

# Studi pembentukan DNA adduct 8-hidroksi-2 -deoksiguanosin (8-OHdG) secara in vitro melalui reaksi fenton dengan butylated hydroxyanisole (BHA) dan asam askorbat = In vitro study of DNA adduct 8-hydroxy 2 -deoxyguanosine (8-OHdG) formation through fenton reaction with butylated hydroxyanisole bha and ascorbic acid

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## Abstrak

Butylated Hydroxyanisol (BHA) dan Asam Askorbat merupakan antioksidan yang biasa digunakan sebagai BTP (Bahan Tambahan Pangan). Antioksidan ini dapat berubah menjadi pro-oksidan yang dapat menghasilkan radikal bebas seperti radikal hidroksil (HO $\cdot$ ). Radikal hidroksil (HO $\cdot$ ) dapat menyerang basa-basa DNA dan membentuk DNA adduct 8-OHdG. Pada penelitian ini, DNA 2'-deoksiguanosin 5'-monofosfat (dGMP) direaksikan dengan BHA dan Asam Askorbat melalui reaksi Fenton (Fe(II) dan H<sub>2</sub>O<sub>2</sub>) dengan variasi pH (7,4 dan 8,4) dan suhu (37°C dan 60°C) menggunakan HPLC-UV pada panjang gelombang 254 nm. Konsentrasi adduct keseluruhan yang terdeteksi hanya mencapai nilai batas deteksi namun tidak dapat terkuantifikasi. Pembentukan DNA Adduct 8-OHdG dari senyawa BHA terdeteksi pada reaksi dGMP, BHA dan Fe(II) pada pH 7,4 dan 8,4 baik suhu 37°C maupun 60°C. Selain itu, terdeteksi pada reaksi dGMP, BHA, Fe(II), dan penambahan H<sub>2</sub>O<sub>2</sub> pada pH 7,4 dan 8,4, suhu 60°C. Di sisi lain, pembentukan DNA Adduct 8-OHdG dari senyawa Asam Askorbat hanya terdeteksi pada reaksi dGMP, Asam Askorbat, Fe(II), dan penambahan H<sub>2</sub>O<sub>2</sub> pada pH 8,4, baik suhu 37°C maupun 60°C. Pembentukan DNA adduct 8-OHdG pada pH 8,4 lebih tinggi dibandingkan pH 7,4 dan pembentukan DNA adduct 8-OHdG pada suhu 37°C juga lebih tinggi dibandingkan suhu 60°C.

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Butylated Hydroxyanisol (BHA) and Ascorbic Acid are antioxidants that are commonly used as food additives. These antioxidants can be turned into pro-oxidants which can generate free radicals, such as hydroxyl radical (HO $\cdot$ ). Hydroxyl radical (HO $\cdot$ ) can attack the bases of DNA and forming DNA adduct 8-OHdG. This research was conducted by reacting DNA 2'-deoxyguanosine 5'-monophosphate (dGMP) with BHA and ascorbic acid through Fenton reaction (Fe(II) and H<sub>2</sub>O<sub>2</sub>) with variation of pH (7,4 and 8,4) and temperature (37°C and 60°C) using HPLC-UV at wavelength of 254 nm. Overall, the concentration of adduct was detected only attaining the limit of detection value, but it cannot be quantified. The formation of DNA adduct 8-OHdG of BHA compound was detected in the reaction of dGMP, BHA and Fe (II) at pH 7,4 and 8,4 either 37°C or 60°C. Additionally, it was also detected in the reaction of dGMP, BHA, Fe(II) and H<sub>2</sub>O<sub>2</sub> at pH 7,4 and 8,4, at the temperature of 60°C. On the other side, the formation of DNA adduct 8-OHdG of ascorbic acid compound was only detected in the reaction of dGMP, ascorbic acid, Fe (II) and H<sub>2</sub>O<sub>2</sub> at pH 8.4 either 37°C or 60°C. DNA adduct 8-OHdG formation at pH 8.4 is higher than pH 7.4. DNA adduct 8-OHdG formation at the temperature of 37°C is also higher than 60°C.