

# Efek iradiasi gamma terhadap kadar senyawa bioaktif, aktivitas antioksidan dan cemaran mikroba daun beluntas (*Pluchea indica* (L.) Less.) = Effect of gamma irradiation on the bioactive content, antioxidant activity and microbial contamination of beluntas leaves (*Pluchea indica* (L.) Less.)

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## Abstrak

Daun beluntas atau *Pluchea indica* (L.) Less telah lama dimanfaatkan sebagai makanan dan obat tradisional. Iradiasi sinar gamma sering digunakan untuk dekontaminasi bahan pangan maupun herbal, namun diperlukan dosis iradiasi yang tepat agar efektif dalam membunuh mikroorganisme dengan tetap memaksimalkan kadar senyawa bioaktif dan aktivitas biologisnya. Penelitian ini bertujuan untuk mengevaluasi pengaruh iradiasi gamma  $^{60}\text{Co}$  terhadap cemaran mikroba, kadar senyawa turunan asam kafeoil quinat, dan aktivitas antioksidan daun beluntas. Serbuk daun beluntas diiradiasi dengan sinar gamma  $^{60}\text{Co}$  dengan dosis serap 0, 2,5, 5, 7,5, dan 10 kGy. Angka lempeng total bakteri aerob dan angka kapang khamir diuji menggunakan metode Petrifilm pada 0 dan 3 bulan setelah iradiasi. Setelah proses maserasi dengan etanol 70%, kadar 6 senyawa turunan asam kafeoil quinat dalam ekstrak daun beluntas ditentukan dengan Kromatografi Cair Kinerja Tinggi. Aktivitas antioksidan ekstrak daun beluntas diukur dengan metode DPPH, ABTS dan ferric reducing antioxidant power (FRAP). Iradiasi gamma dosis 2,5–10 kGy efektif menurunkan angka lempeng total dan angka kapang khamir serbuk daun beluntas ( $p < 0,05$ ). Kadar senyawa turunan asam kafeoil quinat dalam ekstrak daun beluntas meningkat signifikan pada dosis 5–10 kGy ( $p < 0,05$ ). Sementara aktivitas antioksidan menunjukkan kenaikan signifikan pada dosis 2,5–10 kGy ( $p < 0,05$ ). Diantara dosis iradiasi tersebut, dosis 10 kGy menunjukkan hasil yang terbaik. Dengan demikian, iradiasi gamma dosis 10 kGy bermanfaat dalam menurunkan cemaran mikroba sekaligus meningkatkan kadar senyawa asam kafeoil quinat dan aktivitas antioksidan daun beluntas.

.....*Pluchea indica* (L.) Less or beluntas leaf has long been used as food and in traditional medicine. Gamma irradiation is widely used as a decontamination method of foodstuffs and herbs. However, the appropriate dose of gamma irradiation is necessary to reduce microbial contamination while maximizing the plant's bioactive constituents and biological activities. This study investigated the effect of gamma  $^{60}\text{Co}$  irradiation on the microbial burden, caffeoylquinic acid derivatives content, and antioxidant capacity of beluntas leaf. Beluntas leaf powder was exposed to gamma rays from  $^{60}\text{Co}$  at the absorbed dose of 0, 2.5, 5, 7.5, and 10 kGy. The total aerobic bacteria count and total yeast and mold count were investigated using the Petrifilm method at 0 and 3 months after irradiation. After a maceration of beluntas leaf with 70% ethanol, the content of six caffeoylquinic acid derivatives (CQAs) was assayed using high-performance liquid chromatography. The antioxidant capacity of the extract was determined using the DPPH, ABTS, and ferric reducing antioxidant power (FRAP) methods. Gamma irradiation at 2.5–10 kGy effectively reduced bacteria, yeast, and mold in beluntas leaf powder ( $p < 0.05$ ). The levels of CQAs in beluntas leaf extract were significantly increased at 5–10 kGy ( $p < 0.05$ ). Meanwhile, the antioxidant activity was enhanced significantly at 2.5–10 kGy ( $p < 0.05$ ). Among the irradiation doses, 10 kGy showed the best results. Thus, gamma irradiation at 10 kGy is useful in reducing microbial contamination as well as increasing caffeoylquinic acid derivatives

content and antioxidant capacity of beluntas leaf.