

**Microbiology 2400
Study Guide #8
Winter Semester 2008
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LABORATORY SECTION

DIFFERENTIAL, SELECTIVE, AND ENRICHED MEDIA

**You should read the introductory material presented in your laboratory manual
Information on this procedure can be found in chapter 6.**

Note: See handout for additional information concerning this exercise.

1. Define each of the following media types.
 - a. Differential medium
 - b. Selective medium
 - c. Enriched medium

You should be able to cite 1 specific example of each of the above mentioned media types.

2. Eosin Methylene Blue Agar (EMB agar) has a number of uses in the microbiology laboratory. One of its most famous uses is in the identification of what specific bacterial organism? What is the outstanding characteristic that this organism exhibits when grown on EMB agar?
3. Both EMB and MacConkey's agar can be used to suppress the growth of Gram ___ bacteria. What component of the medium is involved in their above mentioned action?
4. Mannitol Salt agar is a medium, which is rather widely employed in the cultivation of which medically important genus?
5. What component of Mannitol Salt agar selects for the above-mentioned genus?
6. What was the reference book cited in class as a good source of information concerning the use and composition of microbiological growth media?
7. What is the function of agar in a growth medium such as Nutrient agar? To what class of chemical substances does agar belong? (Lipids, proteins, etc.)

8. Blood agar is used to detect hemolytic reactions. What are the 3 classic types of hemolytic reactions? You should be able to describe each. What component of blood agar qualifies this medium as being an example of an enriched medium?
9. What are fastidious microbes? Generally, what type of growth media must be employed in their cultivation?
10. The ability of some bacteria to grow on Mannitol Salt Agar raises the issue of how these bacteria can survive and grow in an environment that is rather hypertonic to most bacterial species. What is the general approach that *Staphylococcus aureus* takes to allow it to handle the high salt concentration and still not suffer massive water loss?

STANDARD PLATE COUNT

**The Textbook reference for this set of questions is Chapter 6
You should also read the introductory material presented in your laboratory
manual**

1. In conducting standard plate counts, what are the usual accepted sample sizes and diluent volumes that are employed?
2. In connection with the standard plate count of the *E. coli* culture that was conducted in the laboratory, you also were introduced to an instrument known as a spectrophotometer. This instrument was used to measure how much _ the bacterial organisms, growing in a tube of growth medium, absorbed.
3. You should be able to explain, in general terms, how the use of this instrument could be used to determine the number of bacterial cells/ml in a culture.
4. If you were able to conduct a standard plate count of Quarton Creek Water, the same material that you used for the MPN testing and used nutrient agar in your Petri dishes, which were incubated at 37C, you would of course not have every bacterium in the water supply produce a colony for you to count. You should be able to cite 2 different reasons for this. **NOTE: Please don't ask me about the answer to this question. Just talk it over with your classmates, etc. Let's just see what you can do on your own.**
5. You should be able to complete dilution problems of the type presented on the practice sheet you have been given.

LECTURE SECTION

CHAPTER 5

The following questions are the final questions which refer to the section on bacterial metabolism.

1. Given the fact that NADH (let us assume that the NADPH does not get involved in the production of ATP) leads to the production of 3 molecules of ATP, How many ATP molecules are produced via the metabolism of a single glucose molecule via the Entner-Doudoroff pathway. Yes, this pathway actually exists. See page 875 of your textbook. Note, for this type of question, I will provide the diagram of the pathway as indicated on page 833. It is not necessary to memorize this pathway.
2. Some time was spent discussing a Cyanobacterium (Blue green algae) by the name of *Chroogloeocystis siderophila*. This organism is currently being investigated to see if it can be used to remove what material from power plant flue gases? This bacterium needs to be able to grow under a rather unusual condition. What is that condition? The bacterium was isolated from a rather unique environment. What was that environment?
3. You were also introduced to a very unusual bacterium (probably a Green Sulfur bacterium) by the rather strange name of GSB1. Where was this bacterium isolated from? Given the fact that it is photosynthetic, it does require light. Where is it thought that the light comes from?

Chapter 6

1. You were introduced to several different mechanisms that bacterial cells make use of to reproduce. The first of these methods was that known as binary fission. In discussing this approach to reproduction, I noted that 3 major events have to occur in order for binary fission to achieve its goals. What were those events?
2. While the above-mentioned process is really quite complex, it can be completed in remarkably quickly. It was noted in class, that *E. coli* has the ability to divide once every ___ minutes under the right set of circumstances.
3. You were introduced to the genus, *Streptomyces* to illustrate another method of bacterial reproduction. This method of reproduction involves the production of what are known as ____. You should be able to describe the production of the previously mentioned structures with the use of a labeled diagram. Generally speaking, members of the genus, *Streptomyces* are ___ bacteria. Members of this genus have been widely studied because of their ability to produce ___ for man's use.

4. You were also introduced to a group of bacteria known as the Chlamydia. While these bacteria actually do use the process of binary fission to reproduce, they do have a rather different “life cycle”. What are the names of the two stages in the life cycle? Which of the stages is infective for man? Which of the stages does undergo binary fission?
5. The Chlamydia gain access to our body by several means. What means were noted in class? These organisms are single most important of the ___ transmitted disease organisms and also a major cause of ___ in man.
6. You should be able to sketch and label a typical bacterial growth curve. This includes labeling the axis to the graph.
7. When producing a growth curve, the numbers of bacteria present are plotted as the ___ of their numbers.
8. Draw the growth curve of a “self sterilizing culture”. What is meant by this term?
9. Draw the growth curve of a bacterial species, which is capable of forming endospores and has done so. Note: In this case the numbers of microbes, which are plotted on the vertical axis of the graph, have been determined by the plate count technique.