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IDENTIFICATION OF REFERENCE GENES FOR REAL-TIME PCR GENE EXPRESSION STUDIES IN DEVELOPING SEEDLING OF *CYAMOPSIS TETRAGONOLOBA* UNDER NITROGEN STRESS

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Guar (*Cyamopsis tetragonoloba*) is an important industrial crop because of many industrial applications of galactomannan gum present in its seeds. It, being a legume crop, can fulfil its nitrogen requirement through biological nitrogen fixation. However, this crop usually encounters nitrogen deficiency during the initial stages of crop growth when nitrogen fixing nodules have not been fully developed. The knowledge about genes of guar involved in various processes can help in developing improved varieties of this crop. qRT-PCR is a preferred technique for accurate quantification of gene expression data. This technique requires use of appropriate reference genes from the crop to be studied. Such genes have not been yet identified in guar. In the present study, expression stabilities of 10 candidate reference genes, viz., *CYP, ACT 11, EF-1α, TUA, TUB, ACT 7, UBQ 10, UBC 2, GAPDH* and *18S rRNA* were evaluated in shoot and root tissues of guar (RGC-1066 variety) under nitrogen stress. Four different algorithms, geNorm, NormFinder, BestKeeper and ΔCt approach were used to assess the expression stabilities of reference genes and the results obtained were integrated into comprehensive stability rankings. The study indicated that *CYP, TUA and UBC 2* genes were the most stable reference genes in guar under nitrogen stress whereas *EF-1α* gene was the most unstable reference gene. The *CYP, TUA* and *UBC 2* genes were the most suitable reference genes for accurate normalization of the gene expression data under nitrogen stress. Our findings are expected to provide a boost to gene expression studies in guar under nitrogen stress. Such studies are likely to improve our understanding of molecular mechanisms of nitrogen uptake in guar seedling and facilitate research initiatives to determine genes expressing under nitrogen stress in this industrially important crop.

III-V/ SI INTEGRATION FOR NEXT GENERATION HIGH SPEED LOW POWER ELECTRONICS

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The integration of III-V on Si substrate provides the platform for future high-speed electronic devices due to the high mobility of III-V materials. Among the III-V compound semiconductors, InxGa1-xAs and AlxGa1-xSb are the most promising materials for high speed, low power consumption electronics such as MOSFET, FinFET and TFET due to their low electron effective mass. Simulation and epitaxial growth of InxGa1-xAs and AlxGa1-xSb materials on Si substrate for high speed, low power electronics will be presented in the presentation. The frequency dispersion of accumulation capacitance (Δcacc) and interfacial trap density (Dit) are 3.06 %/dec and 3.2x1012cm-2eV-1 for In0.53Ga0.47As MOSCAPs on Si substrate. A reasonable Dit level with high FL movement efficiency indicates low acceptor-like traps and good carrier transport properties for MOSFET applications.

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