Cyranose® 320

Portable Handheld Electronic Nose

Sensigent
Intelligent Sensing Solutions

Back by Popular Demand

In fact, it never left.

The **Cyranose®** is the world's best-selling handheld electronic nose instrument. It's available exclusively from Sensigent along with our new **NoseChip™** nanosensor arrays and our advanced **CDAnalysis™** chemometrics software with new signal processing features and machine learning classification algorithms.

These innovations give the **Cyranose®** ***more capability*** for your ***most challenging*** sensing needs all for an ***affordable price***.

Contact Sensigent to get your **Cyranose®** today!

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Cyranose® 320

Portable Handheld Electronic Nose

The terms **smellprint™** and **eNose®** were invented for the **Cyranose®** to represent the ability of sensor array devices to **measure and visualize** complex chemical mixtures in simple, easy to interpret 2-D and 3-D graphical representations. What does a blueberry muffin smell like? Check its **smellprint™**. How do you measure it? Use our **eNose®**.

There are many innovations in the **Cyranose®**, the world's first and best-selling handheld electronic nose instrument. The **Cyranose®** is powered by patented **NoseChip™** electronic sensor array technology and **PCnose™** software to provide an intuitive, easy-to-use sensing instrument for on-site inspection and analysis. It is used by manufacturing, quality and R&D professionals worldwide for **rapid and accurate** determinations of the aroma quality and chemical profile associated with products and materials.

Each **Cyranose®** is customized to your sensing needs. Multiple applications are programmed and stored as individual methods. Non-expert users simply select the appropriate method by name and begin making measurements. Results are displayed with **user-defined**, **simple**, **actionable messages**, such as "accept", "reject", or "Formula 15" with a **5-star quality rating**. Results are stored in databases for easy access and reporting.

Hundreds of **industrial and medical research papers** have been published by **Cyranose®** customers on a variety of topics. These range from detecting contamination in meat and poultry, spoilage of produce and dairy products, off-odors in packaging and retail products, odors in the environment, to screening and diagnosis of diseases like COPD, asthma, lung cancer and tuberculosis by measurement of human breath. New sensing applications for industry and medicine are being investigated by **Cyranose®** users worldwide. Check with Sensigent for the latest details and publications.

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NoseChip™

Nanosensors on Multi−Pixel Arrays

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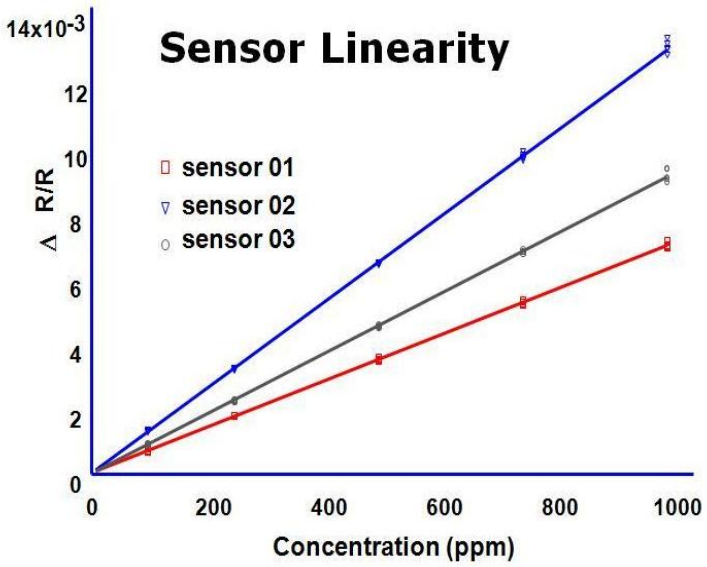
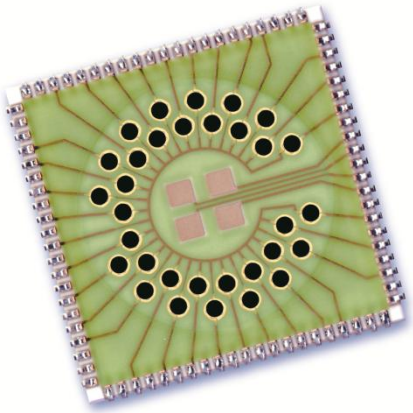
Your measurements require sensors that are proven sensitive, rugged, reliable and responsive to a wide range of chemicals from **volatiles to semivolatiles**. Our **proprietary thin-film nanocomposite sensors** have been in continuous commercial production for over 15 years. **NoseChip™** nanocomposites are highly-reversible vapor absorbers with compositions selected from application of rigorous theory (QSAR, LSER) and years of empirical testing. Nanocomposite sensors are physically and electrically stable and robust **over millions of measurement cycles** as proven in high-speed (>1 Hz) measurements over many years of continuous (24/7/365) operation for industrial process monitoring. This includes our **eNose® Aqua** sensor products for the worldwide beverage industry.

