

**PENGARUH PAPARAN TIMBAL (Pb) PADA KADAR
MALONDIALDEHID (MDA) PLASMA TIKUS WISTAR JANTAN
(*Rattus norvegicus*)**

ABSTRAK

Latar Belakang – Timbal (Pb) merupakan logam berat beracun yang dapat memicu stres oksidatif melalui pembentukan *reactive oxygen species* (ROS). Proses ini menyebabkan peroksidasi lipid yang menghasilkan malondialdehid (MDA) sebagai produk akhirnya. MDA dikenal sebagai biomarker kerusakan oksidatif yang dapat diukur dalam plasma, sehingga penting untuk mengetahui pengaruh paparan Pb terhadap kadar MDA dalam tubuh.

Tujuan – Penelitian ini bertujuan untuk mengetahui pengaruh paparan timbal (Pb) terhadap kadar malondialdehid (MDA) plasma pada tikus Wistar jantan (*Rattus norvegicus*) dengan variasi dosis dan durasi paparan akut.

Metode Penelitian – Penelitian ini menggunakan *true experimental* dengan *completely randomized post-test only with control group design*. Subjek penelitian adalah 45 ekor tikus Wistar jantan yang dibagi menjadi lima kelompok dosis (0, 50, 100, 150, dan 200 mg/kgBB/hari) dan tiga subkelompok durasi (3, 7, dan 14 hari). Paparan Pb asetat diberikan secara per oral, dan kadar MDA plasma diukur menggunakan metode *Thiobarbituric Acid Reactive Substances* (TBARS). Analisis data menggunakan uji *Oneway ANOVA*.

Hasil – Hasil *Oneway ANOVA* pengaruh dosis paparan timbal didapatkan $p < 0,001$ ($p < 0,05$) untuk perlakuan 3, 7 dan 14 hari sedangkan pengaruh durasi paparan timbal didapatkan $p = 0,727$ ($p > 0,05$) untuk kelompok kontrol serta $p < 0,001$ ($p < 0,05$) untuk kelompok perlakuan terhadap kadar MDA.

Kesimpulan – Pemberian timbal berbagai dosis dan durasi berpengaruh terhadap kadar MDA pada tikus Wistar jantan (*Rattus norvegicus*). Dosis dan durasi timbal asetat peroral 50 mg/kgBB/hari selama 14 hari sudah dapat meningkatkan kadar MDA secara signifikan.

Kata Kunci: Stres oksidatif, malondialdehid (MDA), *Rattus norvegicus*, timbal (Pb).

The Effect of Lead (Pb) Exposure on Plasma Malondialdehyde (MDA) Levels in Male Wistar Rats (Rattus norvegicus)

ABSTRACT

Background - Lead (Pb) is a toxic heavy metal widely used in industry and known to induce oxidative stress by increasing the formation of reactive oxygen species. These reactive compounds initiate lipid peroxidation processes that result in malondialdehyde (MDA), a compound commonly used as a biomarker of cellular oxidative damage.

Objective - This study aimed to determine the effect of acute lead exposure on plasma malondialdehyde (MDA) levels in male Wistar rats (*Rattus norvegicus*) based on varying doses and durations of exposure.

Methodology - The study was conducted using a true experimental design with a completely randomized post-test only with control group design. A total of 45 male Wistar rats were randomly divided into five groups, each receiving lead acetate orally at doses of 0, 50, 100, 150, and 200 mg/kg body weight per day. Each dose group was further divided into three subgroups based on exposure duration: 3, 7, and 14 days. Plasma MDA levels were measured using the Thiobarbituric Acid Reactive Substances (TBARS) method. Data were analyzed using Oneway ANOVA.

Results - One-way ANOVA showed a significant effect of lead exposure dose on MDA levels ($p < 0.001$) across all durations. Duration of exposure did not significantly affect MDA levels in the control group ($p = 0.727$) but showed significant effects in the treatment groups ($p < 0.001$).

Conclusion - Lead exposure at varying doses and durations impacts MDA levels in male Wistar rats. Even low-dose lead acetate (50 mg/KgBW/day) for 14 days significantly increased MDA levels.

Keywords: oxidative stress, malondialdehyde (MDA), *Rattus norvegicus*, Plumbum (Pb).