

KEYWORDS: Chromatography, gas, halitosis, indium oxide, semiconductors, sulfur compounds

Journal of Periodontology

2006, Vol. 77, No. 7, Pages 1142-1147 , DOI 10.1902/jop.2006.050388

(doi:10.1902/jop.2006.050388)

Development of a compact and simple gas chromatography for oral malodor measurement.

Murata T, Rahardjo A, Fujiyama Y, Yamaga T, Hanada M, Yaegaki K, Miyazaki H.

Department of Oral Health, Nippon Dental University, Tokyo, Japan.

BACKGROUND: Volatile sulfur compounds (VSCs) in oral air are the only type of gases correlated with the strength of oral malodor. We developed a compact and simple gas chromatograph (GC) equipped with a newly invented indium oxide semiconductor gas sensor (SCS) for measuring the concentrations of VSCs in mouth air. We have assessed the correlation between measurements with a GC-SCS and those with a regular GC. **METHODS:** Oral air samples from randomly selected volunteers were analyzed with both a GC-SCS and a GC with a flame photometric detector (FPD), which is specific to VSCs, and GC-SCS measurements were compared to those obtained by GC-FPD. Subsequently, oral air samples before and after mouthrinsing with 5% ethanol mouthwash were analyzed to determine the effect of ethanol on VSC measurements by GC-SCS. **RESULTS:** There were strong correlations between VSC concentrations determined using these two gas chromatography methods (hydrogen sulfide, $R=0.821$, $P<0.0001$; methyl mercaptan, $R=0.870$, $P<0.0001$; and dimethyl sulfide, $R=0.770$, $P<0.0001$). Although GC-SCS can differentiate ethanol and VSCs in oral air samples after mouthrinsing, GC-SCS measurements demonstrated higher values than those obtained by GC-FPD; however, this discrepancy improved over time due to the reduced effect of ethanol. **CONCLUSION:** The results suggest that GC-SCS may be useful for the diagnosis of halitosis.