Identification of temperature sensitive protein annotation in CDPK3 protein of *Oryza sativa*

Directorate of Rice Research, India

Rice is not only staple food for millions in India, but also it is interwoven with livelihood security of Indian populace. Of the several factors of climate change effecting the rice yields, temperature, high as well as low probably is the most important factor. Calcium-dependent protein kinases (CDPKs) play an important role in rice signal transduction, gene expression, protein accumulation and enhanced in response to cold. Over-expression of a single Ca\(^{2+}\) dependent protein kinase confers cold tolerance to rice crop. The current work aims to characterize and annotate the protein using insilico tools and software. Major sites prone for mutations have been identified through RONN. The hotspot site located on the CDPK3 sequence of *Oryza sativa* is R7 position which when substituted with any of the other possible 19 amino acids would result in a decrease in the stability of the protein as shown. As per the results of SIFT it can also be inferred that though all the substitutions result in a decrease in the stability of the structure the mutations R7C and R7W are not tolerable to the cold. The amino acid substitutions of R7C and R7W are found to be damaging with respect to the results of all the three tools Mutan I, PolyPhen and SIFT. Thus the site R7 and the substitutions with C and W are found to be the most damaging mutations that could ultimately affect the cold tolerance of the plants.

shiva0843@gmail.com; lvsubbarao1990@gmail.com