

Analysis of Human Food Products Sold in Connecticut During 2023

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INTRODUCTION

The Department of Analytical Chemistry (DAC) at the Connecticut Agricultural Experiment Station (CAES) provides regulatory enforcement analysis of pesticide residues, total arsenic, and heavy metals found in domestic and imported food sold within the state for the Connecticut Department of Consumer Protection (DCP). The pesticide residue surveillance program ensures: 1) that pesticides on food products are used in accordance with their label and 2) that the public is protected from the deliberate or accidental misuse of pesticides. The DAC began testing for arsenic in select food samples for the DCP in 2016.

Aflatoxins are toxic compounds produced by *Aspergillus* molds which could grow on peanuts, corn, grains, and tree nuts such as almonds. In 2023 CAES in conjunction with DCP began testing almond milk beverages for the presence of aflatoxins. The US FDA has set an action level for total Aflatoxins (Aflatoxins B1, B2, G1, and G2) in human food at 20 ug/kg.

Violations of federal law occur when pesticides are not used in accordance with label registration and are: 1) applied in excessive amounts (over tolerance violation) or 2) when they are, accidentally or deliberately, applied to crops on which they are not permitted for use (no tolerance violation). A more complete overview of the agencies involved, their roles, and a discussion of tolerances is found in Krol *et al.* 2006¹. Tolerance levels for pesticide residues

in food established are established by the FDA and apply to both human and animal food. Likewise, the FDA has issued nonbinding action level recommendations for arsenic in bottled water², rice cereals for infants⁴, and draft action levels for apple juice³. Laboratory results are forwarded to the DCP for all submitted samples.

The Food Safety Modernization Act (FSMA)⁵ mandated accreditation for regulatory testing laboratories. It is widely recognized that accreditation is a rigorous assessment, conducted by an independent science-based organization, which assures the capability and competency of a laboratory and its management systems. The DAC at the CAES gained initial accreditation for chemical testing to the International Organization for Standardization (ISO) / International Electrochemical Commission (IEC) ISO/IEC 17025:2005(E) standard on December 28, 2016 for pesticide and arsenic analysis in food. Subsequently, the laboratory gained accreditation to the updated ISO/IEC 17025:2017 standard on February 28, 2019. The laboratory is assessed on a biennial basis to ensure adherence to the ISO/IEC 17025:2017 standard. The DAC is currently accredited by the American Association for Laboratory Accreditation (A2LA) for: 1) Pesticide Residues in Food, 2) Aflatoxin Analysis in Animal Food, 3) Percent Crude Fat Analysis in Animal Feed, 4) Percent Crude Protein in Animal Feed, and 5) Total Delta-9 tetrahydrocannabinol (THC) and Cannabidiol (CBD) Analysis in Hemp (*Cannabis Sativa*) and 6) THC,

tetrahydrocannabinolic acid (THCA), CBD, and cannabidiolic acid (CBDA) in food, plant material, and consumer products⁶.

The current work reports upon the 402 human food samples tested during the 2023 calendar year for pesticide residues, aflatoxins arsenic, and/or heavy metals. All samples were collected and submitted by the CT DCP as part of the manufactured food regulatory program standard (MFRPS) and the laboratory flexible funding model (LFFM) cooperative agreement testing programs and were tested in accordance with the ISO/IEC 17025:2017 standard.

METHODS

Samples for Pesticide Residues:

The sample extraction and cleanup procedure is based on quick, easy, cheap, effective, rugged, and safe (QuEChERS) chemistry. Following homogenization and extraction, samples are analyzed using a liquid chromatograph with a high-resolution mass spectrometer (LC-HRMS) and a gas chromatograph coupled to a tandem mass spectrometer (GC-MS/MS). Findings are reported to the DCP in mg/kg (ppm). Based on past FDA enforcement and the enforcement levels in use in the European Union (EU), the CAES defines its Limit of Reporting (LOR) at 0.010 mg/kg (ppm). Limits of Detection (LOD) levels and measurement uncertainty have been established for all pesticides reported.

Samples for Aflatoxins:

Samples analyzed for Aflatoxins were extracted with 80% acetonitrile in water, followed by clean up with solid phase extraction cartridges specific to Aflatoxins B1, B2, G1, and G2. Following clean up, analytes were eluted using methanol. Aflatoxins were quantitated using liquid chromatography paired with high resolution mass spectroscopy (LC-HRMS). Reporting limit for aflatoxins was set to 1 µg/kg⁹.

