

**PENGARUH PEMBERIAN EKSTRAK PEGAGAN (*Centella asiatica*)
TERHADAP KADAR HDL DAN LDL TIKUS PUTIH (*Rattus norvegicus*)
YANG DIBERI PAPARAN GELOMBANG ELEKTROMAGNETIK
TELEPON SELULER**

ABSTRAK

Latar Belakang : Paparan gelombang elektromagnetik (EM) telepon seluler berpotensi meningkatkan stres oksidatif yang berkaitan dengan perubahan metabolisme lipid dan risiko aterogenik. Ekstrak *Centella asiatica* kaya flavonoid dan triterpenoid dilaporkan bersifat antioksidan dan antiinflamasi sehingga dapat bermanfaat dalam memodulasi profil lipid pada kondisi paparan EM.

Tujuan : Mengetahui pengaruh pemberian ekstrak pegagan (*Centella asiatica*) terhadap kadar HDL dan LDL tikus putih (*Rattus norvegicus*) yang diberi paparan gelombang elektromagnetik telepon seluler.

Metode : Penelitian ini adalah penelitian *true experimental* dengan desain *post-test only with control group*. Tikus Wistar jantan sebanyak 30 ekor dibagi acak menjadi 5 kelompok yaitu K1 (kontrol sehat), K2 (dipapar EM ponsel 4G 2100 MHz melalui panggilan WhatsApp 2 jam/hari selama 45 hari), K3-K5 dipapar EM dengan perlakuan yang sama serta diberi ekstrak *Centella asiatica* 125, 250, dan 500 mg/kgBB/hari per oral 1 jam sebelum paparan. Analisis menggunakan *One Way ANOVA* ($p < 0.05$) dilanjutkan uji *Tukey HSD* berpasangan antar kelompok.

Hasil : Rerata HDL (mg/dL) berturut-turut yaitu K1=24.8; K2=34.33; K3=27.83; K4=30.33; K5=41.33. Hasil ANOVA menunjukkan perbedaan signifikan antar kelompok ($p = 0.014$). Uji *Tukey HSD* menunjukkan perbedaan signifikan antara K1 dengan K5 ($p = 0.014$) dan K3 dengan K5 ($p = 0.043$). Rerata LDL (mg/dL) berturut-turut yaitu K1=16.1; K2=14.8; K3=28.7; K4=12.5; K5=19.6. Terdapat perbedaan signifikan ($p = 0.011$) dengan perbandingan signifikan antara K2 dengan K3 ($p = 0.044$) dan K3 dengan K4 ($p = 0.009$).

Kesimpulan : Terdapat pengaruh pemberian ekstrak *Centella asiatica* terhadap kadar HDL dan LDL pada tikus Wistar jantan yang dipapar gelombang EM. Dosis 500 mg/kgBB paling efektif meningkatkan HDL, sedangkan dosis 250 mg/kgBB paling optimal menurunkan LDL.

Kata kunci : *Centella asiatica*, Gelombang elektromagnetik, HDL, LDL

THE EFFECT OF PEGAGAN (*Centella asiatica*) EXTRACT ON HDL AND LDL LEVELS IN WHITE RATS (*Rattus norvegicus*) EXPOSED TO MOBILE PHONE ELECTROMAGNETIC

ABSTRACT

Background : Exposure to electromagnetic (EM) field from mobile phones potentially increases oxidative stress, which is associated with changes in lipid metabolism and increased atherogenic risk. *Centella asiatica* extract is rich in flavonoids and triterpenoids and is reported to have antioxidant and anti-inflammatory properties; therefore, it may be beneficial in modulating lipid profiles under EM exposure.

Objective : to determine the effect of *Centella asiatica* extract on HDL and LDL levels in white rats (*Rattus norvegicus*) exposed to electromagnetic waves from mobile phones.

Methods : This study was a true experimental study using a post-test only control group design. Thirty male Wistar rats were randomly allocated into five groups: K1 (healthy control), K2 (exposed to 4G mobile-phone EM field at 2100 MHz via WhatsApp calls for 2 hours/day for 45 days), and K3-K5 (exposed to the same EM protocol and administered oral *Centella asiatica* extract at doses of 125, 250, and 500 mg/kg body weight/day. Data were analyzed using one-way ANOVA ($p < 0.05$), followed by Tukey's HSD post-hoc test for pairwise comparisons.

Results : The mean HDL levels (mg/dL) are K1=24.8, K2=34.33, K3=27.83, K4=30.33, and K5=41.33. A significant difference is observed among groups ($p=0.014$). Tukey's HSD test shows a significant difference between K1 and K5 ($p=0.014$) and between K3 and K5 ($p=0.043$). The mean LDL levels (mg/dL) are K1=16.1, K2=14.8, K3=28.7, K4=12.5, and K5=19.6. A significant difference is observed among groups ($p=0.011$), with significant pairwise differences between K2 and K3 ($p=0.044$) and between K3 and K4 ($p=0.009$).

Conclusion : Administration of *Centella asiatica* extract affects HDL and LDL levels in male Wistar rats exposed to EM field. A dose of 500 mg/kg body weight is the most effective in increasing HDL, whereas a dose of 250 mg/kg body weight is the most optimal in reducing LDL.

Keywords : *Centella asiatica*, electromagnetic field, HDL, LDL