

## INHIBITORY MECHANISM OF N-HEXANE AND DICHLOROMETHANE LEAF EXTRACTS OF *CLERODENDRUM PHLOMIDIS* LINN. ON FOOD BORN PATHOGEN *BACILLUS LICHENIFORMIS*

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**Abstract:** Bacillus related microbes are mainly found in the severe cases of foodborne infection and many other lethal diseases. Few herbal medicines are effective against *Bacillus licheniformis*, but their mechanism of action is not reported. The antimicrobial potential of herbal extract from *Clerodendrum phlomidis* (n-hexane and dichloromethane extract) was assessed by well diffusion assay which showed a zone of inhibition of 19 and 15.5 mm respectively. Underlying mechanism of action behind the n-hexane and dichloromethane extract of *C. phlomidis* is reported by an *in vitro* study over *Bacillus licheniformis* through FACS, SEM, and DNA fragmentation analysis. Fluorescent activated cell sorting was done to determine membrane potential disruption caused by extracts that revealed dichloromethane has more activity for membrane potential disruption. The SEM analysis of bacteria showed irregular structure in cell wall, blebbing and leakage of cellular contents and disruption of membrane. DNA fragmentation analysis showed a precise smear formation of bacterial cellular DNA providing evidence of its apoptosis. The FTIR spectroscopic analysis of herbal extract was done to determine the dominance of functional groups present within purified antimicrobial extracts and which had shown the dominance of Alcoholic (OH-) group, halogen groups(C-X), Aldehydic (CHO-) groups within them. The antibacterial action is mainly contributed by disruption of membrane potential, degradation of bacterial genomic DNA, damage of bacterial cell membrane and leakage of cellular content. The result provides a significant contribution towards understanding the antibacterial mechanism of n-hexane and dichloromethane extract of *C. phlomidis*.

**Keywords:** *Clerodendrum phlomidis*, *Bacillus licheniformis*, Herbal extract, FACS, SEM, DNA fragmentation

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