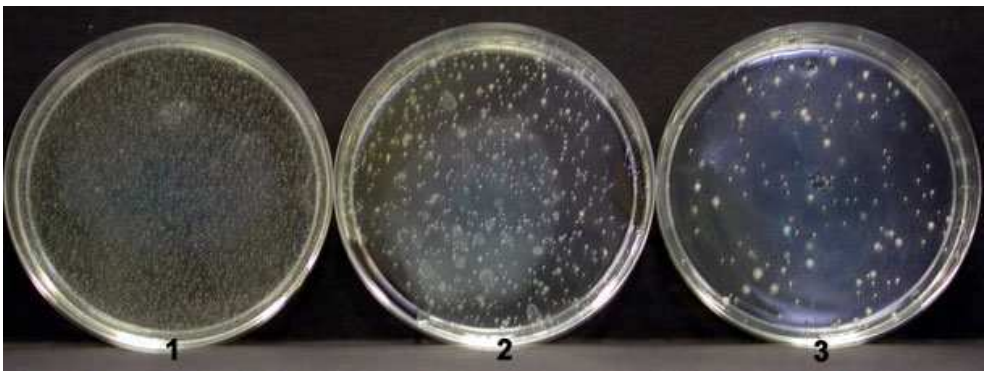
HOW TO SOLVE PRACTICAL ASPECTS OF MICROBIOLOGY

5. CALCULATION OF INOCULUM SIZE



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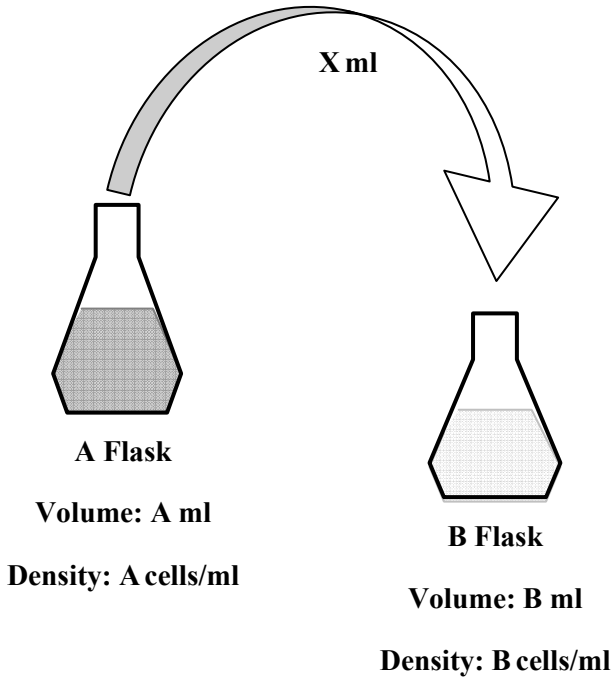
5. CALCULATION OF INOCULUM SIZE

Often it is necessary to know the initial cell density of a culture, for example when we wish to determine the growth characteristics of a microorganism, or for the industrial production of certain compounds.

This situation is reflected in the following diagram:



From a culture with a density of A cells/ml, X ml are transfer to a new flask to obtain a final cellular density of B cells/ml. The problems, with more or less complexity, are always reduced to this scheme: we want to know the densities of A or B flasks or the volume of inoculum.

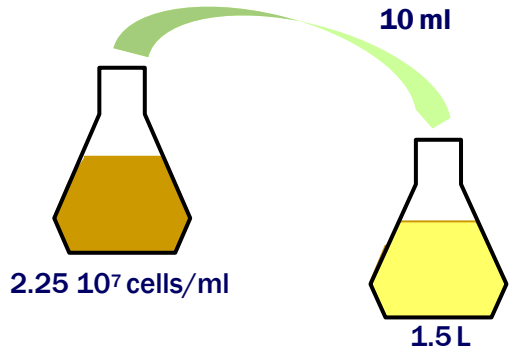
To solve these problems, it is important to note that if a flask (B) has a volume of 100 ml and a density of 10^6 cells/ml, the total number of cells in the flask will be 10^8 cells (density x volume). These 10^8 cells have been transferred in X ml (inoculum). The volume of this inoculum depends on the density of the initial culture (A).

This scheme will be useful to solve problems like the following one:

5.1. From a bacterial culture with a density of 2.25 10^7 cells/ml, we have inoculated a flask containing 1.5 liters of sterile culture medium. If the volume used as inoculum has been 10 ml, which is the bacterial density in the flask?

SOLUTION

5.1. Density into the flask?



Cellular density?

2.25 10^7 cells ⟶ 1 ml

A cells ⟶ 10 ml

A = 2.25 10^8 cells transferred

$$\frac{2.25\ 10^8 \text{ cells}}{1{,}500 \text{ ml}} = 1.5\ 10^5 \text{ cells/ml}$$