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- GC를 이용한 포름알데히드 분석방법 개발 및 평가 -

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◎ Abstract

This study was carried out to develop gas chromatography for analyzing formaldehyde and investigate usability of environmental protection agency(EPA) TO-11 as formaldehyde measurement method at industrial hvøiene field.

To develop and evaluate formaldehyde measurement method using 2,4-dinitro -phenylhydrazine(2,4-DNPH) coated sampler, laboratory test and field test were conducted. Results of this study are as follows. Limit of detection(LOD) of measurement methods, HPLC-UVD, GC-NPD and GC-FID, is $0.008\mu\text{g}/\text{ml}$, $0.060\mu\text{g}/\text{ml}$, $0.472\mu\text{g}/\text{ml}$ respectively. LOD of these methods is less than LOD of NIOSH 2539 and OSHA 52 method. Coefficiency of measurement methods, HPLC-UVD, GC-NPD and GC-FID, is 0.008, 0.009, 0.020 respectively. Desorption efficiency of sep-pak xposure aldehyde sampler and sorbent sample tube is 1.05(range : 0.99 - 1.12), 1.02(range : 0.99 - 1.06) respectively. Desorption efficiency was done at 0.5, 1, 2 times the target concentration($36\mu\text{g}$) for the recommended air volume(24ℓ). Samples of sorbent sample tube and sep-pak xposure aldehyde sampler turned out to be stored at refrigerator, according to storage test results. Measurement methods of HPLC-UVD, GC-NPD, GC-FID, according to results of precision for the combined sampling and analytical procedure, became acceptable to OSHA evaluation standard. Field test using exposure chamber met the

NIOSH overall uncertainty recommendation (less than 25%). Overall uncertainty of Sepak- HPLC(UVD), Tube - GC(NPD), Tube-GC(FID) is 11.0% - 17.0%.

Consequently gas chromatography(GC-NPD, GC-FID) and high performance liquid chromatography(EPA TO-11) methods using 2,4-DNPH coated sampler for formaldehyde measurement turned out to be suitable to measure personal formaldehyde exposure at workplaces.