Measurement of Light Intensity for AGP Cultures, Animal Cultures, Toxicity Incubators, and the Bioassay Laboratory

1. SCOPE AND APPLICATION

1.1. This procedure is based on the instruction manual for the Sper Scientific brand Advance Light Meter 840022. It is used to measure light intensity in the bioassay laboratory (B246), culture areas, and bioassay test incubators. Measurements are required annually at a minimum. The FDEP Laboratory performs measurements monthly.

1.2. The use of this SOP constitutes acknowledgement that the meter manual has been read and understood. The manual and the meter are stored on the top shelf of the AGP shakers in B246.

2. SUMMARY OF METHOD

2.1. The Light meter is turned on. The photo sensor is held near the light source and moved until the recommended range is achieved. Incubators are marked with tape or other means to indicate where placement of containers will result in containers being within appropriate ranges. Light bulbs over AGP racks are replaced if appropriate ranges are not met. Light measurements are recorded in the appropriate logbook.

3. EQUIPMENT AND SUPPLIES

3.1. Calibrated Light Meter (the current meter at the time of revision is the Sper Scientific Advance Light Meter 840022 Serial No. 105898)

3.1.1. Light meter must be within calibration dates. The meter can be sent back to the manufacturer and recalibrated for a fee.

3.1.1.1. For in-house comparisons, meters with expired calibration dates can be used if side by side readings are verified to be within 1% of the readings obtained from a meter with a non-expired calibration.

3.1.2. If not recalibrating the meter, purchase a new light meter upon reaching calibration expiration date (preferred method).

3.2. Black waterproof pen

3.3. *Light Intensity Measurement QCs Log sheet* found in *Light Meter Verification and Intensity Checks* binder

3.4. Incubators (Incubator #1, #4, #5, #7, #8, and #9)

The OFFICIAL COPY is the on-line version. All other copies are considered unofficial and uncontrolled.

4. METHODS

4.1. General Measurement

4.1.1. General measurement is for the culture room and water bath. Room light readings usually range between 10-80 Foot-Candles (FC). Readings at the surface of cultures and water bath should range between 50-100 FC. To correct illumination deviations from EPA or NELAC recommended ranges; replace old light bulbs or move test vessels until proper illumination is achieved.

4.1.2. Turn power on by Pressing the 'POWER' button.

4.1.3. Set the meter to measure fluorescent light source. Press the 'SOURCE' button until 'FL' (fluorescence) appears at the bottom left of the display.

4.1.3.1. If it is an unknown source, the standard mode can be used. Standard mode is when no indicator is on the screen.

4.1.4. Set the meter to foot-candles (FC). Press the 'Lux/Fc' button until 'Ft-cd' appears on the bottom right side of the display.

4.1.5. To adjust the range, click the 'RANGE' button until a value appears on screen. When the light meter is out of range "_ _ _ _" will appear.

4.1.6. Place the photo sensor, a white dome set in black plastic, on or as near as possible to the surface at which the measurement is desired. The photo sensor should be parallel to both the surface and the light source.

4.1.7. Allow the light meter 5-10 seconds for the reading to stabilize, record in the appropriate logbook.

4.2. AGP Cultures (Shaker Tables)

4.2.1. Change the measurement range by using the 'RANGE' button to move the decimal place on the light meter.

4.2.1.1. AGP has a meter range of 360-440 FC.

4.2.2. Measure the light intensity at the front, left side, right side, and rear of each shaker rack, ensuring that the collector is held at the level of the liquid in the flasks.

4.2.3. Record the measurements in the *Light Intensity Measurement QCs Log*.

4.3. Toxicity Incubators #1, #4, and #5 (and #7, #8, and #9 when not being used for Algal culturing or tests)

4.3.1. Door lights alone are used for bioassay tests and *C. dubia* cultures. Vertebrate and invertebrate bioassays have a meter range of 50-100 FC.

The OFFICIAL COPY is the on-line version. All other copies are considered unofficial and uncontrolled.

4.3.1.1. Incubator #4 is currently used to culture *C. dubia* but can be used for toxicity testing if needed. *C. dubia* cultures would be relocated.

4.3.1.2. Sections of the plastic door lightbulb shield can be strategically covered to block light, thus reducing light intensity as needed to meet requirements.

4.3.2. The meter range can be changed per section 4.1.5.

4.3.3. Three readings should be taken in each incubator with the door closed. Test different shelves and locations within the incubator (front, middle, back, left side, right side) to ensure the correct light range reaches all necessary areas.

4.3.4. Record the measurements in the *Light Intensity Measurement QCs Log sheet*.

4.4. Toxicity Incubators #7, #8, and #9 (when used for Algal culturing or tests)

4.4.1. Algal lights should be on 24/7. All other extra light fixtures should be turned on when in use.

4.4.2. The meter range can be changed per section 4.1.5. Measure the illumination at various distances from the additional lighting to establish a meter range of 360-440 FC.

4.4.3. Record the measurements range on the *Light Intensity Measurement QC Log Sheet*.

5. DATA ARCHIVAL

5.1. Use a black, waterproof pen for all bench sheets and logbooks.

5.2. To correct raw data entries, place a single line through the incorrect or illegible entry, write the corrected entry near the error, date and initial the correction. Do not overwrite entries.

5.2.1. The corrected entry is written as near as possible to the error or in the comment box on the appropriate bench sheet.

5.2.2. If the correction requires an explanation, write a comment and reference the error with a letter. Initial and date the explanation. Do not attempt to put all information (correction and comments) into a small space.

5.2.3. Use sequential alphabetical annotation to identify errors and corresponding comments (i.e. use ‘A’ for first error and use ‘A’ for corresponding explanatory comment; use ‘B’ for second error and ‘B’ for corresponding comment, etc.).

The OFFICIAL COPY is the on-line version. All other copies are considered unofficial and uncontrolled.

5.3. Record information on the *Light Intensity Measurement QCs Log sheet*.

6. QUALITY CONTROL

6.1. Refer to the QA manual for corrective action and handling out-of-control data.

6.2. If a problem occurs during sample processing, a nonconformance report (NCR) is submitted describing the problem and the corrective action.

6.3. Change light bulbs or adjust placement of test vessels, as needed, to maintain light intensity range. If necessary, make it clear using colored tape or another type of marker which areas should or should not be used.

6.4. All lights should be allowed to "warm up" for a minimum of five minutes prior to measurements.

7. SAFETY/HAZARDOUS WASTE MANAGEMENT

7.1. Laboratory safety features (ex. lab hood or ventilation system), and personal protection equipment (PPE) (lab coat, gloves and safety glasses) are required when working with chemicals and unprocessed samples.

7.2. Refer to the Laboratory Quality Assurance Manual for sample disposal.

7.3. Refer to the Laboratory Health and Safety Manual and Hazardous Waste Management Plan.

7.4. Read MSDS information for reagent handling and disposal.

8. REFERENCES

8.1. Sper Scientific brand – Advance Light Meter 840022 Instruction Manual

8.2. DEP Laboratory Quality Assurance Manual

8.3. DEP Health and Safety Manual

8.4. MSDS Information Sheets

APPENDIX OF SIGNIFICANT CHANGES

02/09/2015 Formatted for 508 compliance.

10/12/2023 Checked for grammar and readability. Updated SN and expiration date for light meter. Made significant changes to reflect current procedures.

The OFFICIAL COPY is the on-line version. All other copies are considered unofficial and uncontrolled.