Summary
SUMMARY

Several therapeutic strategies have been researched to combat the dreadful disease, cancer. In this connection, chemoprevention with dietary compounds holds a prospective avenue. We studied the effect of BDMC-A, a curcumin analog, in breast and laryngeal cancers using MCF-7 and Hep-2 cell lines respectively. The effect of BDMC-A was also compared with curcumin. The results of our study showed that

- BDMC-A induces potent cytotoxicity in a time and dose dependent manner compared to curcumin.
- Our cell cycle analysis proved that BDMC-A arrest cells at G2/M phase in MCF-7 cells and at G1 phase in Hep-2 cells.
- BDMC-A possesses more efficacies compared to curcumin in modulating the important molecular targets and inhibiting breast cancer and head and neck cancer.
- BDMC-A induces nuclear fragmentation, chromatin condensation, early and late apoptosis, mitochondrial membrane depolarization and reactive oxygen species generation more significantly than curcumin in both MCF-7 and Hep-2 cells.
- BDMC-A induces apoptosis through both extrinsic and intrinsic pathways in MCF-7 and Hep-2 cells.
- BDMC-A inhibits the process of invasion, angiogenesis and metastasis in MCF-7 and Hep-2 cells through downregulating MMP-9, VEGF, IL-6 and IL-8 and upregulating TIMP-2.
- BDMC-A inhibits the inflammatory markers responsible for carcinogenesis viz. COX-2, TNF-α, TGF-β, IL-1, IL-4, IL-8.
- BDMC-A significantly inhibits transcription factors responsible for tumor progression and malignancy mainly NF-κB, c-Jun, c-Fos, STAT3, 5, PPAR-γ, β-catenin in both MCF-7 and Hep-2 cells.
- *In silico* docking analysis for BDMC-A with EGFR, PI3K, NFKB, COX-2, MMP-9 and c-Jun was also carried out. These studies prove that BDMC-A binds efficiently with these targets and maintains hinge region interaction in most of the targets studied. In addition, it has DFG loop contact which is not observed in curcumin.

From our study it can be concluded that BDMC-A has potent anti cancer activities compared to that of curcumin.