SUMMARY

The present study deals with the species *Cordia dichotoma* belongs to family Boragineceae. The *Cordia dichotoma* is a small to medium sized tree, stem bark is grey, flowers are short-stalked, white in colour, the fruit are pink or yellowish containing gummy mucilage. *Cordia dichotoma* named as Indian cherry.

The study includes morphological, biochemical and molecular study. The study consist of ten germplasms of *Cordia dichotoma*. The germplasms were collected from different locations of Nanded district. The ten germplasm was selected on the basis of phenotypic variation and distance from each other. The germplasms were named as NCd1(Ardhapur), NCd2(Mudhkhed), NCd3(Barad), NCd4(Tamsa), NCd5(Vishnupuri), NCd6(Bhokar), NCd7(Pawadiwadi), NCd8(Limbgaon), NCd9(Patnoor) and NCd10(Vishnupuri) N --referred as Nanded and Cd- as *Cordia dichotoma*.

The documented data reveals that each part of *Cordia dichotoma* has enormous applications. So, the present work carried out using Leaves, Bark and Fruits, of each selected germplasm. The extract of these plant parts was formed using methanol. The extract was used for biochemical investigation.

The first part of the study was Morphological characterization. The morphological variation was reported on different characters of leaf, Fruit and seed. The leaf characters includes leaf length (LL), leaf width (LW), leaf shape, Fruit characters consist of fruit length (FL), fruit width (FW), mature fruit weight (MFW), ripen fruit weight (RFW), fruit shape, number of fruits per cyme (NOF) and seed characters includes seed length (SL), seed width (SW), seed weight (Swt). The data indicate the considerable variation among selected germplasms. Among the variables few variables has significant co-relation and few has highly significant co-relation. Morphological variations has correlation with molecular characters.

In Biochemical investigation secondary metabolite analysis was find out with screening of alkaloid, flavonoid, phenol, tannin, and saponin. Different tests like Mayers, Ferric chloride, foam test etc. were gives the reaction. Among the leaves, bark and fruit extract of all germplasms
leaves and fruit extracts shows strong coloration. Ferric chloride test of flavonoid shows all +ve reaction, as well as lead acetate test for phenol gives near to all +ve result.

Total estimation of alkaloids, flavonoids, phenols, tannin and saponin were analysed by different standard methods. Total alkaloid content was higher in fruit and leaves extract than bark extract. Total flavonoid content was higher in leaves and fruit extract than bark extract of all germplasms. Phenol content was high in leaves extract and fruit extract. Tannin and saponin content was higher in leaves and fruits extract.

Antimicrobial activity was investigated by disc diffusion method. Antimicrobial activity of leaves, bark and fruit extract against gram +ve, gram –ve and one of the fungus. Comparing the extracts of leaves, bark and fruit of all germplasms leaves and fruit extract gives considerable result. Among the bacterial and fungal cultures, *S.aureus* and *E.coli* has susceptibility towards the extract. Antimicrobial activity was analysed by disc diffusion method, and Minimum inhibitory concentration was analysed by microdilution method. MIC was not giving considerable result.

Antioxidant activity and IC$_{50}$ were analysed by DPPH and FRAP method. DPPH scavenging activity of leaves, bark and fruit extract gives moderate activity. Compared in between leaves, fruit and bark, fruit extract of NCd2 and NCd4 has considerable antioxidant activity. FRAP antioxidant activity and IC$_{50}$ was considerable for leaves extract than bark and fruit extract. Bark extract shows very poor antioxidant activity.

Further present study proceed for High Performance Thin Layer Chromatography (HPTLC). For HPTLC, extracts were sorted on the basis of earlier antimicrobial and antioxidant activity in the same study. Among the total thirty extracts eight extracts were proceed for HPTLC. Quercetin was used as standard flavonoid. Standard mobile phase containing ethyl acetate: formic acid: glacial acetic acid and water were used in 10:1:1:1:2.6 proportion for running the sample. Bands were observed under 254, 366nm and fluroscent light. Each extract indicate the peaks for quercetin. Each extract were shows peaks in the range of 5 to 12 ,it represents the presence of different phytoconstituents.
Lastly the molecular diversity of ten germplasms were analysed by RAPD (Randomly Amplified Polymorphic DNA’s). Pure DNA was isolated using standard method. The DNA purification method was modified according to requirement. Further PCR (Polymerase Chain Reaction) were performed by using five different primers. Different polymorphic bands were observed on gel electrophoresis. Dendogram indicate the three clusters of germplasms. Jaccard’s similarity co-efficient among these accessions was 0.48–0.86. The morphological and molecular characters indicates the co-relation among them. There were three clusters of *Cordia dichotoma* germplasms. Cluster I shows highly significant correlation in leaf width and seed weight, Cluster II shows correlation in leaf size and seed weight, And cluster III has correlation with leaf and seed weight.