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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 18204.3-2025

Replacing GB/T 18204.3-2013

Examination methods for public places - Part 3: Airborne microorganism indicators

公共场所卫生检验方法 第3部分：空气微生物指标

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1 Scope

This document describes the on-site sampling and testing methods for the total number of bacteria, fungi, beta-hemolytic streptococcus, and Legionella pneumophila in the air of public places.

This Part is applicable to the determination of air microbiological indicators in public places. Refer to this document for other locations.

2 Normative references

GB 4789.28

GB/T 6682

GB 19489

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Total bacterial count

The total number of mesophilic aerobic and facultative anaerobic colonies grown and developed on nutrient agar medium after 48 h of cultivation at 36°C± 1°C.

3.2 Total fungal count

The number of colonies formed by culturing on Sabouraud agar medium at 28°C± 1°C for 3~5 d.

3.3 beta-hemolytic streptococcus Streptococcus pyogenes (or Group A) and Streptococcus agalactiae (or Group B) that can produce hemolysin and form clearly defined and completely transparent hemolytic rings (beta - type hemolysis) around bacterial colonies on a blood plate.

[Source. GB 4789.11-2014,2.2, modified]

3.4 Legionella pneumophila

A Gram-negative bacterium with blunt ends, flagella, no spores or capsules, characterized by growth on an activated carbon yeast extract medium containing L- cysteine and trivalent iron salt buffer. It has been identified as a pathogenic Legionella bacterium through biochemical and serological tests and is the main pathogen causing Legionellosis.

[Source. GB/T 40392-2021, 3.2, modified]

3.5 Impacting method

A sampling method that uses an impact type air microbial sampler to collect microorganisms suspended in the air onto the sampling medium through inertial impact.

3.6 Natural sinking method

A sampling method that involves exposing the culture medium plate to air and allowing microorganisms to naturally settle onto the plate by gravity.

4.1.1 Principle

Use an impact type air microbial sampler. Generate high-speed airflow by passing air through narrow slits or small holes. Collect microorganisms suspended in the air onto nutrient agar plates. The bacterial colony count was obtained after 48 h of cultivation at 36°C± 1°C.

4.1.2 Instruments and consumables

The main instruments and consumables used in this method are as follows.

- Six level sieve impact microbial sampler;

- High pressure steam sterilizer;

- Constant temperature incubator. 36°C± 1°C;

- Aseptic petri dish. diameter of 90 mm;

- pH meter or precision pH test paper.

4.1.3.1 Composition

Protein peptone. 10.0 g. Beef extract. 3.0 g. Sodium chloride. 5.0 g. Agar. 20.0 g. Pure water. 1000 mL. Finished culture medium that meets the requirements of GB 4789.28 can also be used. The quality of pure water should meet the requirements of Grade Three water or above in GB/T 6682.

4.1.3.2 Preparation method

Dissolve peptone, beef extract, and sodium chloride in pure water. Correct the pH to 7.4 ± 0.2.Add agar. Perform high-pressure sterilization at 121°C for 15 min. When cooled to 45°C~50°C, pour 15mL of culture into each dish based on sterile operation.

After cooling, make it into a flat plate for later use.

4.1.4 Sampling

4.1.4.1 Sampling points. shall comply with the requirements of A.1 in Annex A.

4.1.4.2 Sampling environmental conditions. Close doors and windows for 15~30 min

during sampling. When sampling in public places where it is difficult to close doors and windows (such as shopping malls, waiting rooms, etc.), the environmental conditions at that time should be maintained. Record the operation status of indoor air conditioning and other equipment, door and window conditions, number of personnel, temperature and humidity, and weather conditions.

4.1.4.3 Sampling method. Aseptic operation should be performed. Load the nutrient

agar plates step by step into a six-stage sieve impact microbial sampler. Collect data at a flow rate of 28.3 L/min for 5~15 min. The sampler should be used according to the instructions.

4.1.4.4 Storage and transportation of samples. Store the collected tablets in an

environment of 4°C. Return to the laboratory for cultivation within 4 h.

4.1.5 Inspection steps

Invert the collected nutrient agar plates and incubate them in a 36°C± 1°C incubator for 48

h ± 2 h. Perform colony counting.

4.1.6.1 Result calculation

The total bacterial concentration in the air of public places is calculated according to They shall meet the requirements of 4.1.5.

4.2.6.1 Result calculation

Count the number of bacterial colonies growing on each plate.

4.2.6.2 Result report

The measurement results of the total number of bacteria in the air of a region are reported as the average of the total number of bacteria measured at all sampling points in the region. The test results are expressed in colony forming units per plate (CFU/plate). The calculated total number of bacteria should be rounded to the nearest integer.

4.2.7 Quality control

It should meet the requirements of 4.1.7.1~4.1.7.5.

5.1.1 Principle

Use an impact type air microbial sampler. Generate high-speed airflow through narrow slits or small holes to collect microorganisms suspended in the air onto a Sabouraud agar plate. The fungal colony count was obtained after culturing at 28°C±1°C for 3~5 d.

5.1.2 Instruments and consumables

The instruments and consumables used in this method are as follows.

- Six level sieve impact microbial sampler;

- High pressure steam sterilizer;

- Fungal incubator. 28°C± 1°C;

- Aseptic petri dish. diameter of 90 mm;

- pH meter or precision pH test paper.

5.1.3.1 Composition

Ni - The number of colonies per level of plate, in colony forming units (CFU);

v - Sampling flow rate, in liters per minute (L/min);

t - Sampling time, in minutes (min); i - Number of tablets.