MPN Tables and Their Use

Appendix

When three serial sample volumes (e.g., dilutions) are used in the bacteriological testing of water, the resulting MPN (most probable number) values per 100 mL can be determined using Table E–1. The MPN values given there are based on serial sample volumes of 10, 1, and 0.1mL. If lower or higher serial sample volumes are used, the MPN values given in Table E–1 must be adjusted accordingly. For example, if sample volumes used are 100, 10, and 1 ml, the MPN values from the table are multiplied by 0.1. Similarly, if the sample volumes are 1, 0.1, and 0.01 ml, the MPN values from the table are multiplied by 10.

In situations where more than three test dilutions have been run, the following rule is applied to select the three dilutions to be used in determining the MPN value (Standard Methods, 1998): Choose the highest dilution that gives positive results in all five portions tested (no lower dilution giving any negative results) and the two next higher dilutions. Use the results at these three volumes in computing the MPN value. In the examples given in the accompanying table, the significant dilution results are shown in boldface. The number in the numerator represents positive tubes, that in the denominator, the total tubes planted.

	1.0 mL	0.1 mL	0.01 mL	0.001 mL	0.0001 mL	Combination of positives	MPN/ 100 mL
a	**5/5**	**5/5**	**2/5**	**0/5**		**5-2-0**	4900
b	**5/5**	5/5	**4/5**	**2/5**	**0/5**	**5-4-2**	2200
c	**5/5**	**0/5**	**1/5**	**0/5**	0/5	**0-1-0**	18
d	**5/5**	5/5	3/5	1/5	1/5		
(d)[a]	**5/5**	**5/5**	**3/5**	**2/5**	0/5	**5-3-2**	1400
e	**5/5**	4/5	1/5	1/5	0/5		
(e)[a]	**5/5**	**4/5**	**2/5**	0/5	0/5	**5-4-2**	2200

[a] Adjusted values used to determine the MPN using Table E–1.

In example c, the first three dilutions are used so as to throw the positive result in the middle dilution. Where positive results occur in dilutions higher than the three chosen according to the above rule, they are incorporated into the result of the highest chosen dilution up to a total of five. The result of applying this procedure to the data is illustrated in examples d and e.

REFERENCE

Standard Methods (1998) *Standard Methods for the Examination of Water and Wastewater*, 20th ed., American Public Health Association, New York.

Table E–1
Most probable number (MPN) of coliforms per 100 mL of sample

Number of positive tubes				Number of positive tubes				Number of positive tubes			
10 mL	1 mL	0.1 mL	MPN	10 mL	1 mL	0.1 mL	MPN	10 mL	1 mL	0.1 mL	MPN
0	0	0		1	0	0	2.0	2	0	0	
0	0	1	18	1	0	1	4.0	2	0	1	
0	0	2	16	1	0	2	6.0	2	0	2	
0	0	3	5.4	1	0	3	8.0	2	0	3	
0	0	4	7.2	1	0	4	10	2	0	4	
0	0	5	9.0	1	0	5	12	2	0	5	
0	1	0	1.8	1	1	0	4.0	2	1	0	
0	1	1	3.6	1	1	1	6.1	2	1	1	
0	1	2	5.5	1	1	2	8.1	2	1	2	
0	1	3	7.3	1	1	3	10	2	1	3	
0	1	4	9.1	1	1	4	12	2	1	4	
0	1	5	11	1	1	5	14	2	1	5	
0	2	0	3.7	1	2	0	6.1	2	2	0	
0	2	1	5.5	1	2	1	8.2	2	2	1	
0	2	2	7.4	1	2	2	10	2	2	2	
0	2	3	9.2	1	2	3	12	2	2	3	
0	2	4	11	1	2	4	15	2	2	4	
0	2	5	13	1	2	5	17	2	2	5	
0	3	0	5.6	1	3	0	8.3	2	3	0	
0	3	1	7.4	1	3	1	10	2	3	1	
0	3	2	9.3	1	3	2	13	2	3	2	
0	3	3	11	1	3	3	15	2	3	3	
0	3	4	13	1	3	4	17	2	3	4	
0	3	5	15	1	3	5	19	2	3	5	
0	4	0	7.5	1	4	0	11	2	4	0	
0	4	1	9.4	1	4	1	13	2	4		
0	4	2	11	1	4	2	15	2	4	2	
0	4	3	13	1	4	3	17	2	4	3	
0	4	4	15	1	4	4	19	2	4	4	
0	4	5	17	1	4	5	22	2	4	5	
0	5	0	9.4	1	5	0	13	2	5	0	
0	5	1	11	1	5	1	15	2	5		
0	5	2	13	1	5	2	17	2	5	2	
0	5	3	15	1	5	3	19	2	5	3	
0	5	4	17	1	5	4	22	2	5	4	
0	5	5	19	1	5	5	24	2	5	5	

Table E–1 (*Continued*)

Number of positive tubes				Number of positive tubes				Number of positive tubes			
10 mL	1 mL	0.1 mL	MPN	10 mL	1 mL	0.1 mL	MPN	10 mL	1 mL	0.1 mL	MPN
3	0	0	7.8	4	0	0	13	5	0	0	23
3	0	1	11	4	0	1	17	5	0	1	31
3	0	2	13	4	0	2	21	5	0	2	43
3	0	3	16	4	0	3	25	5	0	3	58
3	0	4	20	4	0	4	30	5	0	4	76
3	0	5	23	4	0	5	36	5	0	5	95
3	1	0	11	4	1	0	17	5	1	0	33
3	1	1	14	4	1	1	21	5	1	1	46
3	1	2	17	4	1	2	26	5	1	2	64
3	1	3	20	4	1	3	31	5	1	3	84
3	1	4	23	4	1	4	36	5	1	4	110
3	1	5	27	4	1	5	42	5	1	5	130
3	2	0	14	4	2	0	22	5	2	0	49
3	2	1	17	4	2	1	26	5	2	1	70
3	2	2	20	4	2	2	32	5	2	2	95
3	2	3	24	4	2	3	38	5	2	3	120
3	2	4	27	4	2	4	44	5	2	4	150
3	2	5	31	4	2	5	50	5	2	5	180
3	3	0	17	4	3	0	27	5	3	0	79
3	3	1	21	4	3	1	33	5	3	1	110
3	3	2	24	4	3	2	39	5	3	2	140
3	3	3	28	4	3	3	45	5	3	3	180
3	3	4	31	4	3	4	52	5	3	4	210
3	3	5	35	4	3	5	59	5	3	5	250
3	4	0	21	4	4	0	34	5	4	0	130
3	4	1	24	4	4	1	40	5	4	1	170
3	4	2	28	4	4	2	47	5	4	2	220
3	4	3	32	4	4	3	54	5	4	3	280
3	4	4	36	4	4	4	62	5	4	4	350
3	4	5	40	4	4	5	69	5	4	5	430
3	5	0	25	4	5	0	41	5	5	0	240
3	5	1	29	4	5	1	48	5	5	1	350
3	5	2	32	4	5	2	56	5	5	2	540
3	5	3	37	4	5	3	64	5	5	3	920
3	5	4	41	4	5	4	72	5	5	4	1600
3	5	5	45	4	5	5	81				