



Anticancer and Apoptotic Effects of *Hymenodictyon floribundum* (Hochst. & Steud.) B.L.Rob. Stem Bark Hydroethanolic Extract

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Abstract

Purpose The present study aimed to examine in vitro anticancer and apoptotic effects of the 80% ethanolic extract of *Hymenodictyon floribundum* and isolated compounds on A549 human lung cancer cell lines. Furthermore, isolated compounds and crude extract were investigated for their antimicrobial activity against *Aspergillus niger*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Escherichia coli*, *Candida albicans*, and *Staphylococcus aureus*.

Methods The anticancer activity was examined by trypan blue exclusion and MTT assays. Flow cytometry was used to assess apoptosis using the Annexin V-FITC/PI technique, the antimicrobial activity was assessed by using Broth microdilution method against six pathogenic microbes. The GC-MS, ¹H NMR, ¹³C NMR, and mass spectral data were used to elucidate the structure of isolated compounds.

Results The study resulted in the isolation of two compounds, 7-Hydroxy-6-methoxycoumarin (A) and 2,2,4-Trimethyl-3-(3,8,12,16-tetramethyl-heptadeca-3,7,11,15-tetraenyl)-cyclohexanol (K). The compound A and K inhibited the growth of A549 lung cancer cell lines with IC₅₀ values of 77.56 µg/mL and 92.13 µg/mL, respectively. The anticancer effects of compounds A and K were due to early and late apoptotic cell death induction. Compounds A and K exhibited potential antimicrobial activity against all microbes tested. The highest antimicrobial activity was shown by compound A against *S. aureus* with a minimum inhibitory concentration (MIC) of 62.5 µg/mL.

Conclusion These findings provide evidence that the stem bark extract of *H. floribundum* contains compounds with both anticancer and antimicrobial activity. The isolated compounds were found to possess antimicrobial activity and inhibit the growth of A549-Human lung cancer cells by inducing apoptosis.

Keywords *Hymenodictyon floribundum* · Cancer · Apoptosis · Antimicrobial · Medicinal plant

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Abbreviations

DCM	Dichloromethane
DMSO	Dimethyl sulphoxide
GC	Gas chromatography
GC-MS	Gas chromatography-mass spectrometer
ICCR	Indian council for cultural relations
MTT	3-(4, 5-Dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide
MIC	Minimum inhibitory concentration
MBC	Minimum bactericidal concentration
MFC	Minimum fungicidal concentration
NMR	Nuclear magnetic resonance
NCCS	National centre for cell science
O.D	Optic density
P.E	Petroleum ether
PI	Propidium iodide
PBS	Phosphate buffer solution