

Effects Of Black Ginger (*Kaempferia parviflora*) on Embryonic Development, Morphology and Deformities of Zebrafish (*Danio rerio*)

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Structured Abstract

Background: Medicinal plants like *Kaempferia parviflora* are becoming increasingly popular, particularly among pregnant women. There is limited research on the potential negative effects of this plant on pregnant women and developing embryos. This study examines the embryotoxic and developmental effects of *K. parviflora* using the zebrafish embryo model. The primary objectives are to assess embryonic development, morphology, and survivability, as well as any potential developmental deformities caused by embryo exposure.

Methods: *K. parviflora* leaf and rhizome extracts were prepared at five different concentrations (0.1-0.00625 mg/L) using serial dilution. Zebrafish embryos were exposed to different concentrations for 0-120 hours post-fertilization and monitored using a DinoEye camera attached to an inverted microscope. The hatching, survival, anomalies, morphological changes, and heart rate were all monitored and recorded. Statistical analysis, including ANOVA, paired t-tests, unpaired t-tests, and probit linear regression, were used to determine the LC₅₀ value and significant differences between treatment groups (P value < 0.05).

Results: The study found a dose-dependent relationship, with higher concentrations leading to greater toxicity in the zebrafish. Rhizomes have slightly higher cumulative mortality rates compared to leaves. The LC₅₀ for both extracts is <0.0625 mg/L. The hatchability rate is consistent across both extracts. Both extracts cause developmental defects, including pericardial oedema and non-detachment of tail.

Conclusion: This study found that leaf and rhizome extracts of *Kaempferia parviflora* (black ginger) can harm zebrafish embryos significantly. The study found that *K. parviflora* can cause morphological and developmental abnormalities in embryos, such as pericardial oedema, tail non-detachment, decreased survival, increased mortality, and altered heart rates, in a dose-dependent manner. These new findings serve as a foundation for future research on the embryotoxic and teratogenic effects of *K. parviflora*.

Keywords: *Kaempferia parviflora*, black ginger, zebrafish embryotoxicity test

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