Evaluation of the efficiency of Sterilization Method ⇒

Check → Means → To check the sterlization process (Physical, Chemical, Radiation) are efficient to kill 100% Microorg. or not?

⇒ Evaluation can be determined by 3 Values.

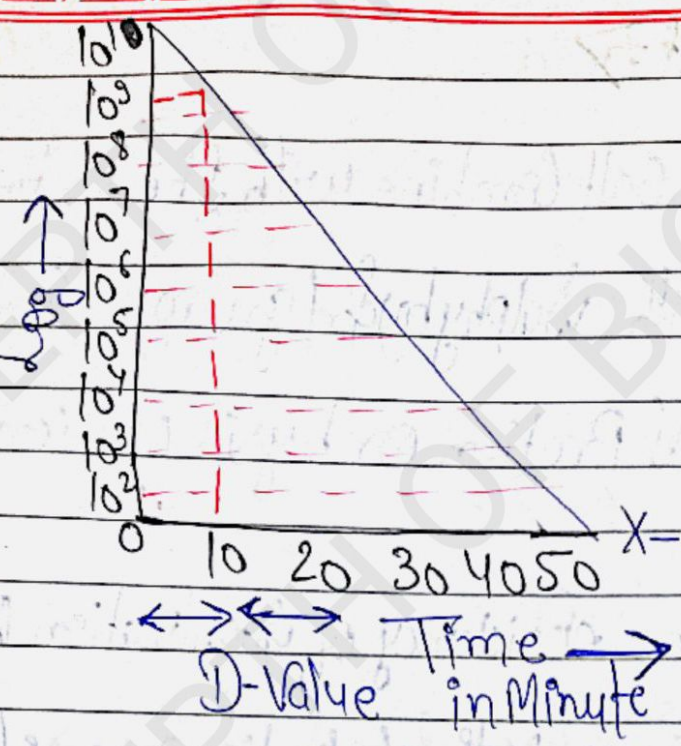
① D-Value ② Z-Value ③ F-Value.

1. D-Value ⇒ Also known as Decimal reduction time

It is defined as time in Minutes at any define Temp. to destroy Microorg. (i.e, Ornt in the sample/Instrument which we need to sterilize) is called D-Value.

⇒ It is Set of condition to acheive 1 log reduction of Microorg. (Check Graph)

Date ___/___/___



→ If Temp. (↓) → Time req. to kill Microorg. ↑.

→ Temp (↑) → Kill time ↓

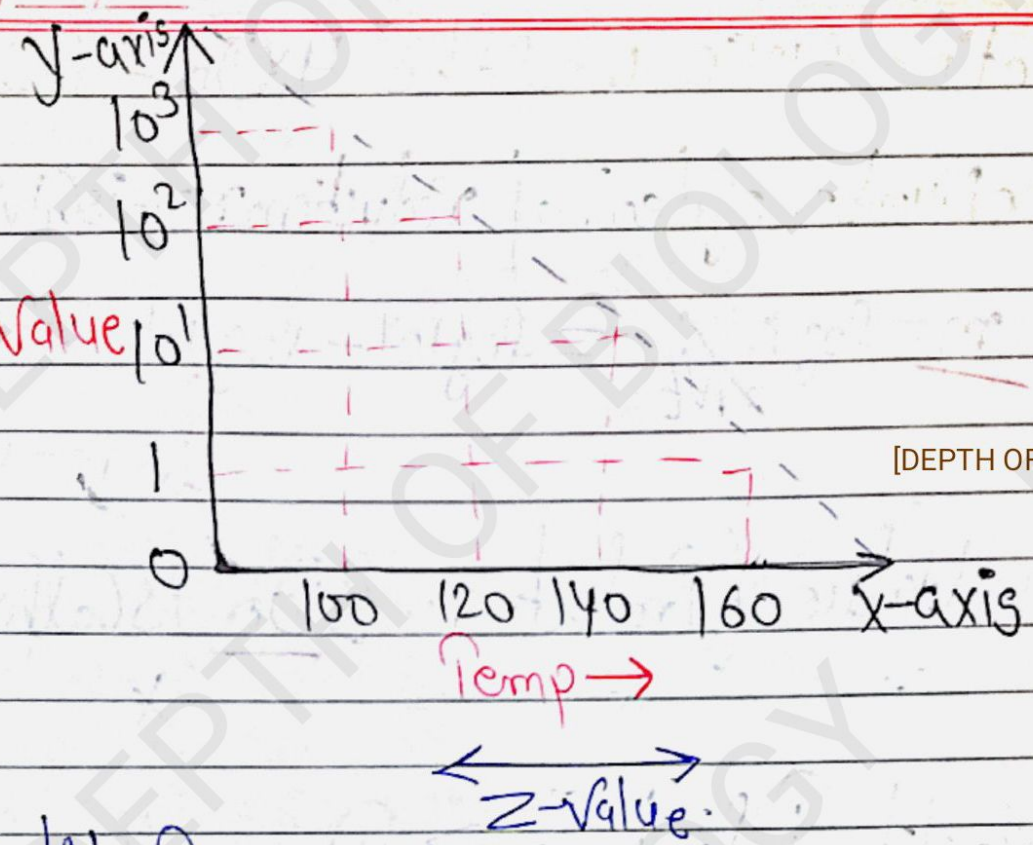
D is specific Value for each Microorg.

⇒ D-Value ↓ (Low) ⇒ Then Sterilization could be Great. & it is more effecient.

(2) Z-Value ⇒

When we plot the D-Value on y-axis & temp. at x-axis then the temp. is req. to reduce the D-Value by One log is called Z-Value.

Date ___/___/___



⇒ If we ↑ the Temp. → D-Value(↓) & Z-Value(↑).
More bacteria kill

③ F-Value ⇒

Heating Method में जो Time req. है for Sterilization
to kill the population of Bacteria Spores in Minute is
Called F-Value.

⇒ D Value for Bacillus thermophilus to be 5 minute &
Initial Number in the Container to be 10,000. If
(N0)
it was req. to reduce number to one (N) in the Heat
Process. Four decimal reduction would be needed.

Date ___/___/___

The time at 121°C would be $4 \times D_0 = 4 \times 5 = 20 \text{ min}$

The Number of decimal reduction req. is Given by ⇒

$$n = \log \frac{N_0}{N_t} = \log 10^4 - \log 10^0 = 4 - 0 = 4$$

(Initial conc. → N_0, Final conc. → N_t)

So $n = 4$

The Value of Product n & D_0 is called F-Value-