ETC Investigation 23201

Title: Testing of an Ultraviolet Lamp

1. Introduction

An ultraviolet lamp with an 8W mercury discharge tube was submitted for analysis on the 23rd May 2008 by Mr M Tillings and Mr C Higgs of R&D Tech Ltd. The ETC was requested to test the bactericidal effects of the lamp using a non-pathogenic bacterium.

2. Analysis

The spectral output of the lamp was plotted over the wavelength range of 200 – 800nm

A culture of non-pathogenic *Escherichia coli* (E.coli) was grown overnight in a liquid nutrient medium at a temperature of 37°C. Strips of filter paper were soaked in the culture medium and allowed to dry at room temperature. The lamp was supported using a retort stand and suspended at a height of 15cm above the bench. Strips of filter paper were exposed to UV radiation for 0, 1, 5, 10, 15 and 30 minutes then placed on the surface of a nutrient agar plate for 5 minutes to transfer bacteria from the filter paper to the agar; the strips were removed and the plates incubated at 37°C overnight to encourage growth of viable bacteria.

3. Results

Chart 1 shows the spectral output of the mercury vapour tube over the wavelength range of 200 – 800nm. Chart 2 is an expansion of the X-axis from 200 – 300nm. The maximum intensity of the tube occurs at 253nm and smaller peaks are also visible which is normal for a mercury vapour discharge.

Fig 1 is a macrograph of an agar plate innoculated with the E.coli culture before irradiation, a confluent growth can be seen. Figs 2 – 4 are macrographs of agar plates after the filter paper strips were applied and after incubation overnight. Bacterial growth is observed at 0, 1 and some evidence at 5 minute exposure but not at 10, 15 and 30 minutes.