# Microbiology assignment

Devise a title for each of the two experiments you did : (I), Experiment 1 demonstrated the growth of bacteria when placed in liquid nutrient broth culture, the number of species present had increased in growth. .(1) (it) Experiment 2 illustrated the growth of bacteria when placed on different surfaces of solid agar plates which included: nutrient agar, CELLED agar and McCracken agar; the number of species present also had increased in growth. (1) 2(A). Experiment 1: Choose 2 words that describe the appearance of the pre – incubation broth: (I) Straw yellow

Transparent . 04) 2 (B). Choose two words that describe the appearance of the post-incubation broth: (I) Turbidity . 04) (it) Follicle formation (h) 3. Complete the table below to show your post-incubation observations in Experiment 2 Nutrient Agar CELLED Agar McCracken Agar Appearance of agar before incubation Pale yellow Green Red Appearance of the colonies for each species on each type of agar E. Coli – Shiny white/clear with rough outer edges. P. Organisms – Matte white/clear with smooth outer edges B. Subsists – Matte white/clear with rough outer edges. E. Coli – opaque yellow colony produced.

P. Organisms – green colony produced B. Subsists – pale blue colony produced E. Coli – orange colony produced P. Organisms – white colony produced B. Subsists – pale orange colony produced. Appearance of Agar surrounding each species following incubation E. Coli – Yellow P. Organisms – Blue B. Subsists – Pale Blue E. Coli – Orange P. Organisms – Orange B. Subsists – Orange (7) 4 Describe what is meant by the term aseptic technique: Aseptic technique is any technique that ensures sepsis (such that

no contamination of the culture) occurs and thus prevents the risk of infection. (1) 4 (B).

Briefly describe 5 aseptic procedures you used during the experiments, emphasizing in each example you give, how you reduced potential contamination to your cultures by unwanted micro-organisms: (I) First, we must sterilize the inoculating loop by heating it until the color reached a distinct red hot in the hottest part of a blue flame on a Bunsen burner. This was done before and after use; this ensures that any bacteria which may have been left on the loop were destroyed and so sepsis is achieved. (1) (it) The inoculating loop was held at a steep angle that is somewhat close to vertical.

This ensures that any liquid that is present on the loop will flow downwards and into the flame, where it will be completely destroyed and so sepsis is established. (1) (iii) Another technique included flaming the necks of bottles using the Bunsen burner. This ensures that any microorganisms present will be destroyed and not able to enter thereby preventing contamination of the culture(s). (iv)We had to perform the transfer of each microorganism on the cultures as quickly and efficiently as possible. The cultures were exposed to air for a minimal amount of time; otherwise risk of contamination would have occurred. 1) (v) During experiment 1, we had to lift the cap of the bottle and hold it in our little finger, taking care not to place it on the worktop. Then using the rest of our fingers, we wool old d n the bottle and use our tree and to complete the rest to the procedure. Once the experiment was completed we used our little finger to place the cap back onto the bottle. (1) 5 (A). The formation of aerosols in the microbiology laboratory should be avoided. What

does a microbiologist mean by an aerosol? This is the dispersal of very fine particles in the form of solid, liquid or gas present in the air. (1) (B).

Why must such aerosols be prevented? Aerosols must be prevented because it can cause contamination to the agar. It can also be a potential threat to us if come in close contact. .(1) 6 (A) Explain what appearance of Escherichia coli in the nutrient broth tells us about the bacteria: The appearance of Escherichia coli revealed white colonies formed on the nutrient broth, this was due to the degree of turbidity which developed post- incubation. The white colonies signified the levels of oxygen and temperature the media had during incubation and also the amount of time the media was placed in or incubation. (B). The contaminated water contained Bacillus subsists in the nutrient broth tells us about the bacteria: In the nutrient broth containing Bacillus subsists, a follicle was formed due to the rapid growth of organisms which were seen sticking to each other towards the surface of the media. 7 (A). Which species of bacteria went the brightest and deepest color of pink following incubation on the McCracken Agar? E. Coli (h) 7 (B). Explain carefully step by step why this happened: E. Coli is considered to be gram-negative bacteria which have the ability to ferment he lactose which is present in McCracken agar.

When E. Coli ferments the lactose, this causes the pH of the culture to fall due to the formation of an acid; this is reinforced by the neutral pink/red color seen on the culture. Additionally, as the pH continues to drops, the neutral pink/red is absorbed by E. Coli which results in the appearance of deep pink/red shown evidently on the culture. 8 (A). You were provided with three different agar media for the experiments. Gars are broadly classified

into two basic types a) general growth media and b) differential/ selective media.

What do you understand by the terms: (I) General growth media: This is a media which provides sufficient levels of nutrients that would be later utilized for the growth of a particular microorganism. An example would be Nutrient agar plates. (it) Differential/selective media: Differential media is used to differentiate microorganisms growing on the same media. To do this, we look at the growth characteristics shown clearly on the media. Selective media is used to isolate and thus only allow the growth of one type of microorganism while inhibiting the growth of another.

This is achieved by the addition of alcohol or dyes in the media to inhibit growth of certain microorganisms. 8 (B). Complete the table below to indicate which of the two broad classifications you would place each of the three different gars you used and your reasons in each case. Basic Category of Agar: General growth agar or Differential/Selective agar? General growth agar Differential/selective agar Your reasons for this classification Nutrient agar snows the characteristics to general gar n agar because the bacteria were able to grow rapidly with each displaying normal appearance of bacterial trains on the media.

CELLED agar is considered a differential/selective agar since it was able to show mass growth of each individual bacterial strain evident on the media, but highlighted the different characteristic changes for each bacterial colony as well as agar color. McCracken Agar is a differential/selective agar because it was not able to allow the growth of gram-positive bacteria. However, it did

highlight the differences between gram-negative bacteria that are able to ferment and those that are not able to ferment lactose. This is reinforced by the color of their colonies.