

MPN Test to Detect the Presence of Coliforms in Pond Water and Potable Water

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Abstract-Purpose of this research is to detect the presence of coliforms, if any, in water bodies by the application of MPN Test. For this research water samples were collected from the affected sites where the possibility of mixing sewage in water bodies is high, and MPN Test were applied to detect the presence of coliforms, which may be pathogenic in nature and are responsible for the cause of diseases like cholera, dysentery, tuberculosis, etc in man and domestic animals.

Keywords: Aerobic, compounds, contaminates, discharge, domestic, E.coli, elevated, F.coli, fermenting, pathogenic, potable, production, sewage.

1-INTRODUCTION:-

Sewage: This is the domestic and non domestic discharge containing substances like parts of vegetables, food substances, and fecal matter etc in it. This contaminates water in many ways like, by increasing amount of organic and inorganic compounds and by introducing species of pathogenic bacterias.

1.1- COLIFORMS: These organisms do not show their presence in natural waters unless they get contaminated with the fecal matter of the patients of certain diseases or their carriers. The idea behind the bacteriological analysis is to see the presence of pathogens in water. Isolation and detection of these pathogens is very cumbersome and time consuming. Organisms like coliforms are always associated with the fecal matter easy to detect and more in number as compared with pathogens are considered as the indicators of pollution. This standard includes all of the aerobic and facultative anaerobic, gram negative nonspore forming, rod shaped bacilli which ferment lactose with gas production within 48 hours at 37 degree celcius . Since organisms included under coliforms differ in biochemical and serologic characteristics and in their natural sources and habitats, now a days fecal coliforms of "F coli" which are characteristically the inhabitants of the intestine of the men and animals are taken as the 'indicators of pollution'. Fecal coliforms and E coli are defined as follows:

1.2-E.COLI: Organisms basically aerobic, gram negative nonspore forming rods, fermenting lactose with the production of gas at elevated temperatures of 44.5 degree celcius in 24 hours.

1.3- F. COLI: Organisms satisfying all the characteristics of fecal coliforms and showing indole positive reaction in addition. When water shows complete absence of fecal coliforms and E.coli they are considered as safe and potable.

All the four samples of pond water are taken for the purpose of this research are from the four different ponds and the two samples of potable water were taken from hand pumps of the district Narsinghpur. All the ponds are highly polluted due to direct discharge of sewage and fecal matter.

2- MATERIALS AND METHODS:

Samples of water were collected from the sites where sewage is discharged and they were diluted to an appropriate concentration with distilled water.

7.5 grams of MacConkeybroth were dissolved in 100 ml. of distilled water, and is heated at 80 degree of temperature, and is then cooled to room temperature.

10 ml of this solution were filled in 5 test tubes each and a Durhams tube were added in inverted position in each test tube, plugged with non absorbent cotton plug. Then another 5 test tubes were with 10 ml of this solution and 1 ml of diluted sample water were added and a Durhams tube were added in each test tube and plugged with cotton plug.10 ml of the same solution were filled

in another 5 test tubes each and 0.01 ml of diluted sample of contaminated water were added in it, then a Durhams tube is added in inverted position and test tubes were plugged with non absorbent cotton plug. All the test tubes are labelled to remember their content. Then all the glass wares used and the test tubes were sterilised in autoclave at 115

degree celcius for 10 minutes. Then all things were removed from the autoclave and the test tubes were left in the BOD incubator at 37 degree celcius temperature for 24 hours. After 24 hours incubation test tubes were examined to see the presence of CO₂ in and around Durhams tubes. Then the test tubes were left in the incubator for another 24 hours for further incubation. After the completion of 48 hours of incubation test tubes were removed from the incubator and are examined to see the presence of CO₂ in and around the Durhams tubes. Readings of both the periods of incubation were written in the table and chart is drawn to highlight the readings and difference in them in 24 hours and 48 hours of incubation.

3- RESULT AND DISCUSSION:-

From all the results obtained by applying MPN test it is clear that the water of the ponds is highly polluted due to sewage discharge. Results of MPN tests are positive which confirms the presence of coliform bacteria in pond waters. All the results obtained from present studies are shown in the table 1. As shown in the table, result of the experiment in 24 hours comes positive in 4 samples and in rest 2 samples results were negative. But after 48 hours all 6 samples of water gives positive results of MPN Test.

Graph were also developed to show the results obtained from the experiment. Green columns in the graph shows development of coliforms positive in 4 samples as indicated by green columns drawn between 0 and +1, and negative results in rest two samples of potable water were shown as green columns drawn between 0 and -1 in 24 hours at 37 degree celcius. Whereas the red columns shows all the 6 positive results of the test in 48 hours at 37 degree celcius in incubator, drawn as red columns between 0 and +1 values

According to the parameters given by WHO presence of coliforms in any water sample indicates that the water is polluted and is not of potable quality, because coliforms may cause various diseases like cholera, which are highly destructive. When water shows complete absence of coliforms, they are

considered as safe and potable.

Table:1

1- Growth of bacteria in 24 hours at 37-c using MPN test

Time Period	1	2	3	4	5	6
24-Hour	+	+	+	+	-	-
48-Hour	+	+	+	+	+	+

2- Growth of bacteria in 48 hours at 37-c using MPN test.

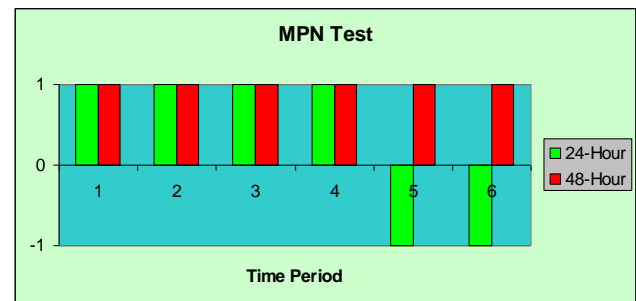


Fig.1 The graph shows positive and negative values of MPN Test.

ACKNOWLEDGMENT:

I am highly thankful to the Public Health Engineering Department Narsinghpur, for giving me all required lab facilities for the completion of present research work.

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