

## Enrichment Culture

Enrichment culture is a very valuable technique developed by some giants in microbiology in the early 1900s. The basic principle involved is that of selection. Often, it is desired to isolate bacteria that are relatively scarce, or are in fact in very low numbers. Normally, bacteria are isolated from one another using the streak plate technique, in which a sample of bacteria is spread out onto an agar plate in such a way that individual cells are separated from each other.

**Enrichment culture:** This technique provides growth conditions that are very favourable for the organism of interest, and unfavourable for competing organisms.

**Methods :** Enrichment culture can be done by

- i) modifying the physical conditions.
- ii) modifying the nutrient content of the culture

### **i) Modifying the physical conditions**

To isolate a bacterium that is a thermophile (prefers to grow at a high temperature such as 55 deg C), incubate the sample at that high temperature. Organisms that cannot tolerate that temperature will die or simply fail to grow, while thermophiles will grow and increase in number, over time becoming a large and larger proportion of the total bacterial population in the sample. This is an example of enrichment by modifying the physical conditions.

### **ii) Modifying the nutrient content of the culture**

1) **To isolate N fixing organisms:** Organisms capable of transformation of N can be isolated by incubating a soil sample in a culture medium which has all the ingredients necessary for growing **except** nitrogen. Those bacteria that can "fix" nitrogen and create their own nitrogenous nutrients for growth will have a selective advantage and increase in number compared to those who can't. Nitrogen is likely to be present in small amounts as a contaminant in the soil or in the other culture ingredients, so it would be incorrect to say that only nitrogen fixing bacteria will grow. They will, however, have a great advantage and will eventually outgrow the others given enough time.

2) **To isolate pesticide degrading bacteria :** Pesticides are organic compounds (most C and H) and are xenobiotic (man-made, unnatural compound). Bacteria generally break down organic compounds as a source of building materials and energy. In a growth medium in which the pesticide in question is the sole carbon source for growth, only those bacteria that can use the compound will grow appreciably, while others will not. Eventually, the culture will contain a sufficiently high proportion of pesticide-degraders that it would be easy to isolate them using the streak plate technique.