Bacterial Endotoxin Sampling

Endotoxin Sampling via Limulus Amebocyte Lysate (LAL) Test

Objective

- To determine the level of bacteria endotoxin concentration in air, dust or liquids.

Advantages and Disadvantages

- **Advantages**
  - Bacterial endotoxin test is a very sensitive test for the detection of lipopolysaccharides commonly found in the cell walls of Gram-negative bacteria. It provides a good measurement for bacterial contamination. Also, when detected in high concentrations is poses a health risk in particular in some occupational settings.

- **Disadvantages**
  - Does not react to Gram-positive bacteria.

Equipment

- Endotoxin-free 3 pc cassette with polycarbonate filter or IOM personal sampler for air sampling.
- Endotoxin-free centrifuge tube (15 ml) for liquid samples.
- Dust collector (e.g. DustChek™, DUSTREAM®) and vacuum cleaner or pump for dust sampling; alternatively 3 pc cassette with high volume pump may be used.

Sampling Protocols

Air Samples with 3-piece Cassettes (Stationary Samples):

- Obtain a 3-piece air sampling cassette (pyrogen-free) with filter (polycarbonate) from EMLab P&K.
- Label the cassette appropriately.
- Remove the upper (blue) and lower (red) plugs from the cassette.
- Attach a high volume pump to the lower opening of the cassette.
- Collect 250 -1000 liters (2-10 Lpm).

Air Samples with IOM Personal Sampler:

- Remove a loaded cassette from its transport clip and remove cassette cover. Ensure O-rings are fitted correctly inside the sampler housing body. Insert the cassette into the clean IOM Sampler body. Screw on the front plate tightly to provide a good seal.
- Clip onto a worker's clothing in the breathing zone.
- Remove sampler dust cap from outlet. Using tubing, connect outlet of the IOM Sampler to the inlet of a sample pump calibrated to 2 Lpm.
- Sample for the appropriate time.

- After sampling, remove the cassette from the sampler body, place the cover on the cassette, and wipe the external surface of the cassette with a clean lint-free paper, cloth, of soft brush. Place cassette with cover into the transport clip.

Liquid Samples:

- Obtain sterile 15ml screw-cap containers that are free of detectable endotoxin for sampling.
- Keep the sampling container closed until it is used. Fill up the container with water.
- Tightly cap the bottles. Make sure that water will not leak out during shipping and transporting.

Dust Samples with 3pc cassette:

- Obtain 3-piece 37-mm closed-face cassettes, preloaded with 0.45 µm pore-size filters for sampling.
- A sufficient amount of dust is required for analysis, preferably 0.1 g or more.
- Vacuum with a pump at 10-15 Lpm for at least five minutes at the sampling sites.

Dust Samples with DustChek™ or DUSTREAM®:

- Obtain dust collector (e.g. DustChek™, DUSTREAM®).
- Typically, the amount of dust collected is far more important than vacuuming time, pump speed, or surface area sampled. As much dust as possible with a minimum of at least a teaspoon or ~150 mg of dust is required to perform the analysis. More is better.
- Remove the caps from each end of the allergen dust collector and then attach the collector to the end of the hose on the vacuum cleaner.
- With the dust collector attached to the vacuum, turn on the vacuum and drag the dust collector over the surface to be sampled (floor, bedding, furniture, etc.). Corners of rooms are often good areas to collect dust samples.
- Remove the dust collector from the vacuum hose and put the caps back on each side of the collector.

Shipping

- Label the sample appropriately (for air samples note air volume) and fill out the Chain of Custody (COC).
- Keep samples refrigerated if samples need to be collected over a longer period of time before submitting to the laboratory.