Identification of bioactive compounds and comparison of apoptosis induction of three varieties of sugarcane leaves

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Abstract

This study identified bioactive compounds and systematically compared apoptosis induction of water extracts of sugarcane (\textit{Saccharum officinarum} L.) leaves among three varieties, including 28NG256, wild type and ROC10, using hepatoma HepG2 cell line. 28NG256 showed the highest levels of total phenolic compounds, flavonoids, tannins, ascorbic acid, and chlorogenic acid among the three varieties. Especially, 28NG256 contained a high level of caffeic acid, which was not detectable in other varieties. The cell proliferation was inhibited by 67.29\%, 55.01\% and 21.38\% for 28NG-256, wild type and ROC10 at 1500 \(\mu\)g/ml, respectively, compared to the untreated cells. The apoptosis induced by the extracts was associated with the attenuation of mitochondrial membrane potentials (\(\Delta\psi_m\)), increase in Bax/Bcl-2 ratio and induction of caspase-3 activation. Of the three varieties, 28NG256 displayed the highest induction of apoptosis in HepG2 cells and the highest increase of ROS generation, suggesting that ROS play a key role in the induction of apoptosis in HepG2 cells. Based on HPLC analysis, caffeic, chlorogenic, and hydroxybenzoic acids were present in 28NG256, which may be, in part, responsible for the effect on HepG2 cell proliferation. Overall, among three varieties, 28NG256 appeared to exert the most potent