

Limit of Detection: Microbiology

UKAS define a Microbiological LOD as the “lowest number of microorganisms that can be detected, but in numbers that cannot be estimated accurately”

Every Microbiological test method will have an upper and lower Limit of Detection (LOD). This is determined by the statistical accuracy with which the analysts are able to count the colonies growing on the plates.

ALS Environmental offer a wide range of Microbiological analysis, providing the ability to report bacterial growth colony forming units (cfu) from 1 to 100,000.

Our standard Total Viable Count (TVC) method analyses 1 millilitre (ml) of sample. The maximum count that can be given for a plate is 1,000 cfu, which converts to a result of 1,000 cfu/ml.

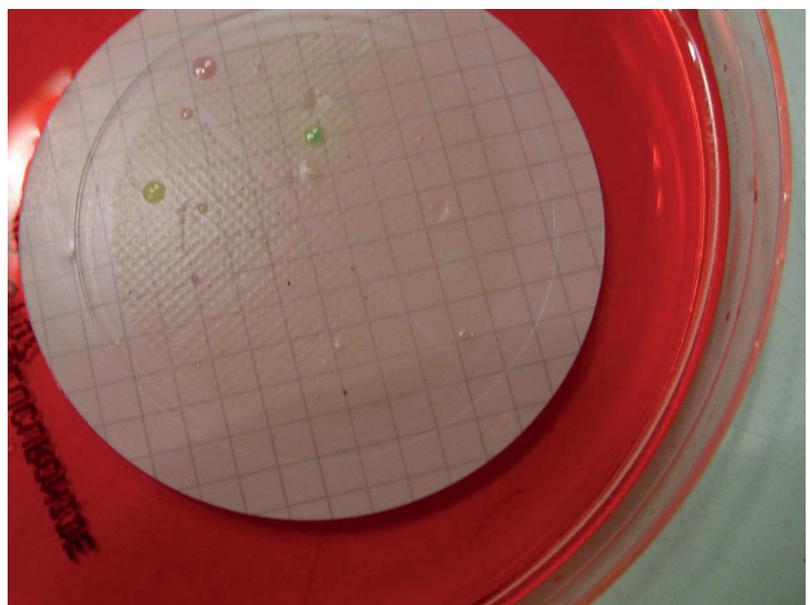
Performing dilutions can extend LOD ranges and in some circumstances, only the dilution is performed and therefore the LOD range deviates.

Results greater than 1,000 must be reported as >1,000 cfu/ml, as the statistical inaccuracy of counting greater numbers is too great. The minimum is 1 cfu, therefore a negative result is 0 cfu/ml.

On a 1:10 dilution plate, all counts will be multiplied by 10 to give the true result. If the dilution is prepared along side the standard test plate the upper LOD is raised to 10,000, providing a reportable range from 0 to 10,000 cfu/ml.



EXAMPLE OF AN OVERGROWN PLATE



EXAMPLE OF A NON OVERGROWN PLATE



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If a 1:10 dilution is prepared without the standard test plate the upper LOD remains at 10,000 as all results are multiplied by 10. The lowest reportable result (for 1 colony on the late) is 10, negative result would therefore be reported at <10 cfu/ml.

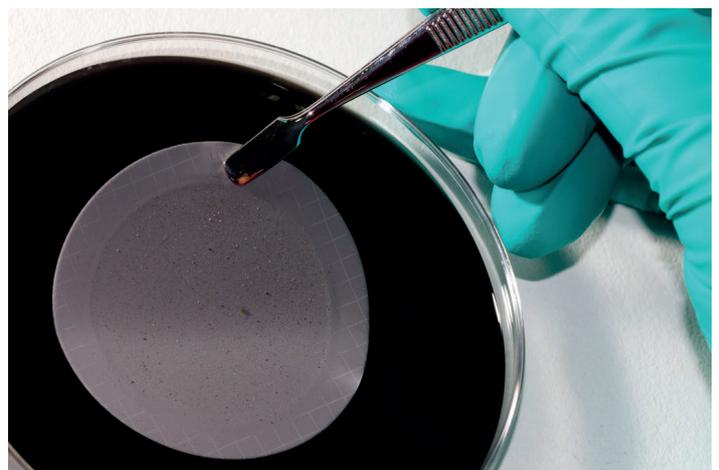
Typical dilutions and associated reportable result range:

Dilution	Membrane filtration methods (Coliforms, E. coli, etc) (cfu/100m)		TVC methods (cfu/ml)	
	As part of dilution series	Stand-alone	As part of dilution series	Stand-alone
Neat (normal sample)	-	0 - 100	-	0 - 1,000
1:10 (10-1)	0 - 1,000	10 - 1,000	0 - 10,000	10 - 10,000
1:100 (10-2)	0 - 10,000	100 - 10,000	0 - 100,000	100 - 100,000
1:1000 (10-3)	0 - 100,000	1000 - 100,000	0 - 1,000,000	1,000 - 1,000,000
1:10000 (10-4)	0 - 1,000,000	10,000 - 1,000,000	0 - 10,000,000	10,000 - 10,000,000

ALS Environmental are able to offer dilution options for the following Microbiological methods:

- TVC (48 hours, 37oC)
- TVC (72 hours, 22oC)
- Coliform
- E-coli
- Enterococci
- Pseudomonas aeruginosa
- Pseudomonas species
- TVC 30oC
- Clostridium perfringens
- SRC

ALS Environmental are able to offer a rapid confirmation technique for the identification of specific organisms such as E-coli or Enterococci which can reduce the reporting times for positive results and provide additional species level information at no additional cost. We participate in a wide range of proficiency testing schemes to ensure that the data we provide is accredited and legally defensible.



References

EA - 4/10 Accreditation in Microbiological Laboratories, European co-operation for Accreditation, page 19