Nanocomposite Response

Nanocomposite sensors exhibit **linear response** over wide ranges of vapor concentration. Limits of detection range from parts-per-billion (ppb) for semivolatiles to parts-per-million (ppm) for volatiles and some gases. Important as well, our nanocomposites don't saturate or poison at higher levels, measuring to parts-per-thousand (ppth) concentrations and above.



Custom NoseChip™ Sensor Modules



Custom nanosensors are available on plug & play modules for the **Cyranose®** to provide enhanced sensitivity and selectivity for detection of gases and vapors. Nanosensors provide **diverse chemical interactions** including reversible electron transfer and proton transfer reactions for measurement of gases, acid, base, oxidizers and many other compounds. Contact Sensigent for the latest nanosensor material offerings including chemically-modified single-wall carbon nanotubes, metallic nanoparticles and conductive composites.

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PCnose™

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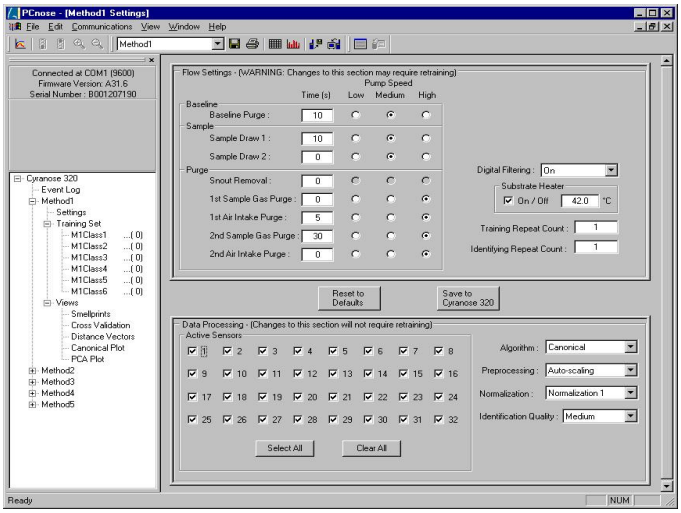
Data Recording, Visualization and Exploration Software

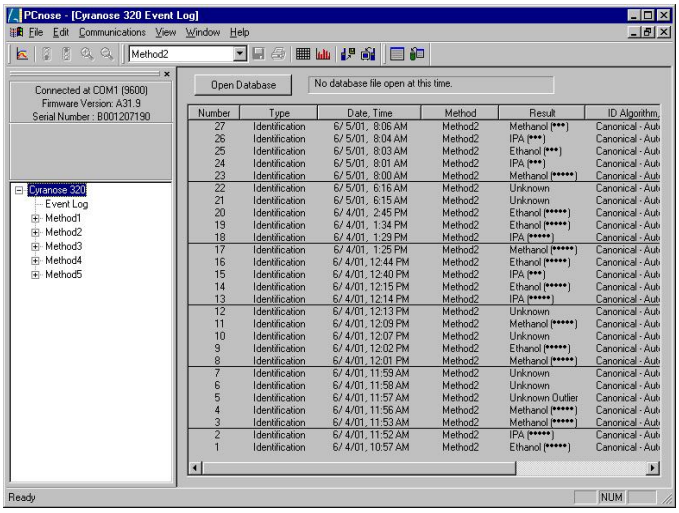
PCnose™ provides visually-rich automatic plotting of the real-time sensor data and analysis results along with complete control over the instrument settings.

