant Factorial Analysis (DFA)
- ▶ Quality Control Charts: Statistical Quality Control (SQC)
- ▶ Quantitative models: Partial Least Square (PLS)
- ▶ Shelf life models
- ▶ Color clustering



Qualitative product mapping (Principal Component Analysis) for competition benchmarking purposes



Quality Control Card (Statistical Quality Control) for checking batch to batch consistency

Main Features and Benefits

■ Objective, reliable assessment

- ▶ Reproducible measurement, controlled conditions
- ▶ Product traceability through data storage

■ In-depth analysis

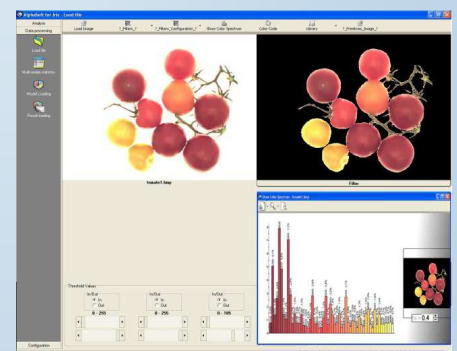
- ▶ Color & shape in one acquisition
- ▶ Whole product analyzed as seen by the consumer (no averaged value)
- ▶ Possible focus on selected portions

■ Easy and fast method

- ▶ Non destructive, no sample preparation
- ▶ No limitation on sample size, several samples in one analysis

■ Powerful and open solution

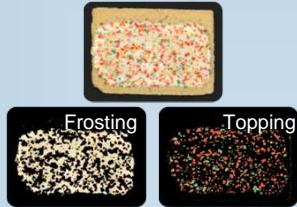
- ▶ Suitable for non-uniform surfaces and irregular shapes
- ▶ Can be correlated with human assessment
- ▶ Can be combined with E-Nose & E-Tongue for multi-sensory evaluation



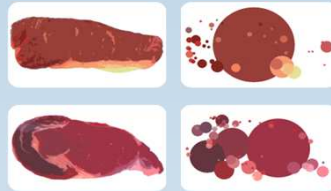
> A Wide Range of Applications

Visual Characterization of Complex Products

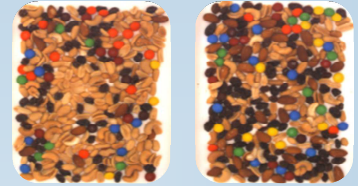
- ▶ Proportion (surface, weight, number) and size distribution of visible elements: Qualitative and quantitative analysis of vegetable mixes, ready-made meals, ingredients blends
- ▶ Surface characterization (area coverage, color, thickness) of coatings, toppings or frosting
- ▶ Assessment of qualitative criteria such as lean/fat ratio in meat



Evaluation of biscuits frosting and topping: surface, thickness



Analysis of beef meat: color, lean/fat ratio quantification and distribution



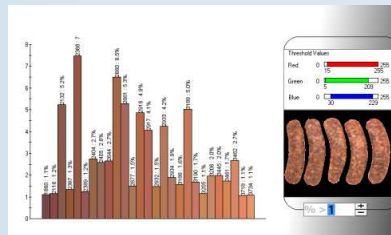
Appetizers: quantification of ingredients proportions

Competition Benchmarking & Consumer Palatability

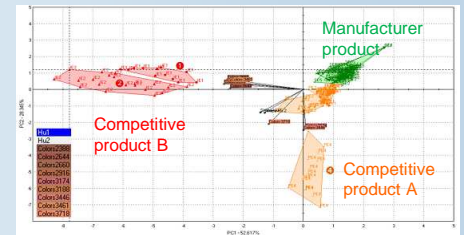
- ▶ Visual comparison with target products or gold standards
- ▶ Relation with consumer likings to assess visual parameters that impact palatability



Three brands of sausages



Color spectrum of sausages of a same brand



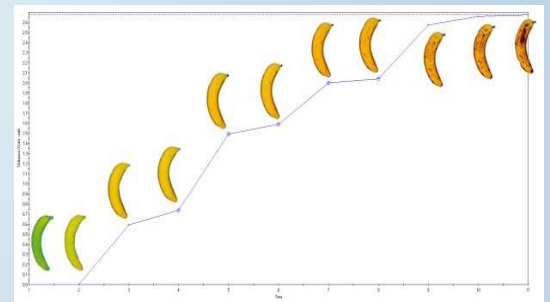
Visual benchmarking map of the sausages

Shelf-life & Freshness Control

- ▶ Evaluation of aspect change (color, shape) over time or under different storage conditions