Samples for Patulin:

Samples analyzed for Patulin were extracted using a QuEChERS based extraction, similar to pesticide samples. Extracts were then analyzed using liquid chromatography high resolution mass spectroscopy (LC-HRMS). Reporting limit for Patulin was set at 5 µg/kg.

Samples for Toxic Elements including Inorganic Arsenic:

Samples are digested with acid and analyzed by ICP/MS. Findings are reported to the DCP as µg/kg (ppb). In 2005, The FDA issued an action level for arsenic in bottled water at 10 µg/L (ppb)². A draft guidance action level for inorganic arsenic in apple juice at 10 µg/kg (ppb) was proposed by the FDA in 2013³. An action level for inorganic arsenic in rice cereals for infants of 100 µg/kg (ppb) was established by the FDA in 2020⁴. The CAES does not report arsenic levels lower than 10 µg/kg (ppb). If no arsenic or trace levels are found, the CAES reports < 10 µg/kg (ppb).

Quality Assurance and Reproducibility

Calibration standards are prepared from reference materials that are traceable to the point of manufacture. Analyte spike-recoveries are evaluated with each batch of samples tested. All systems used for analysis are verified prior to use. Balances are calibrated annually and verified when used to ensure accuracy. Verification weights are National Institute of Standards and Technology (NIST) traceable through the Standard International (SI) system of units. Trends in the data produced are reviewed and analyzed. Overall method uncertainty (MU) has been established and is documented. Batch acceptability is determined using various quality control samples (QCS).

RESULTS AND DISCUSSION

Pesticide Residue Program

The 2023 findings for human food provided by the DCP are summarized in Table 1. Samples were collected between July 25,

2023 and November 7, 2023 from 13 cities and towns throughout the state. The samples included in this bulletin were collected exclusively from Connecticut growers. A total of 100 samples were tested for pesticide residues and 20 (20%) were found to contain at least one pesticide residue greater than the 0.010 mg/kg (ppm) reporting limit. From the 20 samples that tested positive for pesticide residues, there were 19 different pesticides, no residue violations. Of the 20 positive samples, 3 were found to contain multiple residues. The most commonly occurring residues were Chlorothalonil and Phosmet. The remaining 80 samples did not contain reportable residues.

The pesticide residue monitoring program has a historical violation rate of approximately 3–4%. This includes over tolerance and no tolerance violations. The absence of violations during 2023 is consistent with previous years and continues to demonstrate the safety of produce purchased in the state of Connecticut.

The results of all analysis performed at the CAES are reported to the DCP. All regulatory enforcement of illegal residues where CT is the source are performed by the CT DCP, CT DoAg, and/or DEEP. In those cases where illegal residues are reported on samples whose source is outside of CT, the DCP will forward the results to the FDA or the United States Department of Agriculture (USDA) for enforcement. The Enforcement actions (or lack thereof) taken are not always communicated back to CAES.

Aflatoxins in Almond Food Products

For 2023, 75 almond beverage, flour, and butter products were tested for the presence of Aflatoxins B1, B2, G1, and G2. A total of 16 almond flour and almond butter samples tested contained aflatoxins above the reporting limit of 1 µg/kg, but below action levels (Table 2).

Patulin in Apple Beverages and Applesauce

For 2023, 60 apple juice, cider, and applesauce products were tested for Patulin toxin. Patulin was subsequently detected in 20 of the tested products. However, none of the samples tested exceeded the guidance level of 50 µg/kg.

Toxic Elements Testing Program

Heavy metals, such as arsenic, lead, chromium, and mercury, are naturally occurring elements widely found in nature and may be present in foods, depending on the environment. The FDA has issued nonbinding action level recommendations for arsenic in bottled water² and rice cereals for infants⁴, and draft action levels for apple juice³.

There were 115 samples tested in 2023 as part of the CAES contract with the DCP. Of these, 16 (14 %) were maple syrup, 60 (52 %) were baby food, 39 (34 %) were apple juice/cider.

The FDA has issued draft guidance of 10 µg/kg (ppb) of inorganic arsenic in apple juice³. As shown in Table 6, two samples of apple juice were found above this action level. NES-17 was found to have an inorganic arsenic level of 12.2 µg/kg. NES-18 was found to have an inorganic arsenic level of 12.2 µg/kg. Rice is known to contain arsenic, and the FDA has established an action level of 100 (µg/kg) for infant rice products⁴. As shown in Table 5, one sample of infant rice cereal was found to be over this action level. Sample MM-540 was found to have to have an inorganic arsenic level of 114 µg/kg. These potentially violative results were referred to the FDA for follow up review and action.

