24-Epibrassinolide; an active brassinolide and its role in salt stress tolerance in plants: A review

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24-epibrassinolide; an active brassinolide and its role in salt stress tolerance in plants: A review

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Abstract

Salt stress is one of most dramatic abiotic stresses, reduces crop yield significantly. Application of hormones proved effective salt stress ameliorating approach. 24-Epibrassinolide (EBL), an active by-product from brassinolide biosynthesis shows significant salt stress tolerance in plants. EBL application improves plant growth and development under salt stress by playing as signalling compound in different metabolic and physiological processes. This article compiles all identified ways by which EBL improves plant growth and enhances crop yield. Furthermore, EBL enhances photosynthetic rate, reduces ROS production and plays important role in ionic homeostasis. Furthermore EBL-induced salt stress tolerance suggest that complex transcriptional and translational reprogramming occurs in response to EBL and salt stress therefore transcriptional and translational changes in response to EBL application are also discussed in this article.

Keywords: 24-Eppibrassinolide, antioxidative response, chlorophyll biosynthesis, ionic homeostasis oxidative stress, salt stress

Introduction

Salinity is one of most important soil related problems posing several devastating effects on plants. Among all the other abiotic stresses, salt stress is considered one of the serious threats to crop production under arid and semiarid regions of the world limiting plan growth and productivity (Nazar et al., 2011; Kordrostami et al., 2016). It is estimated that more than 20% of irrigated land area is salt affected which will expand to 50% by 2050 (Pitman and Läuchli, 2002; Wang et al., 2003). Salt stress causes damaging effects on crop productivity by distressing plant metabolism including reduced water potential, ion imbalance and toxicity thereby leading to crop failure (Krishnamurthy et al., 2016). Plant responses to salt stress are complex and depend on several factors such as concentration and type of solutes, growth stage of plant, genetic potential of the plant and environmental factors.