

Role of different microorganisms on the mechanical characteristics, self-healing efficiency, and corrosion protection of concrete under different curing conditions

This paper explores a comparison between the action of introducing two *Bacillus* species, and *D.salina* alga on the compressive and flexural strengths, corrosion rate, and self-healing ability of concrete. Those are evaluated under curing specimens in fresh- and Qaroun lake conditions. It is registered that the increment percentages of microbial concrete mechanical properties at early ages (average of 35%) are greater than those at later ones (average of 8%); the functionality of microbes added directly to concrete depends mainly on time. The no accelerated specimens treated with either bacteria contributed to a significant reduction of the corrosion rate (0.05 mm/year), but the alga was more conservative (0.18 mm/year). Internal application of either bacteria displayed efficient crack healing more than the external one, especially when prisms were cured in sea water. The bacterial and algal activity engaged the rebar's passive layer protection and corrosion inhibition, besides the other target properties improvement.