

## Study of Aerosol Deposition and Shielding Effects on Fluorescent Imaging Quantitative Evaluation in Protective Equipment Validation

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**Abstract :** The leakage of protective clothing is an important issue in the occupational health field. There is no quantitative method for measuring the leakage of personal protective equipment. This work aims to measure the quantitative leakage of the personal protective equipment by using the fluorochrome aerosol tracer. The fluorescent aerosols were employed as airborne particulates in a controlled chamber with ultraviolet (UV) light-detectable stickers. After an exposure-and-leakage test, the protective equipment was removed and photographed with UV-scanning to evaluate areas, color depth ratio, and aerosol deposition and shielding effects of the areas where fluorescent aerosols had adhered to the body through the protective equipment. Thus, this work built a calculation software for quantitative leakage ratio of protective clothing based on fluorescent illumination depth/aerosol concentration ratio, illumination/Fa ratio, aerosol deposition and shielding effects, and the leakage area ratio on the segmentation. The results indicated that the two-repetition total leakage rate of the X, Y, and Z type protective clothing for subject T were about 3.05, 4.21, and 3.52 (mg/m<sup>2</sup>). For five-repetition, the leakage rate of T were about 4.12, 4.52, and 5.11 (mg/m<sup>2</sup>).

**Keywords :** fluorochrome, deposition, shielding effects, digital image processing, leakage ratio, personal protective equipment

**Conference Title :** ICASFE 2016 : International Conference on Agricultural Science and Food Engineering

**Conference Location :** Tokyo, Japan

**Conference Dates :** May 26-27, 2016