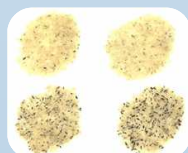
Different bananas varieties



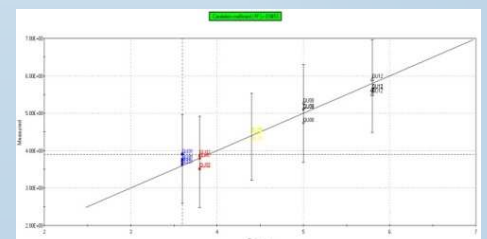
Follow-up of ripening stages

Characterization of defects & foreign products

- ▶ Detection and quantification of foreign products or out-of-specification ingredients
- ▶ Color clustering linked with a flaw: measurement of burned surface or spots, fat blooming in chocolate



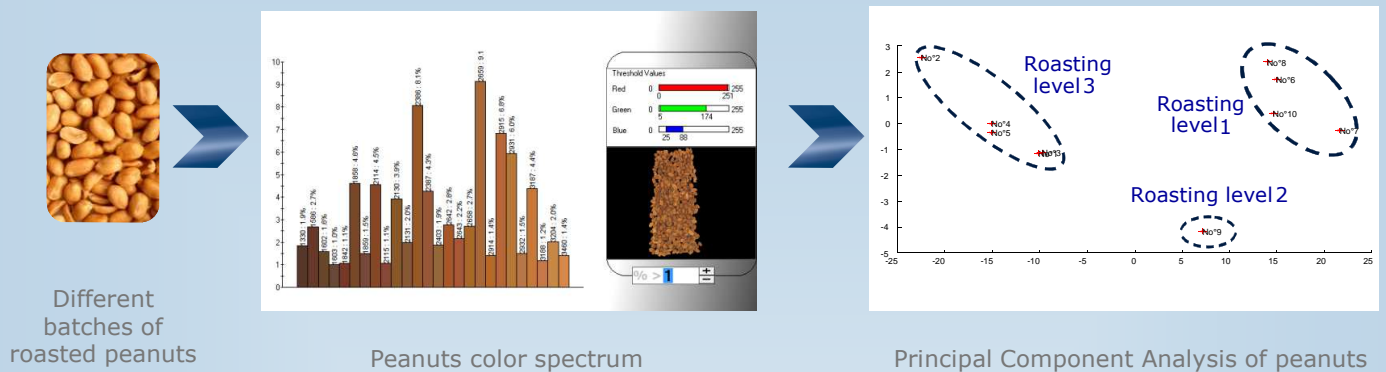
Rice batches



Model for quantifying out-of-specification grains in rice

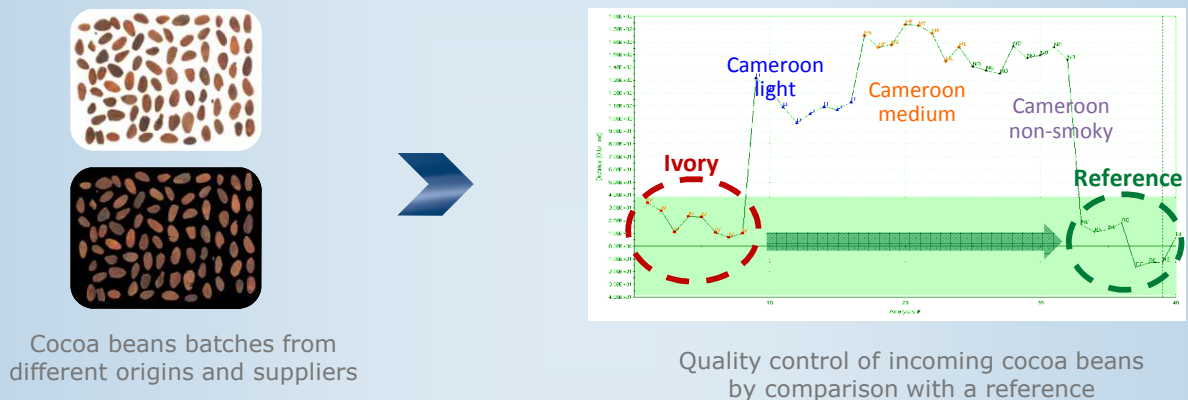
Process Monitoring

- ▶ Evaluation of process impact on product aspect (cooking, roasting, cutting, etc.)



Quality Control & Batch to Batch Consistency Testing

- ▶ Visual assessment against an agreed standard and within accepted tolerances
- ▶ Comparison of products manufactured from different production plants or at different times



Specifications

- ▶ Closable light chamber (420 x 560 x 380 mm)
- ▶ Surface available for sample testing: 270 x 390 mm
- ▶ Controlled white light (5000 K), LED technology
- ▶ Software-controlled CMOS camera - 16 million colors
- ▶ Automatic calibration scale with standardized color scale
- ▶ 110 / 220 V - 50 / 60 Hz
- ▶ AlphaSoft software for system monitoring, data acquisition and multivariate statistics processing



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