Studi Pengaruh Iradiasi Sinar Gamma Terhadap Kualitas dan Aktivitas Antiinflamasi Ekstrak Etanol 70% Jahe Merah (Zingiber officinale Roscoe var. rubrum) = Study of the Irradiation Gamma Ray Effect on the Quality and Anti-Inflammatory Activity of 70% Ethanol Extract of Red Ginger (Zingiber officinale Roscoe var. rubrum)

Aulia Nova Kusumaningtyas, author

Abstrak

Jahe merah telah lama dimanfaatkan sebagai salah satu obat tradisional untuk mengurangi peradangan atau inflamasi. Namun, herbal rimpang seperti jahe merah dilaporkan mengandung cemaran mikroorganisme yang relatif tinggi. Sehingga diperlukan metode sterilisasi untuk mendekontaminasi cemaran mikroorganisme tersebut. Iradiasi gamma sering menjadi pilihan untuk dekontaminasi, tetapi belum diketahui dosis yang efektif membunuh mikroorganisme dan tidak mempengaruhi kadar senyawa bioaktif serta aktivitas biologis jahe merah. Penelitian ini bertujuan mengevaluasi pengaruh iradiasi gamma terhadap cemaran mikroorganisme, kadar senyawa 6-gingerol, 8-gingerol,10-gingerol, dan 6-shogaol serta aktivitas antiinflamasi ekstrak etanol 70% jahe merah. Serbuk rimpang jahe merah terlebih dahulu diekstraksi dengan metode maserasi menggunakan etanol 70% 1:5. Ekstrak jahe merah kemudian diiradiasi dengan dosis 0, 5, 7,5, 10, dan 15 kGy. Evaluasi cemaran mikroba angka lempeng total dan angka kapang khamir dilakukan dengan metode tuang. Evaluasi kadar bioaktif dianalisis dengan metode Kromatografi Cair Kinerja Tinggi. Aktivitas antiinflamasi diukur dengan metode penghambatan denaturasi protein BSA dengan spektrofotometer UV-Vis. Efektivitas iradiasi sinar gamma dalam menurunkan angka cemaran mikroorganisme meningkat seiring meningkatnya dosis iradiasi ($p<0,05$). Kadar bioaktif 6-gingerol menunjukkan kadar yang paling tinggi diantara tiga senyawa bioaktif lainnya. Namun, secara keseluruhan dosis iradiasi gamma yang diberikan tidak berpengaruh signifikan terhadap kandungan 6-gingerol,8-gingerol,10-gingerol dan 6-shogaol dalam ekstrak etanol 70% jahe merah ($p>0,05$). Aktivitas antiinflamasi ekstrak etanol 70% jahe merah juga tidak berbeda signifikan setelah di iradiasi dengan dosis 0-15 kGy ($p>0,05$).

.....Red ginger has long been used as a traditional medicine to reduce inflammation. However, rhizome herbs such as red ginger are reported to contain relatively high levels of contamination by microorganisms. So a sterilization method is needed to decontaminate the microorganisms. Gamma irradiation is often an option for decontamination, but it is not yet known which dose is effective in killing microorganisms and does not affect the levels of bioactive compounds or the biological activity of red ginger. This study aims to evaluate the effect of gamma irradiation on contamination of microorganisms, levels of compounds 6-gingerol, 8-gingerol, 10-gingerol, and 6-shogaol, and the anti-inflammatory activity of a 70% ethanol extract of red ginger. Red ginger rhizome powder was first extracted by the maceration method using 70% ethanol at 1:5. The red ginger extract was then irradiated at doses of 0, 5, 7.5, 10, and 15 kGy. The evaluation of microbial contamination of the total plate count and yeast mold count was carried out by the pouring method. The evaluation of bioactive levels was analyzed using the high-performance liquid chromatography method. Anti-inflammatory activity was measured by inhibiting BSA protein denaturation with a UV-Vis spectrophotometer. The effectiveness of gamma irradiation in reducing the number of microorganisms

contaminating the environment increased with increasing irradiation dose (p 0.05). The level of bioactive 6-gingerol showed the highest level among the other three bioactive compounds. However, overall, the dose of gamma irradiation given had no significant effect on the content of 6-gingerol, 8-gingerol, 10-gingerol, and 6-shogaol in the 70% ethanol extract of red ginger ($p > 0.05$). The anti-inflammatory activity of the 70% ethanol extract of red ginger was also not significantly different after irradiation with dose 0-15 kGy ($p > 0.05$).