Instrument Settings Page



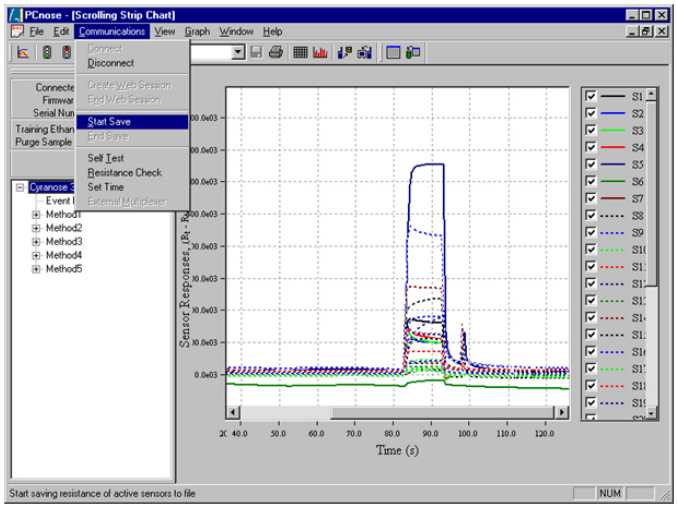
Operators have complete control over the flow rates and sampling durations, selection of chemical sensors (from 1 to 32), and data processing and analysis parameters.

Data Log and Event Log



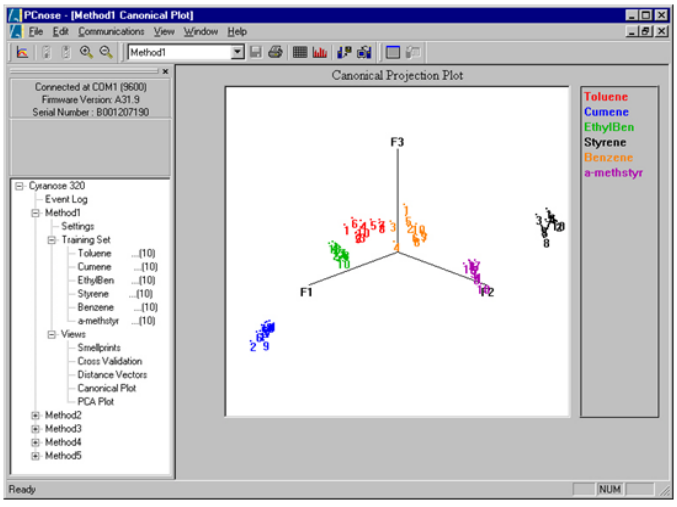
Measurements are stored with the analysis methods. On-board databases (logs) record the analysis result, quality rating, date and time stamp for every measurement.

Real-Time Sensor Response



The scrolling strip chart provides visualization of the sensor response for all 32 chemical sensors for optimization of air sampling parameters and instrument settings.

Results Visualization



Discrimination results are visualized in 2D and 3D displays of the **smellprints™**, distance vectors, PCA and CDA scores for simple and complex data sets.

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CDAnalysis™

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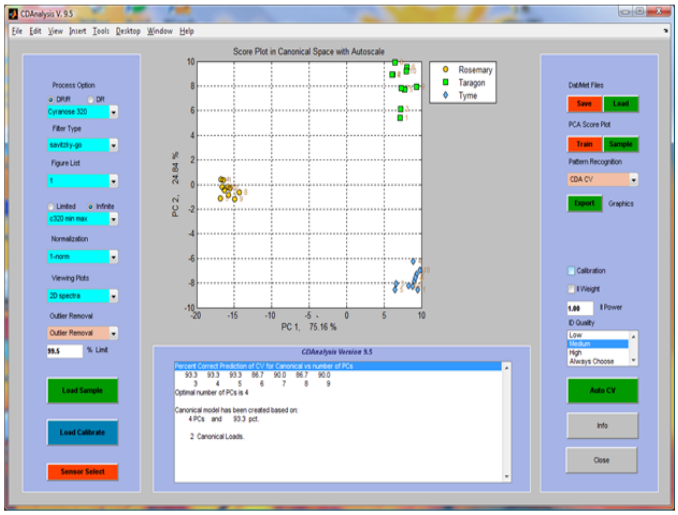
Chemometric Data Analysis and Experimentation Software

