

Remediation of acid sulphate soils: The role of organic matter

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When acid sulphate soils dry, oxidation of pyrite can cause strong acidification. Re-saturation of acid sulphate soils can lead to re-formation of pyrite and pH increase through activity of sulphate reducing bacteria (SRB), which also require available organic carbon (OC).

We investigated why several acid sulphate soil profiles in the Lower Murray (Australia) have not recovered from acidification after a severe drought. The chemical characterisation of the organic matter by solid-state ¹³C NMR spectroscopy revealed small proportions of easily degradable carbohydrates and proteins, but high proportions of hardly degradable lignin and lipids. The low quality and availability of OC likely limits the activity of SRB. To overcome these deficiencies in substrate quality and availability, we added different amounts of organic matter in a lab incubation experiment. The results clearly demonstrate that only high OC additions significantly accelerated pH neutralisation and thus remediation of acidic acid sulphate soils.