Improving Short Term Instability for Quantitative Analyses with Portable Electronic Noses (2014)

TÃ-tulo:Â Improving Short Term Instability for Quantitative Analyses with Portable Electronic NosesAutores: Miguel MacÃ-asâ€“MacÃ-as, J. Enrique Agudo, Antonio GarcÃ-aâ€“Manso, Carlos J. GarcÃ-aâ€“Orellana, Horacio M. GonzÃ¡lezâ€“V andÂ RamÃ³n Gallardoâ€“Caballero Revista:Â Sensors Vol./Pag.:Â 14(6), 10514-10526Ed./AÃ±o:Â MDPI, 2014DOI:10.3390/s140610514ISSN:Â 1424-8220Abstract:

One of the main problems when working with electronic noses is the lack of reproducibility or repeatability of the sensor response, so that, if this problem is not properly considered, electronic noses can be useless, especially for quantitative analyses. On the other hand, irreproducibility is increased with portable and low cost electronic noses where laboratory equipment like gas zero generators cannot be used. In this work, we study the reproducibility of two portable electronic noses, the PEN3 (commercial) and CAPINose (a proprietary design) by using synthetic wine samples. We show that in both cases short term instability associated to the sensorsâ€™ response to the same sample and under the same conditions represents a major problem and we propose an internal normalization technique that, in both cases, reduces the variability of the sensorsâ€™ response. Finally, we show that the normalization proposed seems to be more effective in the CAPINose case, reducing, for example, the variability associated to the TGS2602 sensor from 12.19% to 2.2%.

Keywords: electronic nose; quantitative analysis; gas sensor