ABSTRACT

The Influence of Giving Bidara Leaf Extract (*Ziziphus spina-christi L)* on Diarrhea and the Histological the Intestine of Rats Infected with *Escherichia coli*

The flavonoid content in bidara leaf extract is anti-inflammatory by inhibiting NF_KB (Nuclear Factor kappa B). NF_KB is a transcription factor that plays a role in cellular response to bacterial stimulation. Active NFKB transcribes COX-2 (ciclooxygenase-2), an indusible isoform of COX which is regulated by different growth factors and cytokines such as IL1β, IL6 or TNFα and will experience increased expression during inflammation. Transcription of COX-2 and iNOS results in damage due to inflammatory cytokines such as cytokines (TNF-α, IL-6 and IL-1β), because high IL-6 synthesis will produce CRP.

The content of tannins in bidara leaf extract is anti-diarrheal with its ability to inhibit the adhesion of Eschericia coli on the epithelium of the intestinal mucosa and damage the bacterial cell wall which results in bacteria being unable to develop.

This study aims to prove the effect of bidara leaf extract on diarrhea, CRP levels and the histological features of the intestines of mice infected with Eschericia coli.

The experimental animals were 20 rats which were divided into 5 treatment groups. The control group K (-) was only given a standard diet, K (+) was only given EPEC, the treatment group P (1) was given EPEC and 90 mg / 150gBB of bidara leaf extract, P (2) was given EPEC and 180 mg / dose of bidara leaf extract. 150gBB, P (3) were given EPEC and bidara leaf extract at a dose of 360 mg / 150gBB.

The experimental animals given bidara leaf extract dosage of 360mg / 150 gBB experienced the shortest average duration of diarrhea. The Kruskal-Wallis test results for serum CRP levels showed a significant difference ($p = 0.001$) and the Mann Whitney test results on CRP levels showed that there were significant differences between the treatment groups. Based on the results of histopathological observations after being given bidara leaf extract, it was found erosion of the intestinal mucosal epithelium in the positive control group, P1 and P2, but there was an improvement in the mucosal epithelium in the P3 group. The results of the Mann Whitney test for intestinal mucosal epithelial erosion showed no difference between negative control and group P3 with p value> 0.05. This proves that the higher the dose given can improve intestinal mucosal epithelial erosion.

Conclusion, flavonoids and tannins in bidara leaf extract can reduce the average duration of diarrhea, reduce serum CRP levels and improve intestinal mucosal epithelial erosion.

ABSTRAK

Pengaruh Pemberian Ekstrak Daun Bidara *(Ziziphus spina-christi L)* terhadap Diare dan Histologis Usus Tikus yang Terinfeksi Escherichia coli

Kandungan flavonoid dalam ekstrak daun bidara bersifat antiinflamasi dengan mekanisme menghambat NF_KB (*Nuclear Factor kappa B)*. *NF_KB* merupakan faktor transkipsi yang berperan dalam respon seluler terhadap rangsangan bakteri. Aktifnya *NF_KB* mentranskripsi COX-2 (ciklooksigenase-2) merupakan isoform COX yang bersifat indusibel yang diregulasi oleh faktor pertumbuhan dan sitokin yang berbeda seperti IL1β, IL6 atau TNFα dan akan mengalami peningkatan ekspresi selama inflamasi. Transkripsi COX-2 dan iNOS mengakibatkan munculnya sitokin pro-inflamasi seperti sitokin (TNF-α, IL-6 dan IL-1β), karena sintesis IL-6 yang tinggi akan memproduksi CRP.

Kandungan tanin dalam ekstrak daun bidara bersifat antidiare dengan kemampuannya menghambat adhesi *Eschericia coli* pada epitel mukosa usus dan merusak dinding sel bakteri yang mengakibatkan bakteri tidak bisa berkembang.

Penelitian ini bertujuan untuk membuktikan efek ekstrak daun bidara terhadap diare, kadar CRP dan gambaran histologis usus tikus yang diinfeksi *Eschericia coli*.

Hewan percobaan adalah 20 tikus yang dibagi menjadi 5 kelompok perlakuan. Kelompok kontrol K (-) hanya diberi diet standar, K (+) hanya diberi *EPEC*, kelompok perlakuan P (1) diberi *EPEC* dan ekstrak daun bidara 90 mg/ 150gBB, P(2) diberi *EPEC* dan ekstrak daun bidara dosis 180 mg/150gBB, P(3) diberi *EPEC* dan ekstrak daun bidara dosis 360 mg/150gBB.

Hewan coba yang diberikan ekstrak daun bidara dosis 360mg/150 gBB mengalami rerata lama diare paling pendek. Hasil uji *Kruskal-Wallis* untuk kadar CRP serum menunjukkan perbedaan yang signifikan (p=0,001) dan hasil uji *Mann Whitney* pada kadar CRP menunjukan ada perbedaan secara signifikan antara kelompok perlakuan. Berdasarkan hasil pengamatan histopatologis setelah diberikan ekstrak daun bidara ditemukan erosi epitel mukosa usus pada kelompok kontrol positif, P1 dan P2, tetapi ada perbaikan epitel mukosa pada kelompok P3. Hasil uji *Mann Whitney* untuk erosi epitel mukosa usus menunjukkan tidak ada perbedaan antara kontrol negatif dan kelompok P3 *p* value > 0,05. Hal ini membuktikan bahwa semakin tinggi dosis yang diberikan dapat memperbaiki erosi epitel mukosa usus.

Kesimpulan, flavonoid dan tanin pada ekstrak daun bidara dapat menurunkan rerata lama diare, menurunkan kadar CRP serum dan memperbaiki erosi epitel mukosa usus.

Kata kunci: Ekstrak Daun Bidara, EPEC, CRP, mukosa usus halus