

The Electronic Nose

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Electronic nose is a new developed technology used to detect and to visualize flavors and odor. It is also known as excites sensory panelists because it works more like the human nose. The electronic nose is a valuable tool that creating it takes more than 10 years of research performed at Warwick and Southampton Universities in the United Kingdom and Toulouse University in France.

This instrument is very efficient that in a few minutes it delivered objective, reproducible aroma discrimination with sensitivity comparable to the human nose for most functions. Electronic nose uses an array of sensors that responds to volatile and semi-volatile organic chemical in food material, similar to the way the human nose works. Electronic nose used a sensors and a simulated brain consisting of a computer and sophisticated software. The primary functions of this instrument are: data acquisition – detection of volatile flavor chemicals with specialized electronic sensors. Secondly, data presentation – statistic graphic plot e.g polar plots, bar chart. Lastly, data interpretation – software to assist the user in understanding the practical significance of the graphic outputs, usually accomplished through applications of artificial neural networks.

Electronic nose is made by three major manufactures; Alpha m.o.s (Demotte, IN), Aroma scan (Hollis, NH) and Neotronics (Gainesville, GA). Sensors made by these manufacturer are different

but function same way. Aroma scan uses “inking” or “masking” process where by it puts 32 sensors on one computer chip or board. Neotronics uses an array of 12 different sensors which are basically soldered onto a sensor head and alphamos used tin oxide sensors in its array. Artificial neural networks (Anns) in electronic nose allowed it to function in the way a brain function when it interprets responses from olfactory sensors in the human nose. Anns nodes can be compared to the neurons in the brains.

The electronic nose is been used by major companies like the wine industry, coffee industries, fresh food company and before approved by the FDA, it is used to determine the freshness of fish. Some of its applications are: It can be used for selection of raw material, packaging interaction effects, raw material confirmation, intermediate and final products, detection of contaminations, spoilage and adulteration, monitoring of storage conditions, scale – up monitoring, managing raw material variability and more. Recently, Sharp, Japanese electronics company is looking at incorporating the technology in its microwave oven to allow the oven to shutoff automatically when they began to detect chemicals associated with overcooked food.

Reference:

1. <http://www.foodproductdesign.com/articles/0695QA.html>
2. en.wikipedia.org/wiki/Electronic_nose