

Achyranthes aspera Leaf Extract Induces Apoptosis in MCF-7 Human Breast Cancer Cells via Mitochondrial Pathway

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SUMMARY. Breast cancer is one of the most dreading types of cancer among women. Herbal medicine has become a potential source of treatment for breast cancer. In this study, we examined the apoptosis-inducing potential of *Achyranthes aspera* leaf extract in MCF-7 human breast cancer cells. Cultured MCF-7 cells were separated into the following four groups: Group 1 served as the Control, while Groups 2, 3, and 4 were treated with *A. aspera* leaf extract at concentrations of 10, 20, and 40 μg , respectively. After 24 h of incubation, the cells were observed for morphological changes following *A. aspera* leaf extract treatment. These cells were then utilized in numerous experiments. *A. aspera* leaf extract was administered to MCF-7 cells at various concentrations (1-500 μg), which inhibited cell proliferation, increased ROS formation, and induced apoptosis. In addition, real-time PCR analysis revealed that *A. aspera* leaf extract-treated cells had decreased expression of the anti-apoptotic gene Bcl-2 and increased expression of the pro-apoptotic genes Bax, caspase-3 and cytochrome c. These findings indicate that *A. aspera* leaf extract suppress the cell viability of MCF-7 cells and induced cell apoptosis via mitochondrial pathway.

RESUMEN. El cáncer de mama es uno de los tipos de cáncer más temibles entre las mujeres. La medicina herbaria se ha convertido en una fuente potencial de tratamiento para el cáncer de mama. En este estudio, examinamos el potencial inductor de apoptosis del extracto de hoja de *Achyranthes aspera* en células de cáncer de mama humano MCF-7. Las células MCF-7 cultivadas se separaron en los siguientes cuatro grupos: el grupo 1 sirvió como control, mientras que los grupos 2, 3 y 4 se trataron con extracto de hoja de *A. aspera* en concentraciones de 10, 20 y 40 μg , respectivamente. Después de 24 h de incubación, se observaron las células en busca de cambios morfológicos después del tratamiento con extracto de hoja de *A. aspera*. Luego, estas células se utilizaron en numerosos experimentos. Se administró extracto de hoja de *A. aspera* a células MCF-7 en diversas concentraciones (1-500 μg), lo que inhibió la proliferación celular, aumentó la formación de ROS e indujo la apoptosis. Además, el análisis de PCR en tiempo real reveló que las células tratadas con extracto de hoja de *A. aspera* tenían una expresión disminuida del gen antiapoptótico Bcl-2 y una expresión aumentada de los genes proapoptóticos Bax, caspasa-3 y citocromo c. Estos hallazgos indican que el extracto de hoja de *A. aspera* suprime la viabilidad celular de las células MCF-7 e induce la apoptosis celular a través de la vía mitocondrial.

KEY WORDS: *Achyranthes aspera*, apoptosis, breast cancer, cytotoxicity, MCF-7 cells.

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