

Title: Survival of *Escherichia coli* in Sediments in Artificial Irrigation Canals

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Introduction:

Escherichia coli have been shown to grow and survive in streambed sediments in lakes and rivers, but their survival has yet to be studied in artificial irrigation water canal systems.

Purpose:

This study aimed to assess the survival of *E. coli* in sediments typical of irrigation canal system networks found in Arizona.

Methods:

A 100 milliliter overnight of *E. coli* ATCC 25922 was added to one liter of dechlorinated tap water. The *E. coli*/water mixture was added to 2 kilograms sediment and mixed thoroughly. 100 grams of sediment were then added to 10 sterile borosilicate glass petri dishes and placed in an artificial flow through system containing 37.8 liters of dechlorinated tap water. The system was turned and on each sampling day, 10 grams of sediment were collected and eluted by adding 10 milliliters of BPW and shaking the sediment samples for 30 minutes. After allowing the sample to settle for five minutes, the samples were then enumerated using serial dilutions and spread plating onto EMB agar.

Results:

Laboratory grown *E. coli* survived longer in the sediments than in the water. *E. coli* survival was longer in sandy loam sediments than loamy sand sediments with a log reduction of 2.70 over 20 days as compared to a log reduction of 3.57 in sandy loam sediment. Addition of manure did not have a great effect on the survival of introduced *E. coli* in sand or sandy loam sediments at 22°C; Indigenous *E. coli* at 22°C survived longer in loamy sand sediment than laboratory grown *E. coli* with a log reduction of 0.58 and 1.10 in 20 days.

Significance:

It is important to consider sediments in future irrigation water quality monitoring surveys as they serve as a reservoir of *E. coli* bacteria in irrigation water canals. It is important to analyze the effects of resuspension of sediment into the overlying water in irrigation canals.