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Isolation of mutagenic component derived from maltol with UV irradiation

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Keywords: maltol; UV irradiation; mutagenicity; HPLC

Maltol is known as a photomutagenic. It has also been reported that the mutagenicity after the irradiation has been decreased with time. In this study, we tried the isolation of the mutagenic compound generated by the irradiation from maltol. Maltol, dissolved in 10mM NaHCO\textsubscript{3} (2mg/ml) was irradiated under the germicidal lamp. After 0-30 min latencies of irradiation, the mixtures have been kept at room temperature under the darkness for 120 min. The mixtures were sampled at 0, 10, 20 and 30 min during irradiation and at 30, 60 and 120 min after irradiation. The samples were applied to Ames test and reversed phase HPLC (COSMOSIL 5C18 MS-II, 4.6 mm ID X 150mm, CH\textsubscript{3}CN-50 mM Borate buffer pH 8.0 = 5:95 (v/v), 254 nm, 1 ml/min) analysis. As the results, mutagenicity was increased with irradiation latency, and decreased after irradiation. From the results of HPLC analysis, several new peaks were detected. All the peaks were increased with irradiation latency and kept the peak strength after irradiation, but the peak at 2.1 min was decreased after irradiation. The reaction mixture was fractionated by HPLC every 30 sec and applied to Ames test, only the fraction collected from 2.0 to 2.5 min indicated mutagenicity. The results strongly suggested that the peak is the main mutagenic component derived from maltol by UV irradiation.

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Identification of the major mutagens in surface soil of Nagoya, Japan

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Keywords: surface soil; mutagens; nitrated polycyclic aromatic hydrocarbons

It is known that nitrated polycyclic aromatic hydrocarbons, which are derived from automobile and industrial exhausts, are widely spread in atmosphere and accumulates in surface soil. In Nagoya, the highest mutagenicity in organic extracts of surface soil showed 8,971 rev./g of soil toward S. typhimurium strain TA98 in the absence of a mammalian metabolic activation system (-S9mix) in the southern parts where are closed to an industrial area. In this paper, we tried to identify the major mutagens in this urban area.

The crude organic extract was separated by a Sephadex LH-20, a silica gel and a ODS column for LPLC, and then HPLC. Mutation assay was carried out using TA98 in -S9mix. Among nitrated pyrenes (NP), 1,8-, 1,6-, 1,3-diNP (2.81, 3.97, 2.17 pmol/g of soil, respectively) as well as 1-NP (11.2 pmol/g of soil) and 2-NP (about 1/5 of 1-NP) were detected. In addition, a large amount of 1,3,6-triNP (5.52 pmol/g of soil), which may be produced by nitration of 1,3-, 1,6- or 1,8-diniP, was also detected. This is the first report for detection of 1,3,6-triNP in surface soil. A small amount of 3-NBA and 3,6-DNB [3] known as potent mutagens were also detected. The other polynitlated mutagens, which might not be N9-derivatives, were detected in this area. The chemical structure of these compounds now is under investigation. These results indicate that the major mutagens in surface soil of Nagoya were derived from nitrated, especially poly-nitratated such as di- or tri-nitrated PAHs.

名古屋市の表層土壌中の変異原物質
高橋\textsuperscript{1}, 吉田智史\textsuperscript{1}, 麻野間正輝\textsuperscript{2}, 内山武久\textsuperscript{3}, 宮入伸一\textsuperscript{3}, 渡辺徹志\textsuperscript{4}, 平山晃久\textsuperscript{4}, 響谷常雄\textsuperscript{5}, 水谷隆治\textsuperscript{1}, 高橋和彦\textsuperscript{1} (名古屋大・薬\textsuperscript{1}, 名古屋市衛研\textsuperscript{2}, 日大・薬\textsuperscript{3}, 京都薬大\textsuperscript{4}, 静岡大・薬\textsuperscript{5})