Pengaruh Medan Listrik Statis terhadap Aktivitas *Alanine Transaminase*, Kadar Bilirubin dan Kreatinin Tikus (*Rattus norvegicus* Berkenhout, 1769) dengan Induksi *7,12-Dimethylbenz[α]anthracene*

INTISARI

Tikus galur *Sprague Dawley* (SD) sering dipakai sebagai hewan model kanker payudara dengan induksi *7,12-Dimethylbenz[α]anthracene* (DMBA). Salah satu alternatif mengatasi kanker adalah menggunakan paparan medan listrik statis khususnya frekuensi menengah dan intensitas rendah. Untuk itu perlu evaluasi terhadap perlakuan yang dapat mempengaruhi fungsi organ khususnya hati dan ginjal dengan menggunakan parameter aktivitas *alanine transaminase* (ALT), kadar bilirubin dan kreatinin serum. Penelitian ini bertujuan untuk mengetahui pengaruh medan listrik frekuensi menengah dan intensitas rendah terhadap aktivitas ALT, kadar bilirubin dan kreatinin tikus yang diinduksi DMBA. Penelitian dilakukan terhadap 27 ekor tikus yang dibagi menjadi 3 kelompok yakni: Induksi – Terapi, Induksi – Non Terapi, dan Non Induksi – Terapi. Induksi kanker payudara tikus galur SD pada kelompok Induksi – Terapi dan Induksi – Non Terapi dilakukan dengan cara pemberian DMBA peroral dosis 20 mg/kg BB sebanyak 10 kali selama 5 pekan hingga muncul nodul tumor. Terapi diberikan sebanyak 10 jam per hari dengan menggunakan kandang individu *Electro-Capacitive Cancer Therapy* (ECCT) selama 21 hari pada kelompok Induksi – Terapi dan Non Induksi – Terapi. Pengambilan darah dilakukan pada saat tikus belum diinduksi (kondisi *baseline*), sebelum terapi dan sesudah terapi. Serum darah dipisahkan dengan sentrifugasi, kemudian dilakukan pengukuran parameter biokimiawi, yakni: aktivitas ALT, kadar bilirubin dan kreatinin serum. Pengukuran kadar untuk ketiga parameter tersebut dilakukan secara spektrofotometri setelah serum dipreparasi dengan reagen dari kit produk komersial. Data diuji secara statistik dengan uji ANAVA ($p< 0,05$) dan uji Tukey. Hasil menunjukkan tikus yang diinduksi DMBA mengalami penurunan aktivitas ALT dan meningkatkan kadar bilirubin. Perlakuan induksi medan listrik statis frekuensi menengah dan intensitas rendah relatif aman terhadap aktivitas ALT dan kadar bilirubin, namun meningkatkan kadar kreatinin serum, namun masih dibawah kisaran normal. Secara umum paparan medan listrik statis frekuensi menengah dan intensitas rendah relatif aman berdasarkan nilai aktivitas ALT, kadar bilirubin, dan kadar kreatinin.

Kata Kunci: DMBA, terapi medan listrik intensitas menengah – frekuensi rendah, *Alanine Transaminase*, Bilirubin, Kreatinin,

The Effect of Intermediate Frequency and Low Intensity Electric Field on Alanine Transaminase Activity, Bilirubin and Creatinine Level of Rats (*Rattus norvegicus* Berkenhout, 1769) Induced by 7,12-Dimethylbenz[α]anthracene

ABSTRACT

The Sprague Dawley (SD) strain rats are often used as models of animal breast cancer with the induction of 7.2-Dimethylbenz [α] anthracene (DMBA). One alternative to overcome cancer is to use exposure to static electric field, especially intermediate frequency and low intensity electric fields. It is therefore necessary to evaluate treatments that may affect the function of organs especially the liver and kidneys by using alanine transaminase (ALT) activity parameters, serum bilirubin and creatinine levels. The aim of this research is to know the effect of intermediate frequency and low intensity electric field to ALT activity, bilirubin and creatinine levels. The study was conducted on 27 rats divided into 3 groups: Induction - Therapy, Induction - Non Therapy, and Non Induction Therapy. The induction of breast cancer in SD rats in the Induction - Therapy and Induction - Non Therapy group was performed by dosing per oral DMBA 20 mg / kg BW as much as 10 times for 5 weeks until the tumor nodule appeared. Therapy was administered for 10 hours per day using a Electro-Capacitive Cancer Therapy (ECCT) individual cage in 21 day for the Induction - Therapy and Non Induction - Therapy group. Blood sampling was performed when rats were not induced (initial condition), before and after therapy. The blood serum was separated by centrifugation, then the biochemical parameters were measured: ALT activity, serum bilirubin and creatinine levels. The measurement levels for these three parameters were performed spectrophotometrically after serum was prepared with reagents from commercial products kit. Data was analyzed statistically by ANOVA test ($p < 0.05$) following Tukey test. Results showed that DMBA-induced rat decreased ALT activity and increased bilirubin levels. Treatment induction of electric field is relatively safe based on ALT activity and bilirubin levels, but increased creatinine levels although it's still under normal range. In general, exposuring to the intermediate frequency and low intensity static electric field is safe relatively based on the value of ALT activity, bilirubin, and creatinine levels.

Keywords: DMBA, intermediate frequency – low intensity electric field therapy, Alanine Transaminase, Bilirubin, Creatinine,