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# Conducting An Experiment On The Amount Of Oxygen Required By Bacteria In An Aerobic Environment

## Title: Oxygen requirements

This lab looked at the oxygen requirements for a number of different species of bacteria. Organisms tested included two unknown species cultured in an anaerobic environment, *Pseudomonas auriofaciens* (an obligate aerobe), *Staphylococcus aureus* (a facultative aerobe), and *Enterococcus faecalis* (an aerotolerant aerobe). For this experiment it is expected that the growth of the 3 known species of bacteria is consistent with their respective metabolic process. For the unknown species we will attempt to identify their metabolism through a series of tests including culture in thioglycolate tubes.

This lab began by attempting to isolate cultures of anaerobic bacteria from rabbit feces. After inoculating a tube of chopped meat broth with rabbit feces the tube was then covered with 4 cm of mineral oil, in order to limit oxygen, and allowed to incubate. After incubation a loop of inoculum was taken from the chopped meat broth culture and plated on CDC blood anaerobe agar. This plate was then incubate in an anaerobic environment to select for anaerobic bacteria. Two distinct colonies were identified based on morphology and a gram stain, oxidase test, and catalase test were performed for each. Each colony was then inoculated into thioglycolate tubes (a differential medium used to determine oxygen requirements of bacteria), in addition to *P. auriofaciens*, *S. aureus*, and *E. faecalis*. After incubation the growth within the thioglycolate tubes was compared to a known standard in order to discern the organism's oxygen requirements, which can be used to suggest it's metabolism.

Results for the two unknown colonies were used to suggest whether or not those colonies had an anaerobic metabolism. Both colonies selected were gram negative, bacillus type bacteria. For the catalase test, both organisms tested negative for catalase (no bubbling), which suggests they do not need oxygen to live. For the oxidase test, both organisms tested negative for cytochrome c (no color change), which also suggests that the organism does not need oxygen to live. Lastly the results for the thioglycolate test for both colonies tested suggests that they are aerotolerant anaerobes, as growth was observed to be uniform throughout the medium. The results for *P. auriofaciens*, *S. aureus*, and *E. faecalis* was as expected indicating obligate aerobe, facultative anaerobe, and aerotolerant anaerobe respectively.

The results for this lab are consistent with the expected results. *P. auriofaciens*, *S. aureus*, and *E. faecalis* had growth in thioglycolate consistent with their metabolism. The two unidentified

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species of bacteria had growth in thioglycolate that was consistent with the results for both the oxidase and catalase tests.

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