

ABSTRAK

Latar Belakang: Benzo[a]piren merupakan zat karsinogenik yang terdapat pada batu bara, minyak bumi, asap rokok, serta makanan yang dipanggang. Benzo[a]piren yang masuk ke tubuh dapat menyebabkan apoptosis.

Tujuan: Mengetahui suhu *annealing* yang optimal untuk menghasilkan kurva amplifikasi *MCL-1* serta mengetahui perbedaan ekspresi gen *MCL-1* pada mencit yang diinduksi benzo[a]piren dengan dosis yang berbeda.

Metode : Sampel terdiri atas 20 ekor mencit (*Mus musculus*) yang terbagi dalam 4 kelompok. Kontrol sehat (tidak diinduksi), kontrol negatif (*olive oil* 0,4 mL), P1 (benzo[a]piren 12,5 mg/kgBB), dan P2 (benzo[a]piren 25 mg/kgBB). Dosis awal P2 sebesar 50 mg/kgBB, tetapi diturunkan menjadi 25 mg/kgBB karena menyebabkan kematian. RT-qPCR dioptimasi pada suhu *annealing* 60°C, 58°C, 56°C, 54°C, dan 52°C. Analisis data dilakukan menggunakan *fold change*.

Hasil: Sebanyak 4 mencit mengalami *dropout* sehingga diperoleh 16 ekor mencit pada akhir penelitian. Suhu *annealing* 52°C menghasilkan nilai Ct pada seluruh sampel. *Fold change MCL-1* pada kontrol sehat, kontrol negatif, P1, dan P2 berturut-turut sebesar 1; 0,0008; 0,4717; dan 2,0921.

Kesimpulan: Suhu *annealing* optimal untuk menghasilkan kurva amplifikasi *MCL-1* yaitu 52°C. Benzo[a]piren menyebabkan penurunan ekspresi *MCL-1* pada kelompok dosis kecil dan peningkatan pada kelompok dosis besar. Namun hasil belum dapat dipastikan karena kurva amplifikasi belum mencapai fase plateu dan nilai Ct GAPDH fluktuatif.

Kata kunci: Benzo[a]piren, apoptosis, *MCL-1*, RT-qPCR

ABSTRACT

Background : Benzo[a]pyrene is a carcinogenic compound found in coal, petroleum, cigarette smoke, and grilled foods. Exposure to benzo[a]pyrene may induce apoptosis.

Aim : To determine the optimal annealing temperature for obtaining MCL-1 amplification curves and to determine differences in MCL-1 gene expression in mice induced with different doses of benzo[a]pyrene.

Methods : The samples consisted of 20 mice (*Mus musculus*) divided into four groups: healthy control (no induction), negative control (0.4 mL olive oil), P1 (benzo[a]pyrene 12.5 mg/kg body weight), and P2 (benzo[a]pyrene 25 mg/kg body weight). The initial dose for P2 was 50 mg/kg body weight but was reduced to 25 mg/kg body weight because it caused mortality. RT-qPCR was optimized at annealing temperatures of 60°C, 58°C, 56°C, 54°C, and 52°C. Data were analyzed using fold change.

Results : Four mice were excluded from the study due to dropout, resulting in 16 mice at the end of the study. An annealing temperature of 52°C produced Ct values for all samples. The MCL-1 fold changes in the healthy control, negative control, P1, and P2 groups were 1, 0.0008, 0.4717, and 2.0921, respectively.

Conclusion : The optimal annealing temperature for obtaining MCL-1 amplification curves was 52°C. Benzo[a]pyrene was associated with decreased MCL-1 expression in the lower-dose group and increased expression in the higher-dose group. However, these findings cannot be confirmed because the amplification curves did not reach the plateau phase and the GAPDH Ct values were variable.

Key Words : Benzo[a]pyrene, apoptosis, MCL-1, RT-qPCR