

---

Website: [www.aerobiology.net](http://www.aerobiology.net)

### **AIR, Test Code 1045-Total Actinomycete (Actinobacteria) Count**

Thermophilic actinomycetes or actinobacteria are gram-variable branching rods that produce very small airborne spores (1 ul). A few actinobacteria are thermophilic, which means that they have an optimal range for growth between 40°C and 80°C. Common species of thermophilic actinobacteria include *Thermoactinomyces vulgaris* and *Saccharopolyspora rectivirgula*.

The most important health effects from exposure to actinobacteria is hypersensitivity pneumonitis (HP). HP is a disease of the lower respiratory tract caused by an immune response to inhaled antigens.

Actinobacteria, including thermophilic species, are ubiquitous. They are abundant in soil. In fact, the odor we commonly associate with freshly turned soil is a volatile organic compound produced by actinobacteria. In soil, although they are much slower growers compared to other bacteria and fungi, the actinobacteria are effective decomposers, breaking down organic matter such as lignin and cellulose at elevated temperatures. Indoors they are found in house dust and mechanical systems.

**Air samples can be taken with an impactor style sampler (Andersen or SAS). The test is a two plate protocol using Tryptic Soy Agar (TSA) and Nutrient Agar.**

1. Calibrate each sampling pump or piece of equipment by following manufacturer's recommendations.
2. Before each run, thoroughly wipe each sampler stage with rubbing alcohol. Allow to dry. Make sure air passages are not blocked.
3. Load and immediately unload one set of sampling media in each sampler to serve as field blanks.
4. Label agar side of plate with identifier. Remove cover from media, load sampling media into sampler, and attach sampler to pump with flexible tubing or if using a SAS sampler screw the top back onto the sampler..NOTE: Take special care to prevent contamination of media during loading and unloading. Do not touch agar surface.
5. **Sample at known preset flow for an accurately known time, e.g., 5 min.** Rotary vane pump should run at 28. 3 lpm. (In heavily contaminated areas, sampling time may be adjusted) **Sample each plate at the same total air volume.**
6. Replace covers on sampling media. Tape plate or place each plate in separate bag, and pack securely for shipment (media side up).
7. If plates are going to be shipped back to the laboratory send them for overnight delivery in a cooler with an ice pack. If plates are not shipped that day keep the plates in the refrigerator until they are shipped the next day.

#### **References:**

Dillon, H. Kenneth, L. Hung, J. Miller, Field Guide for the Determination of Biological Contaminants in Environmental Samples., 5.2.6.6:61, 7.1: 141-143 (2005).

Draft. Viable Microorganisms Office Environment, OSHA/NIOSH, May 1986

Burge, H. Et al. Guidelines Assessment and Sampling of Bioaerosols in the Indoor Environment. Bioaerosols Committee of ACGIH, Sept. 1987.

NIOSH Manual of Analytical Methods (NMAM), Fourth Edition Method 0800 January 15, 1998