

Identification of Bacteria: Citrate Utilization Test.

Introduction

There are a series of biochemical tests which are useful for the identification of, particularly, the gram negative enteric rods. These four tests are Voges-Proskauer, Methyl Red, Indole Production and Citrate Utilization. This experiment will focus on the Citrate Utilization test.

The Citrate Utilization test is used to identify bacteria which utilize as one of their starting products of metabolism a compound called citrate (ionized form of citric acid). As citrate is utilized from the media by the bacteria, the pH of the medium changes. As the pH becomes more alkaline, the media changes from green to blue (alkaline). The blue color change is the result: blue is positive, green is negative. Some examples of gram negative enteric bacteria and their Citrate Utilization reactions are shown in Table 1.

Genus	Citrate Utilization Reaction
<i>Citrobacter</i>	+ (Blue)
<i>Enterobacter</i>	+
<i>Escherichia</i>	- (Green)
<i>Klebsiella</i>	+
<i>Morganella</i>	-
<i>Proteus</i>	+/-
<i>Providencia</i>	+
<i>Salmonella</i>	+/-
<i>Serratia</i>	+
<i>Morganella</i>	-
<i>Shigella</i>	-

Table 1. Citrate Utilization reactions of several enteric bacteria.

The purpose of this experiment is to learn how to perform and interpret the Citrate Utilization reaction for various bacteria on solid media.

Materials and Methods

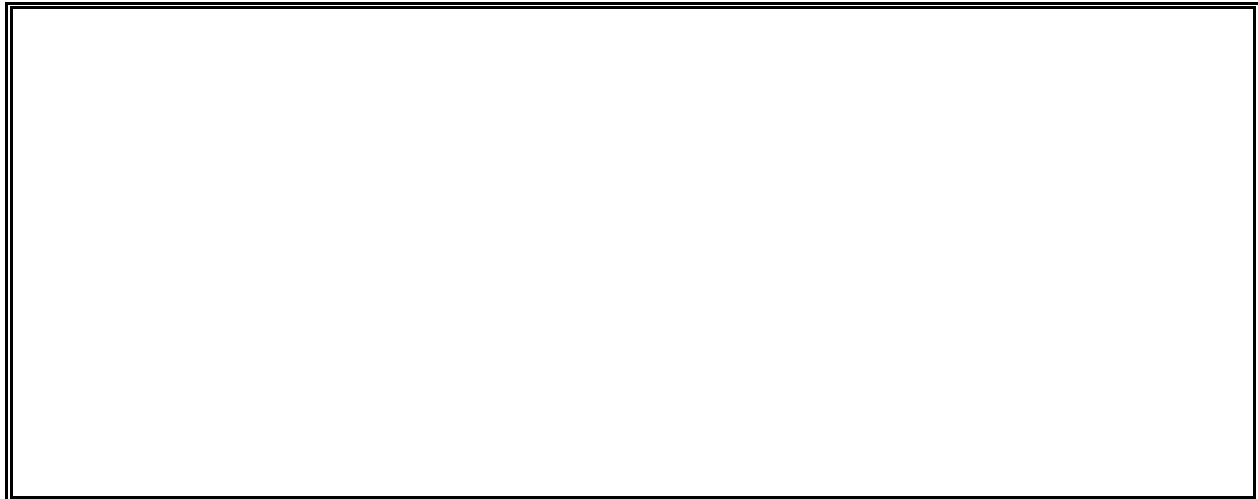
Materials

Simmonds Citrate Agar	Bunsen burner	Incubator
Loop	Bacteria	Disinfectant
Paper towels		

Method

Aseptically streak your Simmonds Citrate Agar with one of the bacteria. Incubate for 48 hours. Finish and interpret this experiment at your next lab period. How do these results compare with the table above?

Draw and label your observations for your bacterium below:



REFERENCES

1. Beishir, L.: **Microbiology in Practice: A Self-Instructional Laboratory Course, Fifth Edition.** (Harper Collins: New York) 1991.

2. Claus, G.W.: **Understanding Microbes: A Laboratory Textbook for Microbiology.** W.H. Freeman and Co.: New York) ©1989.
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