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### Investigating the Impact of Trace Metals on Methanogenesis in Two Missouri Fens

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# INVESTIGATING THE IMPACT OF TRACE METALS ON METHANOGENESIS IN TWO MISSOURI FENS

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Methane ( $\text{CH}_4$ ) is a particularly strong greenhouse gas, having 25 $\times$  the warming potential of  $\text{CO}_2$ . To understand the biological processes and controls contributing to  $\text{CH}_4$  in the atmosphere, one important source is wetlands as they are the leading natural  $\text{CH}_4$  producer. This investigation looks into the effect of Co and Ni on  $\text{CH}_4$  production. These trace metals are necessary in various enzymatic pathways required by methanogens in order to produce  $\text{CH}_4$ , and have relatively low concentrations in fens. The low concentrations of Ni and Co in anoxic natural environments is seen in water concentrations and extractable solid-phase metals. For this experiment, the wetland environment was replicated in microcosms using soils sampled from fens located in Johnson's Shut-Ins. Known metal concentrations of Co and Ni were then added to these microcosms. The Co and Ni dissolved in the liquid of the microcosms showed concentrations of Co and Ni higher than what is optimal for methane production, causing the control with no metal additions to produce the highest amount of methane. These results suggest the concentrations of Co and Ni added were too high causing an inhibition of methanogens; however, a larger sample size with lower concentrations of Co and Ni would gain a clearer depiction of the optimal concentrations required for methanogenesis in fen environments.