The Children's Total Exposure to Persistent Pesticides and Other Persistent Organic Pollutants (CTEPP) Study

Collection of Food Preparation Surface Wipe Samples for Persistent Organic Pollutants

Battelle
Columbus, OH 43201
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Standard Operating Procedure **CTEPP-SOP-2.17**

Title: Collection of Food Preparation Surface Wipe Samples for Persistent Organic Pollutants

Source: Battelle

U.S. Environmental Protection Agency
Office of Research and Development
Human Exposure & Atmospheric Sciences Division
Exposure Measurements & Analysis Branch

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STANDARD OPERATING PROCEDURE (SOP) FOR THE COLLECTION OF FOOD PREPARATION SURFACE WIPE SAMPLES FOR PERSISTENT ORGANIC POLLUTANTS

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1.0 Scope and Applicability

This standard operating procedure (SOP) describes the method for the collection of the food preparation surface wipe samples for the measurement of persistent organic pollutants (POP).

2.0 Summary of Method

This method uses a wipe to collect POP residues from a surface where a study participant prepares food the most often (i.e., kitchen counter). The wipes will be pre-cleaned, wetted with 75% isopropanol in distilled water, and stored in clean jars before field use. The field staff will measure the wipe area; put on a clean pair of cotton gloves; and follow the procedures in this SOP to collect the wipe sample. The wipe sample will be placed in a clean jar; sealed with Teflon tape; and wrapped with bubble wrap for shipment.

3.0 Definition

Persistent Organic Pollutants: semi-volatile organic chemicals (SVOC) and non-volatile organic chemicals (NVOC).

4.0 Cautions

Field staff will keep the sampling materials and the samples out of the reach of children.

5.0 Responsibilities

5.1 The wipe materials will be purchased by Battelle Columbus Laboratory in Ohio (OH). The pre-cleaning of these wipes and packaging for field use will be performed at Battelle Columbus Laboratory. The cleaned wipes will be placed in clean jars and shipped to Battelle Durham Office in the North Carolina (NC) field study and kept at Battelle Columbus Laboratory in the OH field study. The sampling and return shipping will be handled by field team members. Subsequent extractions, sample preparation, and analyses will be performed at Battelle Columbus Laboratory.

5.2 The Laboratory Team Leader (LTL), Field Team Leader (FTL), or QA Officer or designee will oversee the pre-cleaning of the wipe materials and field collection operations, respectively.

6.0 Apparatus and Materials

6.1 Materials

6.1.1 Teflon-lined screw-cap vials (5 mL)

6.1.2 SOF-WICK gauze pads (4" x 4" -6 ply; Johnson & Johnson)

6.1.3 2 oz. glass jars

6.1.4 Cotton gloves

6.1.5 Soxhlet extractor (large size, e.g. Kontes 585000-0023; including extractor body, condenser, 300 mL round bottom flask)

6.1.6 Heating mantle

6.1.7 Variac

6.1.8 Boiling chips (Hengar crystals)

6.1.9 Stainless steel tongs

6.1.10 Teflon or stainless steel tweezers

6.1.11 Glass vials (5 mL) with Teflon-lined screw caps

6.1.12 Small cooler

6.1.13 Blue ice (ice packs)

6.2 Reagents

6.2.1 Acetone (distill-in-glass or equivalent)

6.2.2 Dichloromethane (distill-in-glass or equivalent)

6.2.3 Isopropanol (distill-in-glass or equivalent)

7.0 Procedures

7.1 Pre-extraction of the wipes

7.1.1 Cut each of the wipe (4" x 4" -6 ply) into two wipes (4" x 4" -3 ply). Load eight wipes into a Soxhlet extractor. Add 250 mL of dichloromethane (DCM) to the 300 mL round bottom flask; add a few boiling chips. Connect the condenser. Add the heating mantle and the Variac. A batch of up to 64 clean wipes (eight Soxhlet set-ups) can be prepared.

Alternatively, load 24 wipes in a larger size Soxhlet extractor; add 800 mL of DCM to the 1 L round bottom flask for cleaning.

7.1.2 Continue with Soxhlet extraction overnight for at least 12 hr.

7.1.3 At the end of extraction, drain residual DCM from the Soxhlet extractor and remove wipes to a clean stainless drying canister. Dry the extracted wipes with nitrogen under vacuum at 60 C.

7.1.4 Allow the wipes to dry for approximately 4 hr.

7.1.5 Aliquot 2 mL of 75% isopropanol in distilled water onto the entire surface of one clean dried wipe. Fold the wipe in half and place in a clean jar.

7.1.6 Repeat step 7.1.5 until all wipes are wetted with the solvent and placed in clean jars. Pack the jars and send them to the field.

7.2 Collection of Food Preparation Surface Wipe Samples

7.2.1 Food preparation surface wipe samples will be collected from the kitchen counters or places (e.g., dinning table) that are pointed out by adult participants where they prepare food the most often.

7.2.2 The field staff will measure and mark the designated area (15” x 15”) using masking tape. The field staff will wear a pair of clean cotton gloves and wipe the designated area with the clean gauze pad (2" x 4") in a single direction.

7.2.3 The wiped gauze pad is folded in half (2" x 2") again with the exposed (contacted) surface now on the inside. The surface is wiped a second time in the opposite direction.

7.2.4 The gauze pad is folded again to the inside placed in a clean jar; sealed with Teflon tape; and wrapped in bubble wrap for shipping.

8.0 Records

8.1 Chain-of-Custody Records will be used to document the surface wipe sample collection and shipping. All records will be retained in a locked office area until conclusion of the study and will be archived in a secure room for three years after completion of the study.

8.2 A record of the blank levels of target compounds in each batch of cleaned wipes will be maintained in the Laboratory Record Book (LRB). The LRB will record batch number, date of extraction, lot number for the wipes, and lot number of the solvent used for extraction and spiking. The LRB will be retained in the respective extraction laboratory until the conclusion of the study, and will serve as a continuing file on the expected performance of the cleanup step. At the conclusion of the study, the LRB will be archived in a secure room for three years.

9.0 Quality Control and Quality Assurance

9.1 Field staff will examine the wipe sample at the sampling site and ask the participants about any potential problems during the sample collection. (**Note**: Field staff should not open the sample jar and touch the wipe sample.)

9.2 For each batch of the wipes cleaned, a blank wipe will be analyzed to determine the background levels of the target compounds.

9.3 One field blank will be prepared for each batch of the cleaned wipes. The wipe will be placed in the jar and labeled as a field blank. Store and ship as per instructions for actual field samples.

10.0 Reference

Not applicable.