ABSTRAK

Latar Belakang: Pestisida banyak digunakan di pertanian dan rumah tangga, namun dapat menimbulkan dampak berbahaya bagi kesehatan. WHO melaporkan sekitar 140.000 kematian akibat keracunan pestisida setiap tahun, terutama di negara berkembang seperti Indonesia. Alfa-sipermetrin, piretroid tipe II yang umum digunakan untuk pengasapan, dapat menyebabkan stres oksidatif dan kerusakan ginjal akibat bioakumulasi. Bawang putih (*Allium sativum*), yang kaya flavonoid dan allicin, memiliki efek antioksidan dan sitoprotektif, namun perannya terhadap kerusakan ginjal akibat alfa-sipermetrin belum banyak diteliti.

Tujuan: Membuktikan pengaruh pemberian ekstrak bawang putih dosis bertingkat *(Allium sativum)* terhadap gambaran histopatologi ginjal tikus Wistar yang diinduksi alfa-sipermetrin.

Metode: Penelitian eksperimental kuantitatif dengan desain *post-test only control group* menggunakan 25 ekor tikus Wistar yang dibagi menjadi lima kelompok (n=5): kontrol normal, kontrol negatif (alfa-sipermetrin 20 mg/kgBB), serta tiga kelompok perlakuan dengan ekstrak bawang putih dosis 250, 500, dan 1000 mg/kgBB selama 30 hari. Pemeriksaan histopatologi ginjal dilakukan dengan pewarnaan hematoksilin-eosin.

Hasil: Ekstrak bawang putih secara signifikan menurunkan tingkat kerusakan ginjal dibandingkan kontrol negatif. Skor kerusakan rata-rata: 3,96 ± 1,94 (kontrol negatif), 2,72 ± 1,59 (P1), 0,48 ± 0,77 (P2), dan 0,24 ± 0,52 (P3). Uji Kruskal-Wallis dan Mann-Whitney menunjukkan perbedaan bermakna antar kelompok, kecuali antara P2 dan P3.

Kesimpulan: Alfa-sipermetrin menyebabkan kerusakan ginjal yang signifikan, sedangkan ekstrak bawang putih menunjukkan efek protektif dan reparatif secara dosis-respons.

Kata kunci: alfa-sipermetrin, ekstrak bawang putih, *Allium sativum*, ginjal, tikus Wistar.

ABSTRACT

Background: *Pesticides are widely used in agriculture and households but pose serious health risks. The WHO reports around 140,000 pesticide-related deaths annually, mostly in developing countries such as Indonesia. Alpha-cypermethrin, a type II pyrethroid commonly used for fogging, can cause oxidative stress and kidney damage due to bioaccumulation. Garlic (Allium sativum), rich in flavonoids and allicin, possesses strong antioxidant and cytoprotective properties, yet its role in preventing alpha-cypermethrin-induced renal injury remains insufficiently studied.*

Objective: *To prove the effect of graded doses of garlic extract (Allium sativum) on the kidney histopathological features of Wistar rats induced by alpha-cypermethrin.*

Methods: *A quantitative experimental study with a post-test only control group design was conducted using 30 Wistar rats divided into five groups (n=6): normal control, negative control (alpha-cypermethrin 20 mg/kgBW), and three treatment groups receiving garlic extract at doses of 250, 500, and 1000 mg/kgBW for 30 days. Kidney tissues were examined histopathologically using hematoxylin-eosin staining.*

Results: *Garlic extract significantly reduced kidney damage compared to the negative control. Mean damage scores were 3.96 ± 1.94 (negative control), 2.72 ± 1.59 (P1), 0.48 ± 0.77 (P2), and 0.24 ± 0.52 (P3). Kruskal-Wallis and Mann-Whitney tests showed significant differences among groups, except between P2 and P3.*

Conclusion: *Alpha-cypermethrin exposure caused significant renal injury, while garlic extract demonstrated protective and reparative effects in a dose-dependent manner.*

Keywords: *alpha-cypermethrin, garlic extract, Allium sativum, kidney, Wistar rats.*