The genus Curcuma contains about 70 species distributed in tropical countries. The name Curcuma means yellow colour – the colour of the rhizome of C.longa. The genus includes a number of economically important plants many of which have medicinal value. 4 species of Curcuma (14 accessions) namely C.longa, C.amada, C.aromatica and C.zedoaria The 1st chapter of the thesis deals with the Review of literature on Curcuma species.

The 2nd chapter deals with in vitro regeneration of all the 4 species namely C.longa, C.amada, C.aromatica and C.zedoaria from rhizome or node explants. Callus culture leading to in vitro regeneration has also been documented in this chapter. All the protocols of in vitro regeneration have been standardized by the author and published in a research article in the journal Plant Biotechnology (reprint included in the thesis).

The 3rd chapter of this thesis carries a detailed study on curcumin estimation, isozyme analysis (SOD, EST, ACP and Peroxidase) and RAPD and AFLP analysis. Cluster analysis of the data on RAPD and AFLP markers each resulted in a dendrogram. This revealed the inter and intra species affinity of the accessions.

The 4th chapter contains the effect of gamma ray on plant regeneration, isozyme analysis and RAPD markers which showed interesting results on damage and repair.

The present dissertation deals with the experimental details of the above chapters and the results obtained are discussed critically using the appropriate stastics in the light of existing literature.