A SPECIAL SUMMARY OF ORGANISMS IN EXPERIMENTS 11, 14 AND 15

Here is a review of the **characteristics of the organisms** in Experiments 11, 14 and 15 that we take advantage of ("exploit") when **isolating** and **detecting** them. These things are also emphasized in the introductory paragraphs and procedures for these experiments in the manual. The first three include some good information that could be worked into the introductions of lab reports, as the requirement for the Introduction section is to make it **organism-oriented**, and including the exploitable characteristics is mandatory.

1. **Purple non-sulfur photosynthetic bacteria**: These organisms are metabolically versatile. We found most useful their ability to **photosynthesize under anaerobic conditions (as a main feature of anoxygenic phototrophy),** utilizing an **organic carbon source (heterotrophy)** that few other organisms can utilize as a carbon (or energy) source – namely sodium succinate. Their **photosynthetic pigments** are useful in detection of their colonies.

2. ***Bacillus***: Their ability to produce **endospores** as well as their **ability to grow in the presence of air** (as the various species are **either strictly aerobic or facultatively anaerobic**) were the main points relating to their selection. The endospores from the soil survived the heat treatment, and the aerobic incubation conditions inhibited the anaerobic endospore-forming genus *Clostridium* from growing on the plates.

3. ***Streptomyces***: Their ability to produce **extracellular hydrolytic enzymes** made them among the very few organisms able to grow on the isolation medium (Actinomycete Isolation Agar) which contained high molecular weight compounds (casein and starch) as the major nutrients. An organism without these enzymes would be inhibited from utilizing the starch and casein. And of course, remember how we had to pick the ***Streptomyces*-type of colony** from the colonies of other bacteria and also molds in Period 2. **Not at all relevant in isolation and detection is antibiotic production nor the organisms' gram-positivity.**

4. **Coliforms**: These organisms are **gram-negative** and they **ferment lactose rapidly with the production of acid and gas**; the gas includes hydrogen which is responsible for the bubble formation in a Durham tube. So, among the populations of various organisms able to grow in the enrichment media (which basically inhibited gram-positive organisms as did the subsequent EMB Agar), coliforms would show their presence with a bubble in the Durham tube of a lactose-containing broth medium. (Fecal coliforms also ferment lactose to acid and gas up to at least a 44.5°C temperature). Coliforms also produce **dark colonies on EMB Agar** (a sign of lactose fermentation) as explained in Period 4 of Exp. 15. Remember, "coliform" is not a taxonomic group! Even some strains of *E. coli* are not coliforms – such as many lactose-negative strains which are involved in foodborne illness. Generally a coliform isolate will be identified as a member of the enteric group, and media used for enteric identification are applicable in testing them.

5. **Enterics:** This is a taxonomic group, consisting of dozens of genera related genetically to each other. Not all are found associated with the enteric tract. These organisms are **gram-negative**, so media that inhibit gram-positive bacteria are used in their isolation. They are also fermenters which means they will **all ferment at least glucose**. So, if isolation of gram-negative organisms which do not ferment glucose happens, such organisms are worked with no longer if the aim is to isolate enterics.