The Chemopreventive Effect of Tanacetum Polycephalum Against LA7-Induced Breast Cancer in Rats and the Apoptotic Effect of a Cytotoxic Sesquiterpene Lactone in MCF7 Cells: A Bioassay-Guided Approach


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Key Words
Tanacetum polycephalum • Asteraceae • Sesquiterpene lactone • 8β-hydroxy- 4β, 15-dihydroazulanin C • Breast cancer • Apoptosis • LA7 cells • MCF7 cells

Abstract

Background: Tanacetum polycephalum L. Schultz-Bip is a member of the Asteraceae family. This study evaluated the chemopreventive effect of a T. polycephalum hexane extract (TPHE) using in vivo and in vitro models. Methods and Results: Five groups of rats: normal control, cancer control, TPHE low dose, TPHE high dose and positive control (tamoxifen) were used for the in vivo study. Histopathological examination showed that TPHE significantly suppressed the carcinogenic effect of LA7 tumour cells. The tumour sections from TPHE-treated rats demonstrated significantly reduced expression of Ki67 and PCNA compared to the cancer control group. Using a bioassay-guided approach, the cytotoxic compound of TPHE was identified as a tricyclic sesquiterpene lactone, namely, 8β-hydroxy- 4β, 15-dihydroazulanin C (HDZC). Signs of early and late apoptosis were observed in MCF7 cells treated with HDZC and were attributed to the mitochondrial intrinsic pathway based on the up-regulation of Bax and the down-regulation of Bcl-2. HDZC induced cell cycle arrest in MCF7 cells and increased the expression of p21 and p27 at the mRNA and protein levels. Conclusion: This results of this study substantiate the anticancer effect of TPHE and highlight the involvement of HDZC as one of the contributing compounds that act by initiating mitochondrial-mediated apoptosis.