

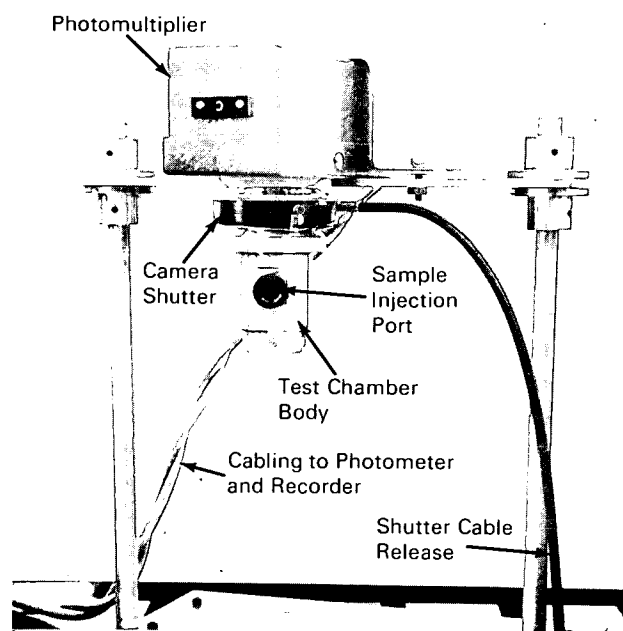
NASA TECH BRIEF



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Simple Chamber Facilitates Chemiluminescent Detection of Bacteria

A simple test chamber has been devised to enable rapid estimation of the number of bacteria in a test sample by means of the chemiluminescent procedure. This procedure is based on the chemiluminescent



reaction of luminol and an oxidant (e.g., sodium perborate) with the cytochrome C portion of certain species of bacteria. The intensity of the light emitted in the reaction is a function of the number of the specific bacteria in the test sample. This chamber and associated apparatus should be useful in microbiological laboratories concerned with such problems

as air and water pollution, sanitation control in food processing, and analyses of clinical specimens.

The test chamber attached to a photomultiplier is shown in the photograph. The cabling from the photomultiplier is connected to a photometer and a strip-chart recorder (not illustrated). The body of the test chamber is made of 347 nonmagnetic stainless steel, with an interior surface that has been polished to a mirror finish. An adapter ring connects the chamber body to a camera shutter having a cable release. Another adapter ring connects the camera shutter to the photomultiplier. A rubber septum is mounted in a port in the side of the chamber for injection of the bacterial sample by means of a hypodermic syringe.

In conducting a test the luminol and sodium perborate reagents are placed in the chamber body, which is then connected to the camera shutter supported in the photomultiplier. After the pH of the bacterial sample is adjusted to a value between 11 and 13, the shutter is opened by means of the cable release and the sample is injected into the chamber through the septum. The intensity of the instantaneous light emitted by the reactants in the chamber is read out on the photometer scale and recorded for future reference on the stripchart recorder. After a measurement, the shutter is closed and the chamber body cleaned to permit testing of the next sample. Depending on the species of bacteria, the sensitivity of the measurement with this apparatus is between 10^3 and 10^4 organisms per milliliter of sample.

Notes:

1. Conventional laboratory techniques for bacterial analysis consume considerably more time and in most cases require a 24-hour incubation period.

(continued overleaf)

2. Requests for further information may be directed to:

Technology Utilization Officer
Langley Research Center
Hampton, Virginia 23365
Reference: B70-10525

Patent status:

No patent action is contemplated by NASA.

Source: J. R. Wilkins and E. C. Marts
Langley Research Center
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