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Studies on Biological Soil crusts and their role in soil Stabilization and control of rainfall-induced soil loss

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Abstract

Biological soil crusts (BSC) form a living skin at the soil surface. These crusts play an important role in preventing soil erosion by wind and rain. Bacteria and Cyanobacteria are known as ecosystem engineers and they construct these BSCs. They bind soil microstructure through exopolysaccharides and create soil macro structure. These crusts improve soil stability, soil aggregation, porosity, fertility etc. In this study we use Biocrust forming microbes particularly bacteria *Bacillus subtilis* and cyanobacteria *Aphanocapsa* to form exopolysaccharides which connects the soil particles together and also to increase soil stability. After 10 days, inoculation of cyanobacteria and bacteria increased both TOC and SOM of soil, compared to the control conditions. The amount of carbon and organic matter falls during the first 10 days. It is due to the difficulty of microbes to cope with the new environment and the deficiency of nutrients. After 10 days, when provided with appropriate nutrients; the TOC and SOM increased significantly. The extracellular polymeric components of cyanobacteria serve as a significant source of organic carbon in this regard. The study's findings showed that a rapid increase in soil nitrogen and carbon content might be achieved by artificially expanding the population of soil microorganisms that fix nitrogen and carbon.

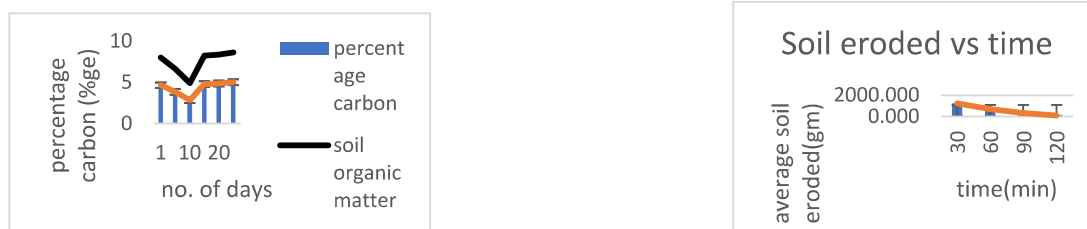


Figure 1 (a) shows time-dependent changes in TOC (b) shows the amount of soil eroded during control study.

Keywords: Rainfall-induced soil loss, biological soil crusts, soil aggregation, bacteria, cyanobacteria