

INTISARI

Buah jambu biji merah (*Psidium guajava* L.) dan Tomat (*Lycopersicon lycopersicum* L. Karsten) diketahui mengandung senyawa antioksidan seperti fenolik dan flavonoid. Peningkatan konsumsi sayuran dan buah-buahan diasosiasikan dengan rendahnya resiko penuaan dini dan diketahui mampu mengurangi kerusakan sel akibat polusi udara, sinar UV, asap rokok dll. Seiring dengan kemajuan ilmu pengetahuan dan teknologi proses penuaan ini diharapkan dapat diperlambat. Senyawa antioksidan digunakan untuk mencegah kerusakan sel-sel tubuh serta menjaga kondisi sel dalam tubuh tetap beregenerasi. Dengan demikian penelitian ini dimaksudkan untuk mengkaji aktivitas antioksidan buah jambu biji merah dan tomat sebagai efek sitoprotektif pada sel fibroblas.

Pada penelitian ini buah segar jambu biji merah dan tomat diekstraksi dengan metode maserasi menggunakan pelarut etanol 70 %. Pengujian aktivitas antioksidan diukur dengan metode *Cupric Ion Reducing Antioxidant Capacity* (CUPRAC) dan *β -caroten bleaching*. Hasil dari aktivitas antioksidan lalu dihubungkan dengan kadar fenolik dan flavonoid total. Kemudian aktivitas sitoprotektif terhadap induksi toksisitas H₂O₂ pada sel fibroblas menggunakan metode MTT.

Aktivitas antioksidan menggunakan metode CUPRAC ekstrak etanolik jambu biji merah sebesar 510,94±5,59 μ mol dan 97,22±1,06 μ mol berturut-turut pada ekivalen α -tokoferol per gram ekstrak dan ekivalen quersetin per gram ekstrak. Untuk ekstrak tomat, aktivitas antioksidannya sebesar 244,58±8,29 μ mol pada ekivalen α -tokoferol per gram ekstrak dan 46,54±1,57 μ mol ekivalen kuersetin per gram ekstrak. Kemudian untuk metode β -karoten bleaching ekstrak jambu merah dan tomat memiliki aktivitas antioksidan dengan nilai IC₅₀ berturut-turut 625,51±12,55 μ g/mL dan 634,41±8,58 μ g/mL. Kadar fenolik total sebesar 3726,56±134,59 mg EAG/100 g ekstrak untuk ekstrak jambu biji merah dan 1926,89±10,43 mg EAG/100 g ekstrak untuk ekstrak tomat. Kadar total flavonoid ekstrak jambu biji merah dan tomat berturut-turut 87,75±16,75 mg EK/100 g ekstrak dan 69,80±3,74 mg EK/100 g ekstrak. Terdapat korelasi positif antara tingginya kadar fenolik dan flavonoid total dengan tinggi aktivitas antioksidan untuk kedua ekstrak tomat dan jambu biji merah, sehingga tingginya aktivitas antioksidan ekstrak kemungkinan dipengaruhi oleh senyawa-senyawa fenolik dan flavonoid. Ekstrak etanol jambu biji merah pada konsentrasi tertinggi 300 μ g/mL memberikan peningkatan viabilitas sel fibroblas setidaknya 9,59 % dibanding kontrol H₂O₂. Namun signifikansinya tidak berbeda nyata, sehingga ekstrak jambu biji merah tidak bisa memberikan efek sitoprotektif terhadap sel fibroblas dari paparan radikal bebas untuk H₂O₂. Sedangkan, ekstrak etanol tomat kemungkinan memiliki efek sitotoksik dari pada efek sitoprotektif dalam melawan kerusakan sel fibroblas yang diberi H₂O₂.

Kata kunci: Sitoprotektif, fibroblas, antioksidan, jambu biji merah dan tomat

ABSTRACT

Red guava fruit (*Psidium guajava* L.) and tomato (*Lycopersicon lycopersicum* L. Karsten) is known to contain antioxidant compounds such as phenolic and flavonoids. Increasing consumption of vegetables and fruits is associated with a lower risk of premature aging and is known to reduce cell damage caused by air pollution, UV rays, cigarette smoke etc. Along with the progress of science and technology it is expected that aging process can be reduced. Antioxidant compounds used to prevent the damage of the body cells and to maintain the condition of cells to remains regenerate. Therefore, this study is intended to examine the antioxidant activity of red guava and tomatoes fruit as well as their cytoprotective effect on fibroblast cells.

In this study, fresh fruit guava and tomatoes fruits were extracted by maceration method using 70% ethanol. Testing the antioxidant activity was measured by *Cupric Ions Reducing Antioxidant Capacity* (CUPRAC) and *β -carotene bleaching* methods. The antioxidant result was then associated with the levels of total phenolic and flavonoid content. Further cytoprotective activity was carried out against hydrogen peroxide (H_2O_2) induced cytotoxicity of fibroblast using MTT methods.

The antioxidant activity using CUPRAC method of red guava extract were $510,94 \pm 5,59 \mu\text{mol}$ and $97,22 \pm 1,06 \mu\text{mol}$ at a equivalent of α -tocopherol per gram extract and quersetin per gram extract respectively. For the tomato extract, the antioxidant activity were $244,58 \pm 8,29 \mu\text{mol}$ at a α -tocopherol equivalent per gram extract and $46,54 \pm 1,57 \mu\text{mol}$ at a quercetine quivalent per gram extract. In addition, using *β -carotene bleaching* method, red guava and tomatoes extracts have the antioxidant activity with the IC_{50} values of $625,51 \pm 12,55 \mu\text{g/mL}$ and $634,41 \pm 8,58 \mu\text{g/mL}$ respectively. The total phenolic content was $3726,56 \pm 134,59 \text{ mg GAE/100 g}$ extract for red guava extract and $1926,89 \pm 10,43 \text{ mg GAE/100 g}$ extract for tomato extract. Levels of total flavonoid of red guava and tomato extract were $87,75 \pm 16,75 \text{ mg QE/100 g}$ extract and $69,80 \pm 3,74 \text{ mg QE/100 g}$ extract respectively. There was a positive correlation between high levels of total phenolic and flavonoids contents with the high of antioxidant activity for both red guava and tomato extracts, so that the high antioxidant activity of the extract was likely influenced by the phenolic and flavonoids compounds. Ethanolic extract of red guava in the highest concentration of $300 \mu\text{g/mL}$ provide improved cell viability at least 9,59 % against fibroblast cells compare to the H_2O_2 treated cells. However it has no significantly differences between these activities, so that red guava extract seemed could not provide the cytoprotective effect against fibroblast cells from free radical exposure to H_2O_2 . Whereas, the ethanolic extract of tomato seemed to have cytotoxic effect rather than cytoprotective effect against H_2O_2 treated fibroblast cells.

Keywords: cytoprotective, fibroblasts, antioxidants, red guava and tomato