

## Antiproliferative and apoptosis inducing activity of *Markhamia tomentosa* leaf extract on HeLa cells

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*Markhamia tomentosa* (Benth) K. Schum ex. Engl. (Bignoniaceae), a tree widely dispersed in west tropical Africa, is used traditionally to treat various diseases as it possesses antimicrobial, antioxidant, analgesic, anti-inflammatory and anticancer activities. This study evaluates the cytotoxic effect and underlying mechanisms of the ethanolic leaf extract of *Markhamia tomentosa* on HeLa and MCF-7 cancer cell lines and Vero non-cancerous cell line. Brine shrimp lethality test was used for preliminary screening. Cytotoxicity was determined using the MTT assay and  $IC_{50}$  was calculated. Effect of *Markhamia tomentosa* on the cell cycle was monitored by flow cytometry and the apoptosis-induction capability confirmed by exposure of phosphatidylserine to the outer leaflet of the plasma membrane. Loss of mitochondrial membrane potential was analyzed by flow cytometry using JC-1. *Markhamia tomentosa* leaf extract was toxic to brine shrimps with  $LD_{50}$  of 31.62 mg/ml. Cell viability and growth of HeLa cells was inhibited by the extract with an  $IC_{50}$  of  $189.1 \pm 1.76$  mg/ml at 24 h post treatment. However, no cytotoxic effect was observed in MCF-7 and Vero cell lines. The extract induced cell cycle arrest in HeLa cells in the  $G_0/G_1$  phase resulting in cell death after 24 h exposure. Induction of apoptosis in HeLa cells was substantiated by Annexin V-FITC/PI double staining showing phosphatidylserine translocation and depolarization of the mitochondrial membrane potential by flow cytometry of JC-1 stained cells. In conclusion, the ethanolic leaf extract of *Markhamia tomentosa* induces  $G_0/G_1$  cell cycle arrest in HeLa cells followed by induction of the intrinsic pathway of apoptosis.

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