EFEK GENOTOKSIK *METHOMYL* PADA KERUSAKAN DNA *Daphnia magna* (Straus, 1820; Cladocera, Daphniidae)

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INTISARI

Methomyl merupakan insektisida yang bersifat toksik terhadap organisme non target. Induksi methomyl menyebabkan kematian organisme melalui kerusakan Asam Deoksiribonukleat (DNA) berupa *strand break* DNA dan stress oksidatif. Peningkatan aktivitas antropogenik terutama bidang pertanian menghasilkan banyak polutan yang masuk ke dalam badan perairan sehingga akan mempengaruhi organisme perairan seperti *Daphnia magna*. Penelitian ini bertujuan untuk mempelajari efek toksisitas methomyl terhadap *Daphnia magna* dan mempelajari efek genotoksik methomyl terhadap kerusakan DNA *Daphnia magna*. Pada penelitian ini digunakan 2 umur *Daphnia magna* yaitu 24 jam dan 48 jam. *Daphnia magna* dipaparkan dengan methomyl selama 24 jam. Efek toksisitas methomyl dianalisis dengan uji toksisitas akut melalui nilai $LC_{50\text{-}24}$ jam. Kerusakan DNA dianalisis dengan *comet assay* melalui parameter *Tail Intensity*, *Tail Moment* dan *Tail Factor*. Pengaruh penggunaan umur diuji dengan *Independent Sample T-Test*. Hasil penelitian menujukkan bahwa paparan methomyl terhadap *Daphnia magna* menyebabkan efek toksik dengan nilai $LC_{50\text{-}24}$ jam pada organisme umur 24 jam sebesar 0,06 ppm dan pada umur 48 jam yaitu 0,024 ppm, nilai ini masuk ke dalam kategori sangat toksik. Induksi methomyl terhadap *Daphnia magna* menyebabkan kerusakan DNA yang ditandai dengan terbentuknya struktur komet berupa kepala dan ekor. Peningkatan konsentrasi methomyl menyebabkan peningkatan kerusakan DNA ditandai dengan peningkatan nilai *Tail Intensity*, *Tail Moment* dan *Tail Factor*. Penggunaan organisme dengan umur yang berbeda tidak mempengaruhi tingkat kerusakan DNA *Daphnia magna*.

Kata kunci: *Comet Assay*, *Daphnia magna*, Kerusakan DNA, $LC_{50\text{-}24}$ jam, Methomyl

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ABSTRACT

Methomyl is an insecticide that is toxic to non-target organisms. Induction of methomyl causes the death of organisms through Deoxyribonucleic Acid (DNA) damage in the form of DNA strand breaks and oxidative stress. An increase in anthropogenic activity, especially in agriculture, produces a lot of pollutants that enter into water bodies so that it will affect aquatic organisms such as *Daphnia magna*. This study aimed to study the toxicity effect of methomyl on *Daphnia magna* and to study the genotoxic effect of methomyl on DNA damage of *Daphnia magna*. In this study, two ages of *Daphnia magna* were used, namely 24 hours and 48 hours. *Daphnia magna* was exposed to methomyl for 24 hours. The effect of methomyl toxicity was analyzed using toxicity acute test through $LC_{50\text{-}24}$ hours value. DNA damage was analyzed by *comet assay* using Tail Intensity, Tail Moment and Tail Factor parameters. The effect of using age was tested with the Independent Sample T-Test. The results showed that methomyl exposure to *Daphnia magna* caused a toxic effect with an $LC_{50\text{-}24}$ hour value in organisms aged 24 hours at 0.06 ppm and 48 hours at 0.024 ppm, this value was categorized as extremly toxic. Methomyl induction of *Daphnia magna* causes DNA damage which is characterized by the formation of comet structures in the form of heads and tails. The increase in methomyl concentration causes an increase in DNA damage which is indicated by an increase in the value of Tail Intensity, Tail Moment and Tail Factor. The use of organisms of different ages did not affect the level of DNA damage of *Daphnia magna*.

Keyword: Comet Assay, *Daphnia magna*, DNA Damage, $LC_{50\text{-}24}$ hours, Methomyl