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Total Coliform Bacteria Testing

COLIFORM BACTERIA

The total coliform bacteria test is a primary indicator of "potability" , suitability for consumption, of drinking water. It measures the concentration of total coliform bacteria associated with the possible presence of disease causing organisms.

SOURCE:

Coliform bacteria are a natural part of the microbiology of the intestinal tract of warm blooded mammals, including man. Coliform bacteria can also be found in soil, other animals, insects, etc. The total coliform group is relatively easy to culture in the lab, and therefore, has been selected as the primary indicator bacteria for the presence of disease causing organisms.

POTENTIAL HEALTH HAZARDS:

Coliform bacteria are not pathogenic (disease causing) organisms, and are only mildly infectious. For this reason these bacteria are relatively safe to work with in the laboratory. If large numbers of coliforms are found in water, there is a high probability that other pathogenic bacteria or organisms, such as Giardia and Cryptosporidium, may be present. The PADEP requires public drinking water supplies to demonstrate the absence of total coliform per 100 mls (about 4 oz) of drinking water. At this time, there are no regulations governing individual water wells. It is up to the private well owner to have his or her water tested.

TESTING:

Approved tests for total coliform bacteria include the membrane filter, multiple tube fermentation, MPN and MMO-MUG ("Colilert") methods. The membrane filter method uses a fine porosity filter which can retain bacteria. The filter is placed in a petri (culture) dish on a pad with growth enrichment media (mEndo) and is incubated for 24 hrs at 35 degrees C. Individual bacteria cells which collect on the filter grow into dome-shaped colonies. The coliform bacteria have a gold-green sheen, and are counted directly from the dish. Since some other bacteria may develop a similar color, a confirmation test using more specific media is required. The confirmation procedure requires

an additional 24 to 48 hrs to complete the test for suspected positive total coliform tests.

The MPN (most probable number) method uses a test tube full of media with a smaller inverted test tube inside which captures carbon dioxide gas released from the growth of coliform bacteria. A series of dilutions and replicates are set up, and those producing gas in 24 hrs at 35 degrees C are counted. A statistical analysis is used to determine the most probable number of bacteria cells present.

Our laboratory is certified for the membrane filter technique. The sample should be collected in a specially prepared, sterile whirl pack bag for the test to be valid. The bags contain a small amount of sodium thiosulfate to remove any chlorine present, and have been sterilized. Sample collection should be done very carefully and directly into the bottle from the tap to avoid contamination of the bottle from hands or a transfer vessel such as a cup. The sample should be kept cool and delivered to the lab within 24 hrs for analysis. Total coliform bacteria testing is a relatively inexpensive when compared to the cost for the determination of the concentration or presence of viruses, Giardia, or Cryptosporidium.

TREATMENT:

Bacteria are removed by disinfection and/or filtration. Filtration alone may not be completely effective, but can improve the performance of disinfectants by removing sediment that can shelter the bacteria. Methods of adding chlorine to water include solution feeders for dry chlorine or liquid chlorine or by feeding gas chlorine directly from 100, 150, or 2000 lb. cylinders. Gas chlorination is recommended only for larger systems that can support the services of a trained water treatment plant operator. Chlorine is normally dosed to a concentration sufficient to maintain a free residual of at least 0.2 parts per million (PPM).

Other disinfectants include iodine, ozone, ultraviolet light, and physical methods such as boiling or steam sterilization. Chlorination is still the most common disinfection method in the United States, although recent concerns have been raised about the reaction of chlorine with organic matter in water. Such a reaction can result in the formation of trihalomethanes, which are suspect carcinogenic compounds. For most individual water supply systems, the most common form of treatment is ultraviolet disinfection. For information on water testing, please visit our Homeowner Outreach Webpage.