

Studi pembentukan DNA adduct 8-hidroksi-2-deoksiganosin sebagai biomarker risiko kanker secara in vitro akibat paparan senyawa akrilamida dan logam kromium heksavalen = Study of 8-hydroxy-2-deoxyguanosine DNA adduct as cancer risk biomarker through in vitro exposure of acrylamide and hexavalent chromium

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Abstrak

Pada penelitian ini telah dilakukan analisis pembentukan senyawa 8-hidroksi-2'-deoksiganosin (8-OHdG) sebagai penanda kerusakan oksidatif DNA yang diakibatkan oleh paparan senyawa akrilamida dan logam kromium heksavalen (Cr(VI)). Studi in vitro dilakukan melalui reaksi senyawa 2'-deoksiganosin dengan akrilamida, logam Cr(VI), asam askorbat, dan H₂O₂ berdasarkan prinsip reaksi Fenton-like pada variasi pH inkubasi 7,4 dan 8,4, suhu inkubasi 37 dan 60 °C, serta waktu inkubasi 7 dan 12 jam. Analisis senyawa 8-OHdG dilakukan menggunakan UHPLC fasa terbalik dengan fasa gerak berupa campuran penyangga natrium fosfat pH 6,7 : metanol (85:15). Hasil yang diperoleh menunjukkan bahwa paparan akrilamida dan Cr(VI) secara in vitro menyebabkan pembentukan 8-OHdG dengan konsentrasi rendah, serta penambahan asam askorbat mampu meningkatkan pembentukan 8-OHdG. Konsentrasi 8-OHdG tertinggi pada sampel tanpa asam askorbat diperoleh dengan kondisi suhu inkubasi 60 °C, serta pada sampel dengan asam askorbat diperoleh dengan kondisi pH inkubasi 7,4, suhu inkubasi 37 °C, dan waktu inkubasi 7 jam.

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This research aims to investigate 8-hydroxy-2'-deoxyguanosine (8-OHdG) formation as a biomarker of DNA oxidative damage following acrylamide and hexavalent chromium (Cr(VI)) exposure. In vitro study was carried out through reactions between 2'-deoxyguanosine, acrylamide, Cr(VI), and reducing agent with respect to Fenton-like principles. Samples at pH 7.4 and 8.4 were incubated for 7 and 12 hours under 37 and 60°C to find the correlation between 8-OHdG concentration over several pH, time, and temperature conditions. Analysis was performed by reversed-phase UHPLC using sodium phosphate buffer pH 6.7 : methanol (85:15) as mobile phase. Results show that low concentration of 8-OHdG could be linked to acrylamide and Cr(VI) exposure, and ascorbic acid might have a role in increasing 8-OHdG to higher concentration. The highest concentration of 8-OHdG was obtained at 60°C in samples without the presence of ascorbic acid, and at pH 7.4, 37 °C, and 7 hours of incubation in samples with the presence of ascorbic acid.