

〈Regular Article〉

Visualization of Modified Human Hair by Artificial Sunlight with Carbonylated Proteins as an Indicator of Hair Damage

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Abstract

The modification of human hair proteins by artificial sunlight was visualized by the detection of carbonylated proteins using fluorescein-5-thiosemicarbazide (5-FTSC). After irradiating natural black hair with artificial sunlight in stages up to 15 h by a solar simulator, the modification of hair proteins were calculated by analyzing the fluorescence images obtained. In the case of natural black hair, the average fluorescence intensity increased in proportion to the irradiation time with a high coefficient of correlation ($R^2=0.88$). In addition, it became evident that the irradiation for 1 h or more increased the fluorescence intensity caused by carbonylated proteins significantly. Thus, this method proved to be sensitive to detect the photo-chemical modification of hair proteins in natural black hair that is caused by sunlight exposure in daily life.

Key words: photo-modification, carbonylated proteins, fluorescein-5-thiosemicarbazide, human hair, image analysis.