Hello students and welcome to this presentation. Today I will be talking about the first semester paper that is Microbiology and Biochemistry I. The paper code is MIC101. I am Dr. Sheryanne Velho-Pereira and I will be taking you through the module #30. The name of this module is culture media and it is under the unit growth and nutrition. In this module I would be teaching you what is simple and what is complex media. I would be also taking you through the different types of culture media, namely enriched,differential and selective. After we're done with this module, you would be in the position of explaining what is simple and complex media along with their principles and examples. You would also be able to cite the different types of complex media, namely enriched,selective differential along with the key characteristic features, and examples.

Culture media can be broadly divided into 2 sub categories. One being defined or synthetic media and the other one being complex. Let's go through each of them individually. The first one is defined or simple media. It is a media in which all the components are known. A classical example for this is Basal Medium. Complex media, on the other hand, is media, in which all components are not known i.e. unknown. An example for this is nutrient Agar.The carbon source in the case of simple media is carbon dioxide, which is most often given as sodium carbonate or bicarbonate. While, in the case of complex media it is glucose, peptone,yeast extract etc. Nitrogen sources in the case of defined or simple media are nitrates or ammonium salts. Whereas in complex media the nitrogen source is beef extract, yeast extract, peptone, etc.

The source of phosphorusin the case of simple media, is phosphate ions and other minerals, whereas in complex media the vitamins and minerals are provided by beef extract, and yeast extract. Now after we have covered what is defined and complex media. Let's go and see what are the examples of organisms that can be cultivated in them. So for simple media you have the photolithotrophs, an example of which is Cyanobacteria and photosynthetic protists while for complex media, it is the chemoorganotroughs examples are bacteria, fungi and protozoa. The utility of the defined or simple media is, it is excellent in research. Whereas in complex media, large scale production of metabolites can be achieved on account of its simple cost. Complex media is further subdivided into 3 sub classes. First one is enriched, an example being Blood Agar. Second one is differential, an example of which is Mac Conkey's agar, and finally you have Selective an example of which is also Mac Conkeys and another example is blood agar. Let's go to the first one, enriched and differential medium. Now, what is enriched media from the very word it has been enriched with some special nutrients, for example blood agar. The blood agar is enriched to encourage the growth of some fastidious microorganisms.Example hemolytic organisms that have special requirements for blood. Example of this media is the blood Agar. Second one is the differential medium, also known as the indicator medium. It helps in differentiating or distinguishing one organism from the other on a same medium. An example of this is blood Agar, which distinguishes between hemolytic and non hemolytic organisms. In this figure you can see the different types of hemolysis. Alpha as indicated by the Alpha symbol has a smaller zone of hemolysis and has a characteristic grass green color. Beta hemolysis is the one wherein there is complete lysis of the RBCS, and you can see as a distinct clear zone. Gamma hemolysis, on the other hand, there is no hemolysis. And the lack of hemolysis is indicated by an absence of a clear zone. Let's now go to what is a selective and differential medium. And we will use Mac Conkey's Media as an example for this. Selective media is the media which selects the growth of a desired Organism and stops the growth of an undesired one.

Differential or indicator media, as you've just seen before, distinguishes between 2 micro organisms growing on that same media. An excellent example for both selective and differential media is Mac Conkey's medium. This medium is selective because it allows the growth of the Gram negative organisms primarily because of the presence of bile salts, namely sodium taurocholate salts that inhibits the growth of the Gram positive counterparts. In addition to the bile soils,there also dyes like crystal violet, which inhibits the growth of Gram positive bacteria. Macconkey's is also a differential medium. It is so because it differentiates between the different groups of bacteria, namely the ones that ferment lactose, that is, the lactose fermenters, and the ones that do not ferment lactose i.e. the lactose non fermenters. The key components that aid in the process of differentiation is lactose,which is the source carbon here and neutral red,which is the dye or the acid base indicator. This is a lovely picture which clearly shows you that on the pink side you have lactose fermenting colonies which are pinkish or reddish in color and on the right you can see lactose, non fermenting colonies which show a characteristic cream or white color. So you can see it's very evident that only the Gram negative organisms are growing here because the medium contains the bile salts and crystal violet that inhibits the Gram positive organisms and you can differentiate them further as follows. The ones showing the pink color are the lactose fermenters while the non fermenter's are the ones showing the characteristic white color.

Let us summarize this entire unit. And we'll start off with what is simple media. It is a media in which all the components are known. Example basal media. Complex media is the one in which all the components are unknown. Example nutrient Agar. Complex media can be further subdivided into three subclasses, enriched,differential and selective. Enriched media is the one that has special nutrients like blood that is used to encourage the growth of some fastidious organisms like the hemolytic organisms. Differential or indicator media is the one that differentiates one organism from the other growing on the same media. And finally, we have selective media that selects the growth of certain desired organisms and stops the growth of the undesired. One example Mac Conkeys agar which facilitates the growth of only Gram negative organisms and inhibits the growth of its Gram positive counterparts. These are my references. I thank you for your attention.