

Microbiology lab report on escherichia coli and staphylococcus aureus essay sampl...

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



In this lab experiment two different types of bacteria, *Escherichia coli* and *Staphylococcus aureus*, were grown singly and mixed on four different types of agar in order to observe the varying morphologies within the colonies. Resulting data was analyzed to provide understanding of the use of differing culture media and conditions for bacterial growth.

RESULTS

Four different agar types were used in this experiment. The first (Nutrient) allowed for growth of both *E. coli* and *S. aureus*. The second agar used (MKL) inhibited the growth of *S. aureus* but allowed the growth of *E. coli*. The third (ASH) yielded growth of both bacterial species. The fourth (Mannitol) was found to inhibit growth of *E. coli* (Table 1).

Table 1. Indication of growth within the four types of agar. G = growth, NG = no growth.

E. coli *S. aureus* Mixed

culture Nutrient GGG MKL GNG GASH GGG Mannitol INGGG Changes in color within the sampled cultures were also noted. No changes occurred within the Nutrient agar. The MKL agar exhibited a color change with *E. coli* and the mixed culture. The agar changed from red to purple, and a noticeable border was present surrounding the colonies that exhibited growth on the dish. The ASH agar did not yield a color change. The Mannitol agar exhibited a change with *S. aureus* and the mixed culture, but no change with *E. coli* (Table 2).

Table 2. Indication of color change within the four types of agar.

Two noticeable changes occurred during this experiment. First, two of the twelve inoculated Petri dishes yielded no growth. In order to explain these occurrences, we must first examine the differing properties of the types of agar used. Nutrient agar is enriched to allow growth of a wide variety of bacterial cultures, thus it was expected that both of the cultures used would exhibit growth on the nutrient agar. MacConkey agar (MKL) is selective for certain types of bacteria and is known to inhibit growth of Gram-positive microorganisms. *S. aureus* is Gram-positive, thus we saw no growth in the MKL Petri dish inoculated with *S. aureus*. The human blood agar (ASH) is nutrient-rich and exhibits a favorable growth environment for many bacterial species, and thus allowed growth of both *E. coli* and *S. aureus*. Mannitol agar has a high concentration of NaCl which inhibits most bacterial groups. Staphylococcus species, however, are able to grow in these conditions and *S. aureus* was present in the Mannitol petri dish (Bauman 2005).

The second change that occurred during this experiment was the change in color of the agar, which was noted to occur within four of the inoculated dishes. These color change occurrences are indicative of pH changes within the agar dishes. The MKL agar is both selective and differential, and is thus able to identify lactose degradation due to the presence of a pH indicator. When a lactose-positive colony such as *E. coli* is inoculated on the agar, the decrease in pH yields a change in color on the agar and the presence of a noticeable border surrounding the bacterial colonies. The Mannitol agar, like MKL, also can be used as a differential agar. The color changes on the Mannitol agar are indicative of acid metabolic wastes produced by the

fermentation of Mannitol by Staphylococci bacteria. This fermentation causes the agar to change from red to yellow, which is what occurred in the dishes containing *S. aureus* (Günter et al, 1998).

QUESTIONS 1.

- a. The needle is flamed before inoculation in order to prevent cross contamination of bacteria on the medium and after to kill the bacteria collected for the culture.
- b. It is important to hold the cap of the tube in your hand, and angled downwards, because microbial contamination can occur if the cap is exposed to another surface or the open air.
- c. The needle must be cooled before the inoculation because if not, the heated needle can kill the bacterial sample you are trying to collect.

2. Enriched media are those that have been supplemented with nutrients to allow for growth of a wide variety of microorganisms. Differential or isolative media are those that are used for differentiating or isolating particular bacterial groups based upon their metabolic properties, and do so by the addition of specific indicator compounds. Selective or inhibitory media allow for, or inhibit, specific bacterial groups based upon the addition of distinct components to the media. Transport media are used in the transportation of bacterial cultures, and contain components that assist in the deterrence of growth during the transportation period (Madigan et al, 2005).

BIBLIOGRAPHY

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