Abstract

The aim of the present study was to evaluate the anticancer activities of bioactive fractions of extracts of leaves of *Memecylon umbellatum* and roots and rhizomes of *Nardostachys jatamansi* and establish the phytochemical basis of activity. The approach of bioactivity-guided fractionation (BAGF) was employed for the separation and identification of bioactive compounds in the plant extracts. The ethyl acetate fraction of *Memecylon umbellatum* (MUEA) and diethyl ether fraction of *Nardostachys jatamansi* (NJDE) were found to be most active in various cancer cells viz. MCF-7, MDA-MB-231, HCT-116 and A549 cells. BAGF led to the isolation of pure compounds, pyrogallol, gallic acid and quercetin from MUEA and nardin and PA-rich oil from NJDE.

Overall, MUEA fraction and its active components: pyrogallol, quercetin, and gallic acid act by the preferred mode of cell death i.e. induction of apoptosis and cell cycle arrest in colon and breast cancer cells. NJDE fraction and its active components: patchouli alcohol (PA)-rich oil and sesquiterpene acid, nardin act induction of apoptosis that was confirmed by staining methods and increased in fold expression of Caspase 3/7 and cell cycle arrest in colon and breast cancer cells. *In vivo*, both the fractions, MUEA and NJDE exhibited significant anticancer activity in animal models of breast cancer in both DMBA-induced breast cancer and MDA-MB-231Br xenograft breast cancer model.