

***HER2* Gene Analysis on HGC-27 Human Gastric Carcinoma Cell Lines Treated with *Annona Muricata L.* Ethanolic Extracts**

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Structured Abstract

Background: Gastric cancer is a major global health concern with high mortality rates due to late diagnosis and limited therapeutic options. One of the molecular targets in gastric cancer treatment is the overexpression of *HER2* in certain gastric cancer cell lines. Nowadays, natural plant extracts have gained attention as potential alternative therapies. Therefore, in this study *Annona muricata* ethanolic extracts have been used against HGC-27 cells to evaluate the effect of the treatment on *HER2* gene expression before and after treatment.

Method: One hundred gram of *A. muricata* were extracted using 70% ethanol. HGC-27 gastric cancer cells were cultured and treated with the extract at concentrations of 50 µg/mL and 100 µg/mL for 24 hours. Morphological changes were observed under a microscope to assess the cytotoxic effects of the treatment. Total RNA was then extracted from both treated and untreated cells, followed by RT-PCR to evaluate *HER2* gene expression, using *HER2* primers and β -*ACTIN* as the internal control. Agarose gel electrophoresis was performed to visualize the amplified bands.

Results: Microscopic analysis revealed dose-dependent morphological alterations in the treated HGC-27 cells, including cell shrinkage and membrane blebbing, indicating the potential cytotoxic effects of *A. muricata* extract. Semi-quantitative RT-PCR analysis showed *HER2* gene bands at approximately 171 bp in both treated and untreated samples meanwhile the expression of the β -*ACTIN* reference gene remained relatively stable across all samples, with bands observed at approximately 168 bp, allowing normalization and comparison of *HER2* expression levels.

Conclusion: In conclusion, *A. muricata* ethanolic extract has induces visible cytotoxic effects in HGC-27 gastric cancer cells but did not significantly alter *HER2* mRNA expression after 24 hours of treatment. These findings have indicated that while the extract affects the cell morphology, its short-term effect on *HER2* gene regulation is limited. Further studies with longer treatment durations are recommended to observed delayed effects on *HER2* expression in HGC-27 cells. For precise quantification, real-time PCR and *HER2* protein validation via Western blot are also suggested.

Keywords: gastric cancer, HGC-27, *HER2*, *A. muricata*, RT-PCR

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