PB-99

Extrinsic Role of Gibberellin Mitigating Salinity Effect in Different Rice Genotypes

Muhammad Farooq[1], Eun-Gyeong Kim[1], Yoon-Hee Jang[1], Kyung-Min Kim[1,2]*

[1]Department of Applied Biosciences, Kyungpook National University, Daegu, 41566, Korea
[2]Coastal Agriculture Research Institute, Kyungpook National University, Daegu 41566, Republic of Korea.

[Abstract]
The overall effects of gibberellic acid (GA3) with NaCl on different rice genotypes are inadequately understood. The present study determines the effect of different GA3 concentrations on the morphophysiological, molecular and biochemical effects of 120 mM NaCl salt stress in rice seedlings. Salt stress reduced germination percentages and seedling growth and decreased bioactive GA content. It also downregulated the relative expression of α-amylase-related genes - *OsAmy1A*, *OsAmy1C*, and *OsAmy3C* in the salt-sensitive IR28 cultivar. Salt stress differentially regulated the expression of GA biosynthetic genes. Salt stress increased antioxidant activity in all rice genotypes tested, except in IR28. GA3 (50 and 100 μM) mitigates the effect of salt stress, rescuing seed germination and growth attributes. GA3 significantly increased bioactive GA content in Nagdong and pokkali (50 μM) and Cheongcheong and IR28 (100 μM) cultivars. The α-amylase genes were also significantly upregulated by GA3. Similarly, GA3 upregulated *OsGA2ox1* and *OsGA2ox9* expression in the Cheongcheong and salt-sensitive IR28 cultivars. The present study demonstrated that salt stress inactivates bioactive GA - inhibiting germination and seedlings growth - and decreases bioactive GA content and GSH activity in IR28 and Pokkali cultivars. Further, GA3 significantly reversed the effects of 120 mM NaCl salt stress in different rice genotypes. The current study also suggests if we know the coastal area water NaCl concentration we can apply the exogenous GA3 accordingly. Thus, we would be able to grow rice cultivars near the coastal area and reduce the rice damage by salinity.

[Acknowledgement]
This work was supported by a grant from the New breeding technologies development Program (Project No. PJ016531012022), Rural Development Administration, Republic of Korea.

*Corresponding author: E-mail. kkm@knu.ac.kr Tel. +82-53-950-5711