Bioactivity-guided isolation of cytotoxic constituents from three medicinal plants

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Abstract

Context: The ethanol extracts and their fractions of three Indian medicinal plants, \textit{Ervatamia coronaria} (Jacq.) Spreit. (Apocynaceae), \textit{Mimusops pudica} L. (Mimosaceae) and \textit{Caesalpinia bonduce} (L.) Roxb. (Caesalpiniaceae) were tested for their cytotoxic activity in the brine shrimp lethality (BSL) bioassay and in various cancer cell lines. The plants were selected based on their traditional use in the treatment of cancer/tumors.

Objectives: To investigate the \textit{in vitro} cytotoxicity of \textit{Ervatamia coronaria}, \textit{Mimusops pudica} and \textit{Caesalpinia bonduce}.

Materials and methods: Ethanolic extracts and their fractions of \textit{E. coronaria}, \textit{M. pudica} and \textit{C. bonduce} were subjected to cytotoxicity studies using BSL bioassay method with concentrations of 10, 50, 100, 500 and 1000 \(\mu\)g/ml. The alkaloid fraction of \textit{E. coronaria} with significant cytotoxicity in BSL bioassay was subjected to \textit{in vitro} cytotoxicity studies with \textit{HT-29}, \textit{A-549}, \textit{HeLa}, and \textit{MCF-7} cell lines at concentrations of 12.5, 25, 50, 100 and 200 \(\mu\)g/ml and a DNA fragmentation study using the \textit{HT-29} cell line.

Results: The alkaloid fractions of \textit{E. coronaria} and \textit{M. pudica} showed significant cytotoxicity with \textit{LC}_{50} values of 62.83 and 85.10 \(\mu\)g/ml in the BSL bioassay, respectively. The purified alkaloid fraction of \textit{E. coronaria} exhibited highest cytotoxicity in \textit{HT-29}, \textit{A-549} and \textit{MCF-7} cell lines with \textit{IC}_{50} values of 32.5, 47.5 and 72.5 \(\mu\)g/ml, respectively, and induced DNA fragmentation in the \textit{HT-29} cell line at a concentration of 65 \(\mu\)g/ml.

Conclusion: The alkaloid fraction of \textit{E. coronaria} exhibited significant cytotoxicity. Alkaloids such as ervatamine, aparicine and coronaridine that were earlier reported may be responsible for this activity.

Keywords

\textit{Caesalpinia bonduce}, DNA fragmentation, \textit{Ervatamia coronaria}, \textit{HT-29}, \textit{Mimusops pudica}

History

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