

## INTISARI

**Latar Belakang:** Kanker paru-paru mengekspresikan VEGF, angiopoietin 2, dan TNF- $\alpha$  secara berlebihan yang berperan terhadap keganasan kanker tersebut. Penelitian sebelumnya dengan ekstrak tunggal kemangi (*Ocimum sanctum L.*), rosella (*Hibiscus sabdariffa*), dan temu putih (*Curcuma zedoaria*) mampu menekan parameter tersebut.

**Tujuan Penelitian:** Penelitian ini bertujuan untuk mengkaji pengaruh pemberian kombinasi ekstrak kemangi, rosella, temu putih secara *in vivo* terhadap rasio berat paru terhadap berat badan mencit, ekspresi VEGF, angiopoietin 2, dan TNF- $\alpha$  pada model hewan kanker paru.

**Metode:** Penelitian dilakukan menggunakan tikus C3H jantan yang diinduksi kanker paru dengan Benzo (a) pyrene (BaP). Hewan coba dibagi kedalam lima kelompok yaitu kontrol negatif, kontrol positif, kontrol obat cisplatin, dosis 1 polih herbal (150mg/kgbb), dan dosis 2 (300 mg/kgbb). Pengamatan ekspresi VEGF pada jaringan dilakukan menggunakan metode IHC. Pengamatan ekspresi protein VEGF, angiopoietin 2, dan TNF- $\alpha$  dilakukan dengan metode LUMINEX.

**Hasil:** Rasio berat paru terhadap berat badan mencit menunjukkan tidak berbeda antara kontrol negatif dengan seluruh kelompok lainnya dengan nilai ( $p > 0,05$ ). Hasil pemeriksaan histopatologi menunjukkan bahwa induksi BaP menyebabkan perubahan arsitektur pada jaringan paru yang berupa penebalan dinding alveolar, penebalan jaringan ikat, deposisi fibrin, infiltrasi sel diantaranya adalah infiltrasi neutrofil namun tidak ditemukan lesi kanker. Penilaian IHC menunjukkan bahwa ekspresi VEGF pada jaringan paru kontrol negatif berbeda signifikan dengan kontrol positif dan kontrol obat cisplatin ( $P < 0,05$ ). Perlakuan kedua perlakuan dosis tidak berbeda signifikan dengan kontrol normal ( $P > 0,05$ ). Analisis luminex terkait konsentrasi VEGF yaitu kontrol positif dan cisplatin berbeda signifikan terhadap kontrol negatif dengan nilai ( $P < 0,05$ ). Perlakuan dosis 1 dan 2 tidak berbeda signifikan dengan nilai ( $P > 0,05$ ). Analisis angiopoietin 2, dan TNF- $\alpha$  tidak berbeda signifikan antar kelompok perlakuan dengan nilai ( $P > 0,05$ ).

**Kesimpulan:** Penelitian ini menunjukkan tidak ada beda antar kelompok perlakuan terhadap parameter rasio/berat badan mencit, angiopoietin 2, dan TNF- $\alpha$ . Dosis 1 dan dosis 2 tidak berbeda signifikan dengan kontrol negatif terhadap kadar VEGF pada analisis LUMINEX serta pada analisis IHC kontrol negatif.

**Kata Kunci:** VEGF, angiopoietin 2, TNF- $\alpha$ , polih herbal, LUMINEX, IHC

## ABSTRACT

**Background:** Lung cancer overexpresses VEGF, angiopoietin 2, and TNF- $\alpha$  which contribute to the malignancy of the cancer. Previous studies with single extracts of basil (*Ocimum sanctum* L), rosella (*Hibiscus sabdariffa*), and temu putih (*Curcuma zedoaria*) were able to suppress these parameters.

**Research Objective:** This study aims to examine the effect of giving a combination of basil, rosella, temu putih extracts in vivo on the ratio of lung weight to body weight of mice, expression of VEGF, angiopoietin 2, and TNF- $\alpha$  in lung cancer animal models.

**Methods:** The study was conducted using male C3H rats induced lung cancer with Benzo (a) pyrene (BaP). The animals were divided into five groups: negative control, positive control, cisplatin drug control, polyherbal dose 1 (150mg/kg bw), and dose 2 (300 mg/kg bw). Observation of VEGF expression in the tissue was performed using the IHC method. Observation of VEGF, angiopoietin 2, and TNF- $\alpha$  protein expression was performed using the LUMINEX method.

**Results:** The lung weight-to-body weight ratio in mice showed no significant difference between the negative control group and all other groups ( $p > 0.05$ ). Histopathological examination revealed that BaP induction caused architectural changes in lung tissue, including alveolar wall thickening, connective tissue thickening, fibrin deposition, and cellular infiltration, including neutrophil infiltration, but no cancerous lesions were detected. IHC analysis showed that VEGF expression in the negative control lung tissue differed significantly from the positive control and cisplatin-treated control ( $P < 0.05$ ). The two dose treatments did not differ significantly from the normal control ( $P > 0.05$ ). Luminex analysis of VEGF concentration showed that the positive control and cisplatin groups differed significantly from the negative control group ( $P < 0.05$ ). Treatment groups 1 and 2 did not differ significantly from the negative control group ( $P > 0.05$ ). Analysis of angiopoietin 2 and TNF- $\alpha$  did not show significant differences between treatment groups ( $P > 0.05$ ).

**Conclusion:** This study shows no significant differences between treatment groups in terms of body weight ratio, angiopoietin 2, and TNF- $\alpha$  parameters. Doses 1 and 2 were not significantly different from the negative control in terms of VEGF levels in Luminex analysis and in IHC analysis of the negative control.

Keywords: VEGF, angiopoietin 2, TNF- $\alpha$ , polyherbal, LUMINEX, IH

