DOWN-REGULATION OF SQUALENE SYNTHASE IN GUAYULE (*PARTHENIUM ARGENTATUM*)

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Guayule (*Parthenium argentatum* A. Gray) is a shrub that naturally grows in a semi-arid environment of southwestern Texas to the Chihuahuan desert of Mexico. Guayule plants produce natural rubber (NR) and store them in their stembark tissues. In guayule plants, NR biosynthesis increases in response to abiotic and biotic stresses. The majority of NR synthesis occurs during the vegetative or dormant period under cold, non-freezing temperatures. Establishing guayule as an alternative rubber-producing crop in the United States will provide supply security for a critical agricultural material and significant benefit for the US rural economy. NR is produced through the isoprenoid (mevalonate (MEV)) pathway in plants. Another isoprenoid metabolite, squalene, produced in plants, might compete with NR for available carbon. Squalene synthase (SQS) is the essential enzyme involved in squalene, a shared precursor for phytosterol and triterpene biosynthesis in plants. In this study, we successfully downregulated the *SQS* gene from guayule by RNA interference (RNAi). Our lab generated a construct, down-regulating *SQS* (*SQSi*) with the purpose of redirecting the pool of farnesyl pyrophosphate (FPP) toward NR production in guayule. Transgenic lines with lower SQS expression were generated. Several of the resulting genotypes showed a correlation of lower *SQS* expression and slightly higher NR content (w/w%) compared to wild-type (WT) and empty vector (EV) controls. These and additional results will be presented.

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