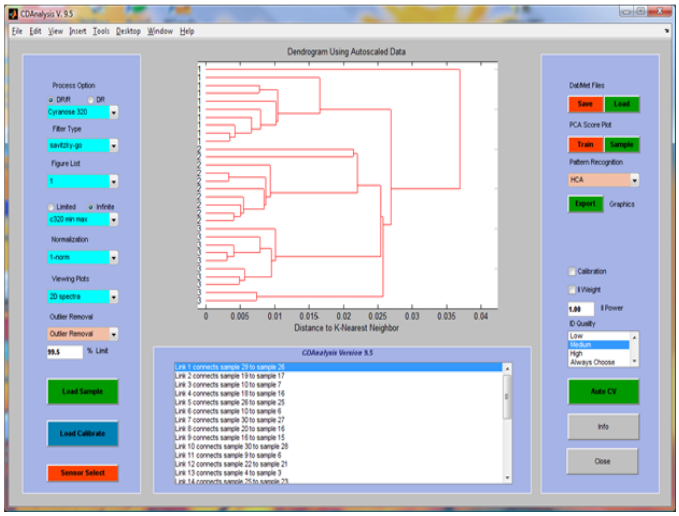
CDAnalysis™ provides more classification algorithms like HCA, SIMCA, SVM and data analysis tools for feature extraction and measurement optimization.

CDAnalysis™ User Interface



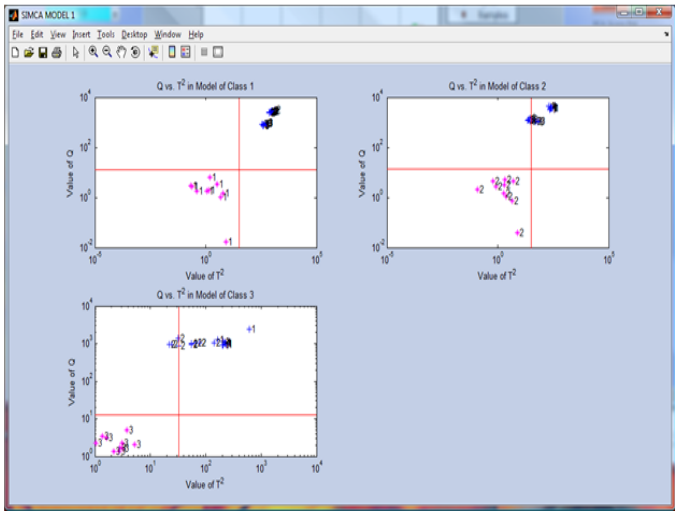
The user interface provides complete control over data processing (left-side) and data analysis (right-side) options to optimize your measurements and improve results.

Hierarchical Cluster Analysis (HCA)



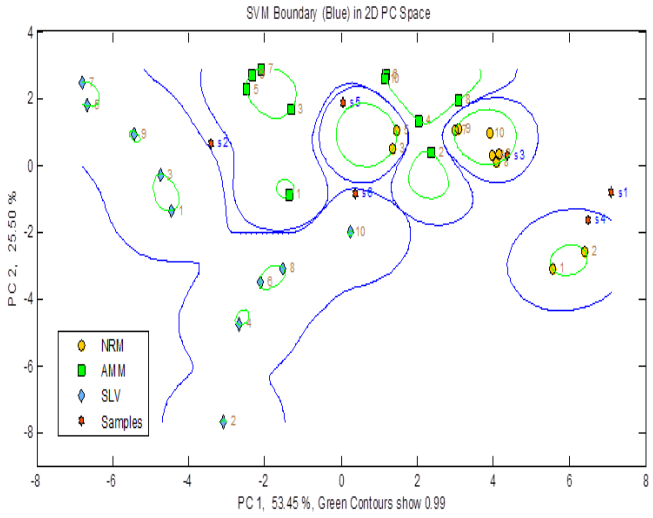
Cluster analysis provides insight into the chemical relationships between sample classes derived from the measurements of the **NoseChip™** sensor array.

