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Detection of Phototoxicity and Photogenotoxicity on Airborne Particulates in Sapporo and Shenyang

Shinobu Wakuri[1], Tomoko Akutagawa[2], Hiroshi Matsumoto[2] and Noriho Tanaka[1]
[1]*Hatano Research Institute, Food & Drug Safety CTR.*, [2]*Hokkaido Environmental Sciences*

Abstract Air pollution is made up by complex mixture exhausted from cars, industries and incinerators etc. Those pollutants come from everywhere without border and contain phototoxic and photogenotoxic chemicals including PAHs exhausted in the air. We have published that the chemicals which show phototoxicity and photogenotoxicity are closely related in mechanistic and the PAHs react as a strong photocatalyzer by radical productions under UV exposure.

In this study, we performed phototoxicity test using BALB/3T3 NRU assay and in vitro photo- micronucleus (MN) assay on the extracts from airborne particulates collected for 24 years (1975-1998) in Sapporo city, Japan and 2 years (1999-2000) Shenyang city, China. Shenyang samples were collected from the three parts consisting of a industrial area, near traffic roads and a residential area in four seasons.

In the older samples from Sapporo, a strong phototoxicity and MN inductions were observed under UV exposure. It was closely correlated with PAHs contents periodically. The samples collected from Shenyang also clearly showed phototoxicity. The above data suggest that the exhaust chemicals containing PAHs are the main factor for photogenotoxicity. Further collaborative works among Asian countries are needed to prevent cancer risk.

Keyword : Photogenotoxicity, PAHs, Air pollution, UV exposure