



Effect of *Ascophyllum* Extract and Water Stress on Soil Biological Properties and Growth of Onion (*Allium Cepa* L.)

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Abstract: A study was conducted to investigate the effect of *Ascophyllum* extract with different irrigations levels (A100%, A75%, A50% and A200%) of the field capacity on soil microbial activity, roots biomass, water use efficiency (WUE), aggregate stability, fresh weight of onion (*Allium cepa* L.) in different soils textures. The highest significant increase in microbial activity was in A100 ($4.81 \text{ CO}_2\text{-C mg g}^{-1}$). In sandy texture, microbial activity in A100 was similar to A50 and A75. Moreover, a pronounced increase in aggregate stability was (13.77%) in A100. Additionally, there was a clear rise in WUE (0.189 g l^{-1}) in A100. Similarly, significant increases in fresh weights of onion were observed (10.07 g) in A100 treatment. Root biomass was higher (8.66 g) in A200 but this treatment did not significantly differ from the A100 treatment. In the silty clay texture, microbial activities, WUE and aggregate stability had extensively increased, while the opposite was true for the roots biomass which was intensified in sandy soil. In conclusion, the combination of *Ascophyllum* extract had reduced the adverse effects of water stress in both soils confirming the beneficial use of algal materials in overcoming the water stress and increase microbial activity, roots biomass and the onion yield.

Keywords: *Ascophyllum*, Microbial activity, Roots biomass, Onion yield, Water use efficiency WUE, Soil structure
