

Studi Genotoksitas Paparan BPA secara in Vitro dengan Logam Pb (II) dan Ni (II) serta Biomonitoring Biomarker DNA Adduct 8-OHdG pada Sampel Urin Balita Pengguna Botol Susu Plastik = Genotoxicity Study of BPA Exposure in Vitro with Pb (II) and Ni (II) and Biomonitoring of Biomarker DNA adduct 8-OHdG as Biomarker in Urine Samples of Toddlers Plastic Milk Bottle Users

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Abstrak

Bisphenol A (4,4'-isopropilendifenol atau 2,2-bis(4-hidroksifenil)-propana) adalah senyawa kimia yang digunakan untuk produksi plastik polikarbonat dan resin epoksi. BPA berpotensi mengakibatkan kerusakan DNA oksidatif akibat terjadinya stres oksidatif dengan membentuk spesies oksigen reaktif. Penelitian ini dilakukan untuk menganalisis pembentukan 8-OHdG sebagai biomarker kerusakan DNA/gen yang disebabkan paparan senyawa kimia BPA. Studi in vitro dilakukan dengan mereaksikan 2'-deoksiguanosin dengan BPA, logam Ni (II), logam Pb (II), dan hidrogen peroksida melalui reaksi fenton-like dengan variasi pH (7,4 dan 8,4), suhu (37°C dan 60°C), dan waktu inkubasi (24 jam dan 30 jam). Analisis pembentukan 8-OHdG pada studi ini dilakukan menggunakan instrumen HPLC kromatografi fase terbalik dengan detektor UV. Pada studi biomonitoring, dilakukan pengambilan sampel urin balita pengguna botol susu plastik. Analisis pembentukan 8-OHdG pada studi biomonitoring ini dilakukan dengan menggunakan instrumen LC-MS/MS. Hasil studi in vitro menunjukkan bahwa paparan BPA, Pb (II), Ni (II), dan hidrogen peroksida terhadap 2-deoksiguanosin dapat memicu pembentukan 8-OHdG, sementara pada studi biomonitoring, konsentrasi senyawa 8-OHdG terdeteksi lebih banyak pada urin balita pengguna botol susu plastik berbahan polikarbonat (PC), mengindikasikan terkandung BPA dalam botol susu plastik tersebut.

.....Bisphenol A (4,4'-isopropylidenediphenol or 2,2-bis(4-hydroxyphenyl)-propane) is a chemical compound used for the production of polycarbonate plastics and epoxy resins. BPA has the potential to cause oxidative DNA damage due to oxidative stress by forming reactive oxygen species. This study was conducted to analyze the formation of 8-OHdG as a biomarker of DNA/gene damage caused by exposure to BPA chemical compounds. In vitro studies were conducted by reacting 2'-deoxyguanosine with BPA, Ni (II), Pb (II), and hydrogen peroxide through Fenton-like reactions with pH variations (7.4 and 8.4), temperature (37°C and 60°C), and incubation time (24 hours and 30 hours). Analysis of 8-OHdG formation in this study was carried out using the reverse phase chromatography HPLC instrument with a UV detector. The biomonitoring study was carried out by taking urine samples of toddlers who use plastic milk bottles. Analysis of 8-OHdG formation in this biomonitoring study was carried out using the LC-MS/MS instrument. Results of in vitro studies showed that exposure to BPA, Pb (II), Ni (II), and hydrogen peroxide to 2-deoxyguanosine could trigger the formation of 8-OHdG. In the biomonitoring study, the concentration of 8-OHdG compounds was detected more in the urine of toddlers who used polycarbonate (PC) plastic milk bottles, indicating that BPA was contained in the plastic milk bottles.