Soft Independent Modeling of Class Analogy (SIMCA)



SIMCA is a supervised classification method for sensor data using Q and T^2 statistics to construct boundaries for class identification.

Support Vector Machine (SVM) and Neural Net (NN) Algorithms



SVM is a non-linear machine learning approach for analysis of complex data sets not easily treated by linear classification methods.

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Cyranose® Results

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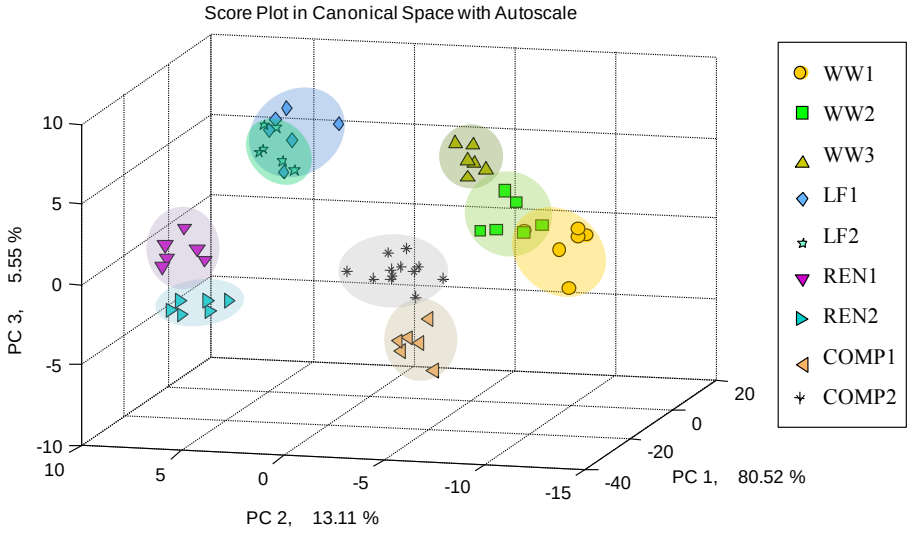
Discrimination Analysis

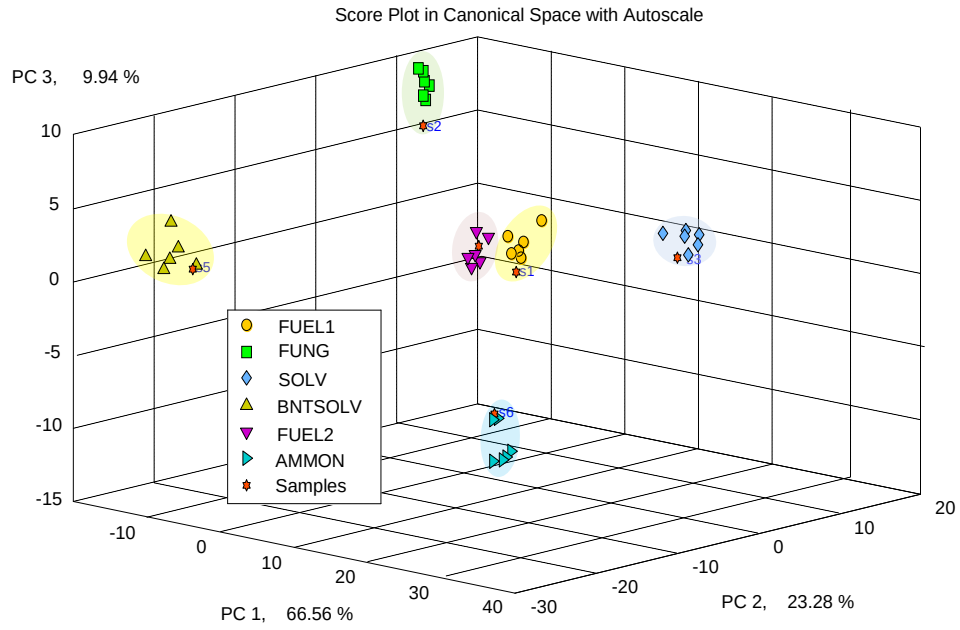
Thousands of discrimination analyses have been performed with the **Cyranose®** to assess product quality (freshness, aging, consistency, contamination) by headspace analysis and to inspect formulations and raw materials. Statistical measures, such as M-distance, Q residual, Hotelling T^2, goodness value GV, combined probability CP and others, provide the basis for **user-defined acceptance thresholds** and process control limits. Here are two examples.

