Combination of metal oxide semiconductor gas sensor array and solid-phase microextraction gas chromatography-mass spectrometry for odour classification of brewed coffee

Publons ID	(not set)
Wos ID	WOS:001063802800001
Doi	10.1002/ffj.3759
Title	Combination of metal oxide semiconductor gas sensor array and solid-phase microextraction gas chromatography-mass spectrometry for odour classification of brewed coffee
First Author	
Last Author	
Authors	Hardoyono, F; Windhani, K;
Publish Date	AUG 29 2023
Journal Name	FLAVOUR AND FRAGRANCE JOURNAL
Citation	
Abstract	Odour analysis of coffee using low-cost and portable instruments in coffee shops, restaurants and bars is essential to keep the loyalty of coffee consumers. This paper aimed to analyse the performance of a gas sensor array for odour classification of brewed coffee. Five grams of ground coffee sample from five different brands was brewed in 80 mL of hot water at a temperature of 90 &DEG;C. The gas sensor array then measured the sensor's response to the brewed coffee odour. The recorded data were analysed using a principal component analysis (PCA), a hierarchical cluster analysis (HCA) and a support vector machine (SVM). Solid-phase microextraction gas chromatography-mass spectrometry (SPME-GC-MS) was used to identify the five coffee samples' volatile organic compounds (VOCs). The visualisation of the PCA score plot shows that the gas sensor array efficiently classifies the brewed coffee based on different odours. The SVM classification using a polynomial kernel obtained an accuracy of 95.21% using training data sets and an accuracy of 96.94% using testing data sets. Meanwhile, for SVM classification using radial basis function kernel, the SVM obtained an accuracy of 100% for training data sets and 93.06% for testing data sets. The SPME-GC-MS analysis showed that the abundance of 2-furanmethanol; 2-methoxy-4-vinyl phenol; phenol, 4-ethyl-2-methoxy- and acetic acid contributed to the separation of the first and the second clusters in the principal components coordinate. Based on data analysis, the gas sensor showed high performance as a low-cost and portable instrument for odour analysis of coffee based on sensory technique.
Publish Type	Journal
Publish Year	2023
Page Begin	(not set)
Page End	(not set)
Issn	0882-5734
Eissn	1099-1026
Url	https://www.webofscience.com/wos/woscc/full-record/WOS:001063802800001
Author	Dr KIKIN WINDHANI, S.E., M.Ec.Dev