U.S. Fish and Wildlife Service
Marquette Biological Station
3090 Wright Street
Marquette, Michigan 49855
U.S.A.

and

U.S. Fish and Wildlife Service
Ludington Biological Station
5050 Commerce Drive
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and

Fisheries and Oceans Canada
Sea Lamprey Control Centre
1219 Queen Street East
Sault Ste. Marie, Ontario P6A 2E5
Canada

INSTRUMENT OPERATING PROCEDURE

INSTRUMENT:

Colorimeter

MODEL:

Pocket colorimeter 11 (420)

MANUFACTURER:

Hach

PRECAUTIONS:

POTENTIAL INTERFERENCES

None listed

SAFETY

No special safety precautions

PROCEDURES:

I. Background

A. The procedures for conducting analyses with the Pocket Colorimeter are similar to those for analyses with the DR/2000/2010/2800 spectrophotometers. Some exceptions in procedures and equipment result from the requirement of portability.

1. Sample bottle size, filter type, and size differ.

2. The addition of sodium borate is done drop-wise with an eye dropper.

B. The Pocket Colorimeter operates at a wavelength of 420 nm and is not adjustable. This wavelength is slightly out of the desired range for analysis of TFM (395 – 400 nm). This fact along with increased variability in wavelength caused by requirements of size and portability limit the use of this instrument to certain applications:

1. Beaver pond or backwater applications

2. Estimations of TFM concentration in a lampricide block for determining flow timing

3. Remote application sites where a DR 2000/2010/2800 spectrophotometer would be unreasonably difficult to transport

II. Preparation

A. Set up the spectrophotometer in a shaded location. Always use the light shield when making absorbance measurements.

B. Ready all peripheral equipment and reagents for sample preparation.

C. Remove the light shield from the end of the instrument and place it over the cell compartment. Press the **POWER** button (bottom center black button with bulb icon). The instrument will display either a flashing “0” or last reading.

D. Check the absorbance match between the 10 mL sample cells:

1. Fill the two pre-matched sample cells with 0.0 mg/L TFM standard.

2. Place the first cell in the sample cell holder with the diamond mark facing forward (toward the keypad). Replace the light shield. Press the **ZERO** key (blue button with “0” icon). 0.000 will appear when the instrument is zero calibrated.

3. Place the second cell in the sample cell holder with the diamond mark facing front. Press the **READ/ENTER** key (green button with check icon).

4. The difference in absorbance between the sample cells must be less than 0.010. If the cells cannot be cleaned so the difference is less than 0.010, than measurements must be corrected by the difference. The cell with the lesser absorbance is used as the blank.

III. Calibration–standards

A. Open the remainder of the new set of TFM standards. Do not allow the standards to sit in sunlight while in use and store the standards in the dark. If the standards are very cold (likely to fog), warm them in a water bath or in the hands.

B. Insert the sample cell that contains the blank and press **ZERO**. Wait until **0.000 ABS** is displayed.

C. Insert the 4.0 mg/L standard, and press **READ/ENTER** (green button). Adjust the result for any significant difference in absorbance between blank and sample cells if necessary. Record the corrected absorbance in the instrument log book. Repeat the procedure with 8.0 and 12.0 mg/L TFM standards

E. Divide the recorded absorbance of each standard by the concentration of TFM (mg/L; 4.0, 8.0, and 12.0). Average the results and record the mean (slope) in the log book.

IV. Calibration–stream water sample

A. Measure the background absorbance and B/A ration of the stream water by the following steps. Do not interchange the cells. Always use the same cell for the 0.0 standard (blank).

B. Prepare the TFM-free stream water sample for analysis

1. Add 6 drops sodium tetraborate buffer to a 60 mL stream water sample and shake.

2. Place a 2.4 cm filter into the syringe filter holder. Filter the buffered stream water sample into the sample cell with the syringe filter.

3. Zero the instrument on the blank then read the stream water sample. Record the result on an analysis form.

4. Measure the absorbance of an acidified stream water sample for determining the B/A ratio by adding 2 drops of 10% sulfuric acid to the cell and recording the result.

V. Sample measurement

A. Collect a stream water sample containing TFM.

B. Prepare the water sample for analysis.

1. Add 6 drops sodium tetraborate buffer to the 60 mL stream water sample and shake.

2. Filter the sample into a sample cell with a syringe filter.

C. Insert the blank into the sample cell holder.

D. Press the **ZERO** key and wait until the instrument is zero calibrated.

E. Dry the stream water sample cell with a tissue and insert into the sample cell holder.

F. Press the **READ** key.

G. Record the resulting absorbance on the lampricide analysis data sheet.

H. Subtract the background absorbance (base blank on the data sheet) and record.

I. Divide the resulting absorbance by the calculated slope of the calibration curve.

J. Record the result as the concentration of TFM (mg/L) in the stream water sample.

VI. Documentation

A. Make entries into instrument log book each time instrument is used.

B. Record results of analysis on LAMPRICIDE ANALYSIS data sheet (Appendix M).

MAINTENANCE:

No recommended maintenance

REFERENCE:

Hach Pocket colorimeter 11 instruction manual

This procedure has been reviewed and approved by the undersigned representative of the U.S. Fish and Wildlife Service.

REVIEWED/APPROVED Jessica M. Barber Digitally signed by JESSICA BARBER Date: 2020.03.10 11:07:05 -04'00' DATE_____

Field Supervisor (U.S.)