

ARTIS MICROPIA

Probiotics

Full of beneficial bacteria



Part 1

Question 1: A whole bunch of colonies should have grown in the dish. From how many bacteria does a colony derive?

Answer: Each colony derives from several bacteria, each of which continues to divide into two.

Question 2: How many bacteria do you think there will be in the dish after seven days?

Answer: After seven days, there should already be billions of bacteria in the dish. After twenty divisions, a single bacterium will have multiplied to more than a million bacteria.

Part 2

Question 1: How many bacterial colonies do you count in the petri dishes? What is the average number?

Answer: Between 125 and 200 colonies can be expected. If one dish has 140 colonies, for instance, and the other has approximately 190 colonies, the average of the two plates is 165.

Question 2: If you add 1ml of Yakult to 9ml of saline solution, that one ml of Yakult will be diluted tenfold. By how much is the Yakult diluted in total?

Answer: In test tube 1, the Yakult is diluted 10 fold. In test tube 2, the solution from test tube 1, has been diluted 10 fold again, so it is diluted 100 fold in total. In test tube 3, the Yakult is diluted 1000 fold, in test tube 4, 10,000 fold, and, finally, in test tube 5, it is diluted 100,000 fold.

Question 3: Calculate how many bacteria there were in 1ml of Yakult. And approximately how many are there in a bottle? **TIP:** Do not forget to take into account that you used 0.1ml in the petri dish, and not 1ml.

Answer: If you were to remove 1 ml from test tube 5, you would have a 100,000-fold dilution of 1ml of Yakult. But you only put 0.1ml in the petri dish. So the number of colonies should be multiplied by 1,000,000 in total. At an average of 165 bacterial colonies per plate, there are therefore $165 \times 1,000,000$ bacteria in 1ml, or 165 million bacteria per ml. That means that there are $165,000,000 \times 65\text{ml} = 10,725,000,000$ bacteria in a bottle of Yakult, so more than 10 billion.

Part 3

Question 1: What do you see happening to the fungus in the petri dish?

Answer: No colonies grew near the fungus; the colonies appear to have formed a circle around the fungus. It could also be that the fungus has no effect on the bacterial colonies.

Question 2: What do you see happening to the amoxicillin in the petri dish?

Answer: No colonies grew near the amoxicillin; the colonies appear to have formed a circle around the slit with amoxicillin.

Question 3: What could have caused this?

Answer: Certain *Penicillium* fungi produce an antibiotic (e.g. penicillin). Amoxicillin is also an antibiotic. The bacteria do not multiply in areas where antibiotic is present. If the fungus does not cause the colonies to form a circle, then that fungus does not produce an antibiotic.