Nivedita Lal et al., J Biotechnol Biomater 2016, 6:8(Suppl)
http://dx.doi.org/10.4172/2155-952X.C1.067

Deep sequencing of root endophyte *Piriformospora indica* grown under salt stress

Nivedita Lal, M.Z. Abdin
Jamia Hamdard, India

Piriformospora indica, a filamentous fungus of the order Sebacinales, is able to make symbiotic interaction with root of different plant species and provides better growth and higher yield to the host plant as well as resistance against biotic and abiotic stresses. High soil salinity, excess of NaCl is one of the important environmental factors that limits distribution and productivity of major crops. The need to produce crops with enhanced tolerance to salt stress has been the stimulus for research. *P. indica*-mediated salt tolerance mechanism was found to be linked strongly with increase in antioxidants under salt stress in barley which attenuates the NaCl-induced lipid peroxidation, metabolic heat efflux and fatty acid desaturation in barley leaves. Salt stress studies have indicated promising effect of *P. indica* in barley. Therefore, it is vital to isolate and functionally characterize salinity stress-related genes to elucidate the mechanisms underlying halotolerance and develop salinity stress-tolerant plants. We have compared the transcriptome of *P. indica* growing under high salt conditions (0.5 M NaCl) with salt free conditions as a control. Approximately 30-40 million 76 bp paired-end reads per sample were obtained using an Illumina NextSeq 500. RNA-seq analysis was performed using Bowtie/TopHat/Cufflinks software pipeline. Total 15410 unigenes were generated with N50 value of 3038. A total of 13461 differentially expressed genes (fold change ≥2) were identified and 2646 genes were down-regulated while 2446 genes were up-regulated under high salt condition. We found that the genes involved in different cellular processes, such as metabolism, energy and biosynthetic processes, DNA repair, regulation of protein turnover, transport and salt stress tolerance were changed under high salt condition. RNA-seq and pathway analyses found that salt stressed *P. indica* have significant differences in gene expression. Our results showed the complex mechanism of *P. indica* adaption to salt stress and it was a systematic work for endophyte to cope with the high salinity environmental problems. Thus, these results could be helpful for further investigation of the salt resistance mechanism in microbes.

Biography

Nivedita Lal has completed her PhD in Plant Molecular Biology at the Jawaharlal Nehru University, New Delhi, India. Currently, she is working on her DST young scientist project (*P. indica* interaction under salt stress) as a PI (Postdoctoral Fellow) at Jaima Hamdard, New Delhi. She has participated in various national and international conferences. She is interested in continuing research career in plant-microbe interaction to understand how the plant-microbe relation regulates plant development and defense response against various stresses.

nivedita229@gmail.com

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