

Zingiberaceous Plants as a Source of Anti-Bacterial Activity: Targeting Bacterial Cell Division Protein (FtsZ)

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Abstract : Bacterial diseases are considered to be one of the most prevalent health hazards in the developing world and many bacteria are becoming resistant to existing antibiotics making the treatment ineffective. Thus, it is necessary to find novel targets and develop new antibacterial drugs with a novel mechanism of action. The process of bacterial cell division is a novel and attractive target for new antibacterial drug discovery. FtsZ, a homolog of eukaryotic tubulin, is the major protein of the bacterial cell division machinery and is considered as an important antibacterial drug target. Zingiberaceae, the Ginger family consists of aromatic herbs with creeping rhizomes. Many of these plants have antimicrobial properties. This study aimed to determine the anti-bacterial activity of selected Zingiberaceous plants by targeting bacterial cell division protein, FtsZ. Essential oils and methanol extracts of *Amomum ghaticum*, *Alpinia galanga*, *Kaempferia galanga*, *K. rotunda*, and *Zingiber officinale* were tested to find its antibacterial efficiency using disc diffusion method against authentic bacterial strains obtained from MTCC (India). Essential oil isolated from *A.galanga* and *Z.officinale* were further assayed for FtsZ inhibition assay following non-radioactive malachite green-phosphomolybdate assay using *E. coli* FtsZ protein obtained from Cytoskelton Inc., USA. *Z.officinale* essential oil possess FtsZ inhibitory property. A molecular docking study was conducted with the known bioactive compounds of *Z. officinale* as ligands with the *E. coli* FtsZ protein homology model. Some of the major constituents of this plant like catechin, epicatechin, and gingerol possess agreeable docking scores. The results of this study revealed that several chemical constituents in Ginger plants can be utilised as potential source of antibacterial activity and it can warrant further investigation through drug discovery studies.

Keywords : antibacterial, FtsZ, zingiberaceae, docking

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