Environmental Odor Analysis – Air Samples



Air samples collected from outdoor sources can be distinguished by the **type of odor**, such as, wastewater treatment, composting, landfills and rendering operations. This is due to the difference in chemical composition of the odors measured with the **NoseChip™** sensor array.

Engine Performance Analysis – Fuel Samples



Breakdown, aging and contamination of high performance materials (fuels, oils coolants) can be detected from headspace analysis. Identification of the **type of defect**, due to contamination from water or solvents, the mixing of fluids, or overheating, can be used for root cause analysis to increase operation lifetimes and reduce cost.

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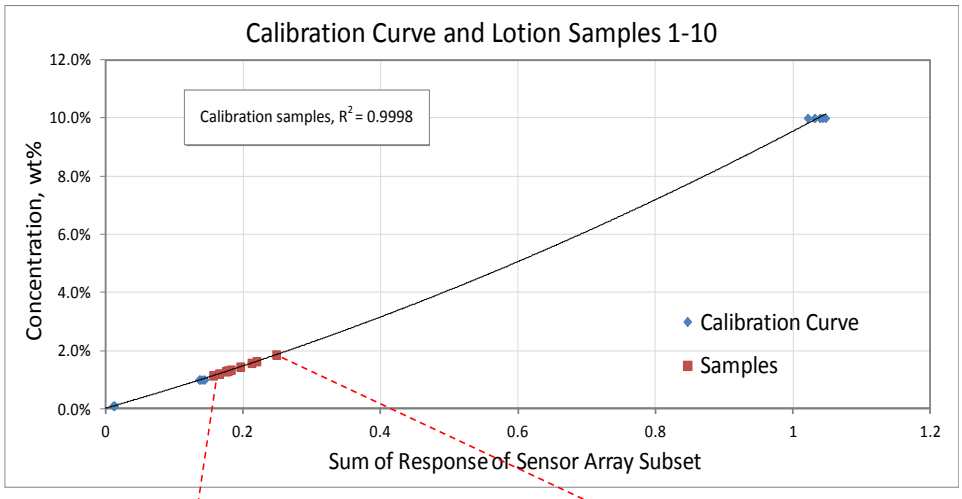
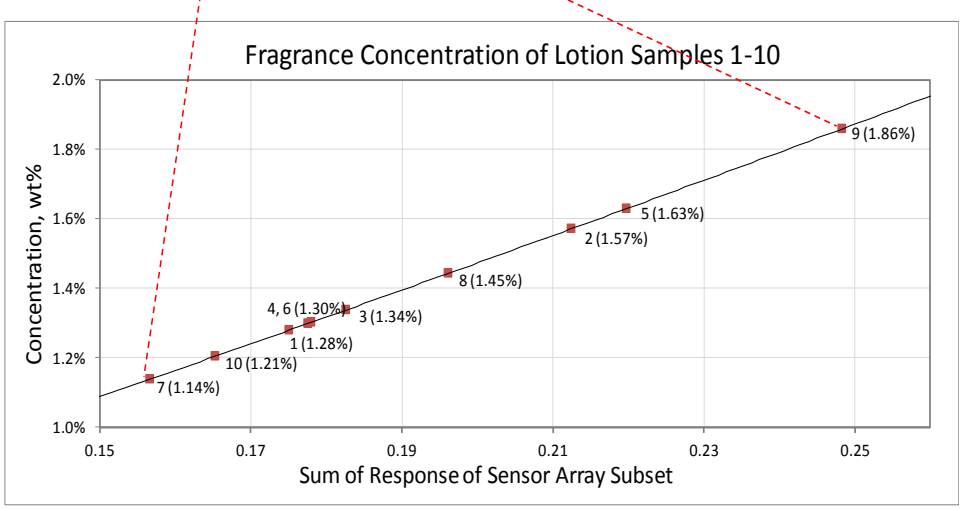
Cyranose® Results

