

**Sugarcane Signaling during Association with Endophytic Diazotrophic
and Hormone-Producing Bacteria**

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Endophytic bacteria that promote plant growth have been isolated from gramineae crop species, such as sugarcane and rice. These endophytes fix nitrogen and produce plant hormones, such as auxin and giberellin. Possibly, both processes might be contributing to promote plant development. Among the identified endophytic bacteria, we work with *Gluconacetobacter diazotrophicus*, *Herbaspirillum seropedicae*, *H. rubrisubalbicans* and *Burkholderia brasilensis*. Unlike other diazotrophic associations, e.g. rhizobium/leguminosae symbiosis, this interaction has unique features, such as the absence of nodule formation. Bacteria colonize the intercellular spaces and vascular tissues of most plant organs, without the plant exhibiting any disease symptoms. The signaling pathways and molecular mechanisms that govern a successful association - promoting plant growth by association with the endophytes - are still not clearly understood. By using genomic tools, we are characterizing a group of genes related to nitrogen metabolism and plant development, in order to understand how plant is benefited by this association. In addition, receptors involved in signaling plant/bacteria interaction are also being studied. Gene expression is being investigated by RT-PCR analysis under different physiological conditions and in sugarcane genotypes with high and low contributions of BNF. The data observed for most of the studied genes indicate that the modulated gene expression during association is not a general stress response against microorganisms, but it seems to be specific for benefic associations. Interestingly, the data showed that expression of several genes is not altered in sugarcane genotypes with low contributions of BNF, indicating that the plant genotype has an important role on the efficiency of the association. Supported by PRONEX, PADCT, CNPq, FAPERJ