New Technology for the sensory evaluation of olive oil

The electronic aroma sensing is a new technology that is being increasingly applied within the food industry as a means of quality assessment based on aroma characterisation.

The FOX 4000 system, manufactured by Alpha MOS, France, uses an 6, 12, ore 18 element metal oxide sensor array to detect the volatile components generated by the sample.

Benefits of this technology:

Conform or non conform to specifications
Odor intensity by scale (1, 2, 3)
Check origine
Detection of contamination, adulteration
Conformity to a reference quality

Data processing:

Identify differences between the fingerprints
Build a model
Predict the quality of unknown samples
Visualization of the results on a 2 D graph
Routine analysis from a data base

Statistical methods:

SIMCA	soft independent modelling class analogy
DFA	discriminant function analysis
PCA	principle component analysis
SQC	statistical quality control
PLS	partial least square

Application samples:

Identification from the source, the country ore the product

Different oilve oils samples were obtained, originating from Australia, Italy, Spain and Greece. All samples were measured under the same experimental conditions. An aroma map has been generated for the samples by plotting the principle component analysis. This map shows that the technique has been able to discriminate significant differences between the majority of the samples. It is also no problem to discriminate different typs of oil. You also discriminate differences of olive oil in the same country. For example Italy.

Check the quality against small quantitys of side products

The PCA plot allows to see that the different oil samples are well discriminated expect for the oil with 0.1ppm hexan. The threshold of detection is between 0,1 and 1,0 ppm of hexan in the oil.

Quality control of the production or the producer

This results are presented on a SPC graph. (Statistical Process Control). The yellow area represents the acceptability level. Until the unknown samples analysis (represented by a dot) is included in this yellow area the unknown sample is similar to the reference (passed sample). If the sample is out of this yellow range the sample is different from the reference (faild sample). On the Y axis the analysis number is reported.

Technical performances

Correlation with Sensory panel
Simple and Easy to use for the operators
Speed of analysis: 5 min. per analysis
Efficiency of the conformity test
Statistical control of the product and production variability

Industrial benefits

Quality control tools for monitoring the product
Conformity of the product compared to the reference
Guaranty of the production stability
Decreasing of the non conformity
Available 24 hours a day

Conclusion:

Electronic Aroma Sensing offers the olive oil industry a powerfull new technology for the evaluation of oilquality and characteritics on the basis of the aroma profil. By the use of reference oils and known quality standarts it may be possible to substitute the traditional evaluation methods with this technology, especially where a rapid, easy to use objectiv method is required.

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