

RESEARCH ARTICLE

Protective Role of Kelakai (*Stenochlaena Palustris*) Extract on Malathion-induced Genotoxic: FTIR Spectroscopy Study

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ABSTRACT

Malathion is a genotoxic pesticide that destructs DNA. Many research have proven it, yet the mechanism has not been clear. That is the reason why this research needs to be conducted. This research used two groups, control, and two treatment group. The control group (P0) was 100 µL of Human Genomic DNA Female solution, while the treatment group (P1) was 100 µL of Human Genomic DNA Female solution which was added with 100 µL of 6 mM malathion solution. The other treatment group (P2) was 100 µL of Human Genomic DNA Female solution which was added with 100 µL of 6 mM malathion solution. Each group of solutions was incubated at 37°C for 48 hours. Then the absorbance was determined by FTIR. The content of the kelakai extract was determined by GC-MS. The results of the GC-MS analysis showed that the ethanolic extract of kelakai contained 6.1% hexadecanoic acid and 6.54% Neophytadiene. the percentage changes in the absorbance of guanine, thymine, cytosin, and adenine were significantly different in each group. So as deformation of the NH-groups in DNA bases. This means that kelakai extract can inhibit DNA damage.

Keywords: Genotoxic, Hexadecenoic acid, Kelakai, Neophytadiene, Malathion.

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INTRODUCTION

Malathion is an organophosphate pesticide that is widely used by farmers as pest control. On the other hand, malathion is also a cancer-causing toxic substance. Previous research stated that malathion is a type of pesticide that triggers ovarian cancer and breast cancer.¹ Research by El Baz *et al.*² also revealed that malathion can trigger leukemia in the children of farmers who use the malathion pesticide.

The mechanism of malathion as a carcinogen is not fully known, but many studies have linked it to the DNA methylation process. DNA methylation can interfere with the transcription process so that gene expression is disrupted.³ In addition, the

nucleophilic group in malathion can cause the breaking of phosphodiester bonds in DNA.^{4,5}

Several studies have revealed that hexadecanoic acid compounds can prevent proliferation by inhibiting DNA-Topoisemerase-1.⁶ Research by Bharath *et al.*⁷ also stated that hexadecanoic acid derived from the algae *Turbinaria ornata* has the potential as an anticancer of the colon in vitro. Nurmalatina's research⁸ states that hexadecanoic acid compounds can also be found in kelakai (*Stenochlaena palustris*).

Kelakai is a type of ferns, belonging to the pteridaceae family that grows in areas of high humidity such as peatlands in

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