Quantitative Analysis

The **Cyranose®** is also used for quantitative measurement of headspace levels for perfume and fragrance loadings, freshness/aging of scented products, and many other types of products. Analyses can take **just a few seconds** for a quick "sniff" test to screen samples and determine levels as high, medium or low. Calibrations can use a subset of sensors or all the **NoseChip™** sensors. Accurate results are obtained using a consistent headspace sampling methodology and a calibration curve developed from the sensor response to a standard. Here's an example.

Headspace Analysis – Lotion Samples





Company A adds 2 wt% fragrance to a lotion product. Their customer claimed they could not smell the fragrance and rejected a batch after delivery. For calibration, the fragrance was added at three levels 0.1, 1 and 10 wt% to an unscented lotion base (*top; blue symbols*). A total of 10 customer samples were tested as unknowns with the **Cyranose®**.

The estimated loading from the calibration curve (*bottom; red symbols*) ranged from 1.1 to 1.9% confirming the lotion contained the proper amount of fragrance.

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Peer−Reviewed Research

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Select 2014 - 2015 Cyranose® Research Publications

The list is too long, **over 200 in total**, to include all of the 2014-2015 research papers or those from prior years. See our website for the growing list of industrial and medical research papers from the worldwide community of **Cyranose®** users.

- Sex and smoking status effects on the early detection of early lung cancer in high-risk smokers using an electronic nose
- Altered exhaled biomarker profiles in children during and after rhinovirus-induced wheeze
- Fusion technique for honey purity estimation using artificial neural network
- Electronic nose and its application to microbiological food spoilage screening
- Approaches to subspecies diagnostics in sagebrush (Artemisia tridentata) using Electronic Nose
- Ecological Genetics of Big Sagebrush: Genetic Structure and Climate-based Seed Zone Mapping
- Development of a Portable Electronic Nose for Detection of Cotton Damaged by Nezara viridula
- Faecal gas analysis by electronic nose as novel, non-invasive method for assessment of active and quiescent paediatric inflammatory bowel disease: Proof of principle study
- Exhaled breath analysis using electronic nose in cystic fibrosis and primary ciliary dyskinesia patients with chronic pulmonary infections
- Identification of airway bacterial colonization by an electronic nose in Chronic Obstructive Pulmonary Disease
- Exhaled breath condensate pH decreases during exercise-induced bronchoconstriction
- Exhaled breath profiling for diagnosing acute respiratory distress syndrome
- The scent of colorectal cancer: Detection by volatile organic compound analysis
- Identification of three subtypes of non-atopic asthma using electronic nose exhaled breath analysis
- Combined sputum hypermethylation and eNose analysis for lung cancer diagnosis
- Evening and morning exhaled volatile compound patterns are different in obstructive sleep apnoea
- Lack of heritability of exhaled volatile compound pattern: An electronic nose twin study
- Detection of bloodstream infections and prediction of bronchopulmonary dysplasia in preterm neonates
- Comparison of various pattern recognition techniques based on e-nose for identifying bacterial species in diabetic wound infections
- Multivariate prediction model for early detection and classification of bacterial species in diabetic foot ulcers
- Expiratory flow rate, breath hold and dead space - electronic nose ability to detect lung cancer
- Analysis of airborne biomarkers for point-of care diagnostics
- Chronic obstructive pulmonary disease in the elderly
- Electronic nose can discriminate colorectal carcinoma and advanced adenomas by fecal volatile biomarker analysis: Proof of principle study
- Detection of volatile compounds in urine using an electronic nose instrument
- Diagnosis of bacteria for diabetic foot infection using electronic nose technology
- Breath testing as a method for detecting lung cancer
- The detection of foodborne bacteria on beef: The application of the electronic nose
- An application of electronic nose technology for diagnosis of Alzheimer's disease

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