



**CYTOTOXICITY AND APOPTOSIS INDUCTION BY KAFFIR LIME
LEAVES EXTRACT (*Citrus hystrix* DC.) IN HeLa CELLS CULTURE
(HUMAN CERVICAL CANCER CELL LINE)**

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ABSTRACT

Kaffir lime (*Citrus hystrix*) is a native plant of Indonesia. Nowadays the use of plants is limited as ingredients in Indonesia cuisine and aromatherapy oils for industry. Leaves of *C. hystrix* contain of polyphenols and essential oils thus they were possibly cytotoxic to cancer cell line. The objective of this research was to determine the cytotoxicity effect and apoptosis induced by leaves extract *C. hystrix* to cervical cancer cell line (HeLa cells). Methods used in this study included sampling of kaffir lime leaves, extraction using three different solvents (ethanol, ethyl acetate, and hexane), detection of metabolite secondary compound (alkaloids, flavonoids, terpenoids, saponins, and tannins) using thin layer chromatography (TLC), cytotoxicity assay via MTT assay, and apoptosis test with double staining method (ethidium bromide-acrydine orange). Result showed kaffir lime crude extract dose dependently inhibit HeLa cells proliferation. IC_{50} of ethanolic and ethyl acetate extract was 82,034 $\mu\text{g/mL}$ and 57,845 $\mu\text{g/mL}$, respectively means cytotoxic to HeLa cells. On the other hand IC_{50} of hexane extract was 203,992 $\mu\text{g/mL}$ which was not cytotoxic. Furthermore ethanolic and ethyl acetate extract were able to induce apoptosis of HeLa cells by increasing the number of apoptotic cells. In conclusion, kaffir lime leaves extract had cytotoxic effect and induced apoptosis. Moreover ethyl acetate extract of kaffir lime was the most potential to induce apoptosis in HeLa cells.

Key words: kaffir lime leaves (*Citrus hystrix*), HeLa, MTT, cytotoxicity, apoptosis.