In conclusion, the plant *Clerodendrum infortunatum* possess large group of secondary metabolites viz: alkaloids, flavonoids, terpenoids, steroids, carbohydrates, tannins, saponins, glycosides, and amino acids. The existence of these phytochemicals in the parts of *C. infortunatum* scrutinized specifies or proposes that the plant has promises in pharmaceutical applications both domestically and industrially. The analysis of anthelmintic properties of the leaf extracts of *C. infortunatum* indicates there is a convinced loss of motility of worms resulted in paralysis followed by death. Therefore, the leaf extracts of *C. infortunatum* may considered to be potent anthelmintic. Evaluation of antifungal potential of the hexane, chloroform, ethyl acetate, and ethanol leaf extracts of *C. infortunatum* against four fungal strains (*Aspergillus niger, Aspergillus fumigates, Aspergillus flavorus, Candida albicans*) demonstrated that *Aspergillus fumigates* ascertain to be sensitive towards the action of different extracts of *C. infortunatum* extracts except ethanol extract. In addition, *Aspergillus niger* and *Candida albicans* are found to be resistant in response to the action of these extracts.

The screening the of leaf and root extracts of *C. infortunatum* for their cytotoxic potential against T47D (Breast), PC-3 (prostate), A549 (lung) and HCT-116 (colon) human cancer cell lines elucidated that the hexane root extract of *C. infortunatum* is found to be significantly toxic against PC-3 (prostate), A549 (lung) and HCT-116 (colon) cancer cell lines exhibiting significant growth inhibition. Likewise, hexane, chloroform root extract also exhibited considerable growth inhibition. The cytotoxic effects of these two extracts verified further by clonogenic, scratch mobility, and DAPI staining methods in A549 cells also described that hexane and chloroform extracts are toxic to this cell line. Interestingly, both extracts which showed high anticancer activity are from the root parts of *C. infortunatum* and unveil the presence of alkaloids, flavonoids as well as terpenoids and can be concluded that cytotoxic property could be due to the high content of these secondary metabolites present in the plant. Furthermore, *in vivo* studies of antitumor effects of *C. infortunatum* hexane and chloroform root extracts in EAT tumor bearing mice exhibited noticeable antitumor activity.
concluded from the increased life span of EAT bearing mice, possibly due to the inhibitory influence of hexane and chloroform root extracts on cell multiplication or promoting cancer cell death by apoptosis.

Based on the qualitative phytochemical analysis trailed by the cytotoxic studies the pharmacognostic evaluation comprising the isolation and characterization of the compounds from the hexane and chloroform crude extracts of *C. infortunatum* resulted in betulinic acid from hexane and lupeol acetate from chloroform root extracts. The basic cytotoxic activity using MTT assay of betulinic acid and lupeol acetate derived from hexane and chloroform extracts of *C. infortunatum* on MCF 7 (Breast), HepG2 (Liver), HCT-116 (Colon), and A549 (Lung) human cancer cells determines that betulinic acid treatment halted proliferation of all cell lines tested except A549 cell line. This confirms its cytotoxic activity against a variety of cancer cell lines. On the other hand, the lupeol acetate treatment ceased propagation of all cell lines tested and resulted to be potent cytotoxic agent.

- The cause of cell death either by apoptosis or necrosis with treatment of betulinic acid and lupeol acetate in HCT-116 cell line confirmed that betulinic acid induced moderate apoptotic cell death may be due to regulation of apoptosis by some members of Bcl-2 anti-apoptotic family proteins. In comparison, lupeol acetate described significant apoptotic cell death of HCT-cell line and resulted in pro-apoptotic agent. Tunnel assay for DNA fragmentation of HCT-116 cell line presents that betulinic acid treated HCT-116 cells displays less DNA fragmentation, which may be the reason for moderate apoptosis by this compound. Lupeol acetate treated HCT-116 cells have presented significant DNA fragmentation. Apoptotic regulation verified by Bcl-2 expression in HCT-116 cells by betulinic acid exhibit that it has not down regulated the anti-apoptotic Bcl-2 protein of HCT-116 cell line which may confirm the reason for less apoptotic cell death. Lupeol acetate has tremendously down regulated the expression of anti-apoptotic Bcl-2 protein and demonstrates pro-apoptotic activity. Pro-apoptotic mechanism associated with cell death of HCT-116 cancer cell line by the expression of caspase-3 protein points out under expression of caspase-3 by the action of betulinic acid and it may also be the reason of less apoptosis of HCT-
116 cells by this compound. Lupeol action on caspase-3 protein clearly demonstrates enormous increase in the expression caspase-3 activity and ultimately proved as a pro-apoptotic compound.

➢ Thus, the overall results obtained from this study unambiguously indicate that the plant *C. infortunatum* certainly possess many essential medicinal properties. Thus, strongly validates the traditional use of this plant in the form of crude extracts since many years in this region. Further the root component of this plant possess strong cytotoxic effects validated through advanced assays and hence may be a good candidate for future studies and consideration for anti cancer drug development.