

## RESEARCH ARTICLE

# Identification and tagging of QTLs for arjunolic acid in *Terminalia arjuna* among Indian sub populations by association mapping and linkage disequilibrium

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## SUMMARY

The content of cardiogenic arjunolic acid in *Terminalia arjuna* vary among the population. We studied the population structure and the association between the molecular markers and its active ingredient among 140 plants collected from various agroclimatic zones in India. Large variation was detected for the arjunolic acid in this study showing suitability of the genotypes. The maximum arjunolic acid content was approximately 238 per cent higher than the lowest value for the genotypes and was found to be considerably correlated to bark thickness, bark fresh weight and bark dry weight. The population structure studies described the existence of nine subpopulations. As the distance increased between the associated markers, Linkage disequilibrium (LD) reduction and a considerable reduction in LD decay was ascertained. Eleven QTL regions associated with arjunolic acid were identified from a genome-wide marker-trait association study. Fine-scale resolution detected significant LD among 3.4 per cent RAPD paired loci and 8.7 per cent ISSR paired loci and 6.7 per cent RAPD paired loci and 13.3 per cent ISSR paired loci. Importantly LD decay found to start at a distance of >20bp from the loci on the genome of *T. arjuna* accessions. Finally, association mapping (AM) in arjun tightly linked to OPT09 which can be a possible substitute to QTL mapping methodology.

**Key Words :** Arjunolic acid, Association mapping, Linkage disequilibrium, QTL, Marker-trait association

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