

Bacteria and acidic end products

[Science](#), [Biology](#)



Title of the Experiment: Enterobacteriaceae Identification: The Enterotube II System Learning Objectives: After completing this exercise we were able to inoculate an unknown bacterium that belongs to the Enterobacteriaceae by using technology effectively with a Enterotube II. An Enterotube II is a miniaturized multi-test system for rapid identification of enterbacteriaceae. We then evaluated the test results and generated a five-digit code for the unknown bacterium.

Thinking creatively and critically we had to figure out the code by looking at the Enterotube and comparing the reactants to the original to see what the result was. We then had to use the five-digit code to correctly identify the unknown bacterium from the interpretation guide. Procedure: Step 1 : Remove organisms from a well-isolated colony. Avoid touching the agar with the wire. Step 2: Inoculate each compartment by first twisting the wire and then withdrawing it all the way out through the 12 compartments using a turning movement.

Step 3: Reinsert the wire (without sterilizing), using a turning motion through all the 12 compartments until the notch on the wire is aligned with the opening of the tube. Step 4: Break the wire at the notch by bending. The portion of the wire remaining in the tube maintains anaerobic conditions essential for true fermentation. Step 5: Punch holes with broken-off part wire through the thin plastic covering over depressions on sides of the last eight compartments. Replace caps and incubate at 35 degrees C for 18-24 hours.

Step 6: After encircling the numbers of the positive tests on the laboratory report, total up the numbers of each bracketed series to determine the five-

digit code number. Refer to the Enterotube II Interpretation Guide for identification of the unknown by using the code number Results: Before inoculation of the Enterotube II showing the original colors of each test which was also used to compare with the inoculated enterotube. After the inoculation of the Enterotube, many of the colors have changed which means they have reacted with the antibiotic.

The reactants then helped me find out what the unknown bacterium is. Each color changed or reacted gives a certain digit Summary & Conclusions: Enterotube II identifies Enterobacteriaceae. The Enterotube II is a multiple test system designed to identify enteric bacteria based on Glucose, Adonitol, Lactose, Arabinose, Sorbitol, Dulcitol fermentation, lysine and Decarboxylation, Sulfur reduction, Indole, Acetoin production of glucose fermentation, Phenylalanine deamination, Urea hydrolysis, and Citrate utilization.

Adonitol Bacterial fermentation of adonitol, which results in the formation of acidic end products, is indicated by a change in color of the indicator present in the medium from red (alkaline) to yellow (acidic). Any sign of yellow should be interpreted as a positive reaction, orange should be considered negative. Lactose Bacterial fermentation of lactose, which results in the formation of acidic end products, is indicated by a change in color of the Indicator present in the medium from red (alkaline) to yellow (acidic).

Any sign of yellow should be interpreted as a positive reaction; orange should be considered negative. Arabinose Bacterial fermentation of arabinose, which results in the formation of acidic end products, is indicated

by a change in color from red (alkaline) to yellow (acidic). Any sign of yellow should be interpreted as a positive reaction; orange should be considered negative. Sorbitol Bacterial fermentation of sorbitol, which results in the formation of acidic end products, is indicated by a change in color from red (alkaline) to yellow (acidic).

Any sign of yellow should be interpreted as a positive reaction; orange should be considered negative. Voges-Proskauer Acetylmethylcarbinol (acetoin) is an intermediate in the production of butylene glycol from glucose fermentation. The presence of acetoin is indicated by the development of a red color within 20 minutes. Most positive reactions are evident within 10 minutes. Phenylalanine Deaminase This test detects the formation of pyruvic acid from the deamination of phenylalanine. The pyruvic acid formed reacts with a ferric salt in the medium to produce a characteristic black to smoky gray color.

Urea The production of urease by some bacteria hydrolyzes urea in this medium to produce ammonia, which causes a shift in pH from yellow (acidic) to reddish-purple (alkaline). This test is strongly positive for *Proteus* in 6 hours and weakly positive for *Klebsiella* and some *Enterobacter* species in 24 hours. Citrate Organisms that are able to utilize the citrate in this medium as their sole source of carbon produce alkaline metabolites that change the color of the indicator from green (acidic) to deep blue (alkaline). Any degree of blue should be considered positive.

After looking at the results of the Enterotube I came to conclusion that my unknown bacteria gave me the five-digit code 34363 which translated to

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Klebsiella pneumoniae bacterium that can form a capsule. It is found in the normal flora of GI tracts in humans. K. pneumoniae can become pathogenic in patients whose immune systems are compromised. K. pneumoniae can cause nosocomial urinary tract infections and pneumonia. In immunocompromised patients, death is possible. For a person to get the K. pneumoniae bacteria, they have to have direct contact with another person. K. pneumoniae is not able to be contacted through the air.

Healthcare workers can help to decrease the spread of K. pneumoniae by washing their hands before and after taking care of a patient. It was established that the Enterotube system provides a simple, reliable, and rapid method for the probable identification of Enterobacteriaceae. The major advantage of the Enterotube is that all tests are done simultaneously by inoculation from a single isolated colony. It is also easier to inoculate, single inoculation, self-contained, numerous tests, little media preparation, rapid results, reliability, uniformity, simple interpretation.