



ABSTRACT

The current study was planned to determine the effect of exogenously applied salt tolerant bacterial isolates to improve the harmful effects of salinity on *Hordeum vulgare* L. cv. Jao-97 in Botanic Garden of GCU, Lahore. Bacterial isolates were obtained from salt effected soil of Kalar Kahar Pakistan. Four Isolates were screened at 100 to 100000ppm and investigated the effect of salt and salt/bacteria mixed treatment on *Hordeum vulgare* L. The effect of bacteria was observed at different levels of salinity (control, 4dSm⁻¹, 8dSm⁻¹, 12dSm⁻¹ and 16dSm⁻¹). With increasing salinity level reduction in growth was found. Application of bacteria increased all parameters of growth including height (19.14%), number of leaves (36.2%), and number of tillers (44%), at 16dSm⁻¹. Plants shoot length and root length were increased (34.5%) and (50.5%) respectively with inoculation of bacteria by increasing salinity level to 16dSm⁻¹. Whereas plants root fresh weight and shoot fresh weight were increased (49.3%) and (41.6%) respectively by inoculating salt tolerant bacteria at 16dSm⁻¹. Dry weight of shoot and root were increased (50%) and (37.5%) respectively at salinity level of 16dSm⁻¹. Chlorophyll a, chlorophyll b, and total chlorophyll were increased (3.74%), (34.61%) and (71.94%) respectively at 16dSm⁻¹. PGPR played significant role in the regulation of plant growth, development, ripening and chlorophyll contents. The effect of salinity was overcome by application of salt tolerant bacteria because it produced indole acetic acid, gibberellins and other growth regulators. After mid harvest, at 18th week final harvest was carried out in which number of ears per plant, number of spikelets per ear, number of spikelets per plant, number of grains per ear, number of grains per plant, weight of grains per ear, weight of grains per plant, Rachis length of plant, weight of thousand grains, and total straw weight were noted. Results showed a significant decrease under the effect of increasing salinity. While by adding the Salt Tolerant Bacteria these parameters were increased significantly up to 16dSm⁻¹. The effect of bacteria was improved as the concentration of salt was increased. Number of ears per plant was increased up to 18.6%, number of spikelets per plant was increased up to 26.8%, percentage increase in number of grains per plant was 23.8%, weight of grains per plant was increased up to 20.7%, weight of thousand grains was increased up to 22.6%, and the total straw weight of plant was increased up to 25.7% at 16dSm⁻¹ concentration of NaCl.