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Editorial

Using Halotolerant Bacteria for Farming in Salt Affected Soils

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Increasing population growth and, as a result, the need for more food and the lack of suitable soil for agriculture, have put today's communities at a serious risk. Production of 70% more food for feeding more than 2.3 billion people by 2050 is a major challenge facing the world's agriculture [1]. However, it has been reported that more than 20% of agricultural land worldwide (about 45 million hectares) is affected by salinity and is increasing day by day [2]. Soil salinity is one of the most important factors affecting plant growth and yield. The most important reaction of the plant to soil salinity or water salinity is growth retardation [3]. According to the FAO report, in areas where there is a problem with salinity of soil and water, salinity leads to a 10 to 60% decrease in crop yields. In these areas, farmers try to compensate for the damage caused by salinity by using more inputs, such as chemical fertilizers. However, the use of these fertilizers resulted in greater salinity of these soils.

The use of rhizospheric bacteria has been shown to reduce application rates of chemical fertilizers, stimulate plant growth, and increase plant tolerance to salinity [4,5]. It has been shown that the bacteria isolated from plants grown in saline areas than ones isolated from non-saline environments are more effective at increasing the tolerance of plants to salinity [6]. The concentration of salts in arid and semi-arid soils is usually very high, in which only salinity resistant plants and halotolerant bacteria are able to grow [6]. Therefore, it seems that one of the ways in which saline soils can be used for sustainable and economical production with emphasis on environmental concepts is the use of these resources in the production of halophytes. Halophytes are resistant or tolerant plants that naturally grow in saline habitats and have a significant ability to complete their life cycle in saline conditions. With a wide range of physiological, morphological and biochemical mechanisms, these plants are able to adapt and grow in high salinity soils [7,8]. In addition to these mechanisms, various studies have shown that microbial communities associated with halophytes can also play a major role in growth of these plants under different stress conditions, including salinity [6]. There are reports that the bacteria associated with halophytes have multiple plant growth promoting (PGP) traits such as indole-3-acetic acid (IAA), siderophores, phosphate solubilization, 1-aminocyclopropane-1-carboxylate deaminase activity, N2 fixation, etc [6]. Previous studies have shown that the bacteria isolated from halophytes, in addition to improving the growth of halophytes, could also significantly increase the growth of non-halophytic plants (saline-sensitive plants) [6].

Therefore, the study of the bacterial community (halotolerant bacteria) associated with halophytes can lead to much knowledge generation such as understanding the interaction effects of microbe plant under salinity conditions, identifying the bacterial mechanisms involved in stimulating plant growth under salinity conditions, identifying bacterial isolates tolerant to salinity and using these superior isolates in the formulation of bio-fertilizers suitable for using in agriculture in saline and arid environments.

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