

Relationship between Response of the Resistive Sensors on the Chosen Volatile Organic Compounds (VOCs) and Their Concentration

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Abstract : Volatile organic compounds (VOCs) are the fungi metabolites in the gaseous form produced during improper storage of agricultural commodities (e.g. grain, food). The spoilt commodities produce a wide range of VOCs including alcohols, esters, aldehydes, ketones, alkanes, alkenes, furans, phenols etc. The characteristic VOCs and odours can be determined by using electronic nose (e-Nose) which contains a matrix of different kinds of sensors e.g. resistive sensors. The aim of the present studies was to determine relationship between response of the resistive sensors on the chosen volatiles and their concentration. According to the literature, it was chosen volatiles characteristic for the cereals: ethanol, 3-methyl-1-butanol and hexanal. Analysis of the sensor signals shows that a signal shape is different for the different substances. Moreover, each VOC signal gives information about a maximum of the normalized sensor response ($\Delta R/R_{max}$), an impregnation time (t_{IM}) and a cleaning time at half maximum of $\Delta R/R_{max}$ (t_{CL}). These three parameters can be regarded as a 'VOC fingerprint'. Seven resistive sensors (TGS2600-B00, TGS2602-B00, TGS2610-C00, TGS2611-C00, TGS2611-E00, TGS2612-D00, TGS2620-C00) produced by Figaro USA Inc., and one (AS-MLV-P2) produced by AMS AG, Austria were used. Two out of seven sensors (TGS2611-E00, TGS2612-D00) did not react to the chosen VOCs. The most responsive sensor was AS-MLV-P2. The research was supported by the National Centre for Research and Development (NCBR), Grant No. PBS2/A8/22/2013.

Keywords : agricultural commodities, organic compounds, resistive sensors, volatile

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