CONCLUSIONS

Nearly all the food we eat, except for organically grown produce, has been intentionally treated with pesticides during production. If pesticides used during food

production have been applied in accordance with the approved use of the product, the levels resulting on the food will be below the EPA tolerance. The results of this work allow the consumer to gain a better understanding of the prevalence and levels of pesticide residues in the food they consume.

Naturally occurring arsenic may be present in some of the foods we consume. The amount of arsenic found in the samples of baby food tested is best correlated to the amount of rice contained in the sample. The CAES currently performs arsenic speciation which determines both the organic and inorganic arsenic fractions in a sample. Although some values of arsenic in samples may seem high, they may not represent the true amount of inorganic arsenic contained in a sample.

Table 1: Human Food Samples Tested for Pesticide Residues in 2023.

| Sample ID | Commodity | Town Collected | Pesticide Found | Amount (mg/kg) |
|-----------|------------------|----------------|-----------------|----------------|
| MM-657 | Broccoli | West Simsbury | | |
| MM-658 | Lunchbox Peppers | West Simsbury | | |
| MM-659 | Corn | West Simsbury | | |
| MM-660 | Tomatoes | West Simsbury | | |
| MM-661 | Garlic Scapes | West Simsbury | | |
| MM-662 | Bell Peppers | West Simsbury | | |
| MM-663 | Sweet Basil | West Simsbury | | |
| MM-664 | Yellow Squash | Simsbury | | |
| MM-665 | Kale | Simsbury | | |
| MM-666 | Celery | Simsbury | | |
| MM-667 | Leek | Simsbury | | |
| MM-668 | Onion | Simsbury | | |
| MM-669 | Zucchini | Preston | | |
| MM-670 | Corn | Preston | | |
| MM-671 | Bell Peppers | Preston | Cypermethrin | 0.078 |
| MM-672 | Cucumber | Preston | | |
| MM-673 | Yellow Squash | Preston | | |
| MM-674 | Tomatoes | Preston | Chlorothalonil | 0.21 |
| MM-675 | Lettuce | N Stonington | | |
| MM-676 | Field Tomatoes | Bethlehem | | |
| MM-677 | Zestar Apples | Bethlehem | Phostmet | 0.013 |
| MM-678 | Bell Peppers | Bethlehem | | |
| MM-679 | Eggplant | Bethlehem | | |
| MM-680 | Cantaloupe | Bethlehem | | |
| MM-681 | Watermelon | Bethlehem | | |
| MM-682 | Cucumber | Bethlehem | Azoxystrobin | 0.1 |
| MM-683 | Corn | Bethlehem | | |
| MM-684 | Bell Peppers | Bethlehem | Chlorothalonil | 0.602 |
| | | | Cypridonil | 0.018 |
| | | | Difencconazole | 0.24 |
| | | | Mandipropamid | 0.21 |
| MM-686 | Cucumber | Woodbridge | | |
| MM-687 | Tomatoes | Woodbridge | | |

Table 1: Human Food Samples Tested for Pesticide Residues in 2023, continued.

| Sample ID | Commodity | Town Collected | Pesticide Found | Amount (mg/kg) |
|------------------|-------------------------|-----------------------|------------------------|-----------------------|
| MM-688 | Scallions | Woodbridge | | |
| MM-689 | Tusil Basil | Woodbridge | | |
| MM-690 | Radish | Woodbridge | | |
| MM-690T | Radish Tops | Woodbridge | | |
| MM-691 | Swish Chard | Woodbridge | | |
| MM-692 | Turnip | Woodbridge | | |
| MM-692T | Turnip Tops | Woodbridge | | |
| MM-694 | Carrots | Roxbury | | |
| MM-695 | Fennel | Roxbury | | |
| MM-696 | Radish | Roxbury | | |
| MM-696T | Radish Tops | Roxbury | | |
| MM-697 | Potatoes | Roxbury | | |
| MM-698 | Koginut Squash | Roxbury | | |
| MM-699 | Tomatoes | Roxbury | | |
| MM-700 | Potatoes | Roxbury | | |
| MM-701 | Zucchini | Roxbury | | |
| MM-702 | Carrots | Roxbury | | |
| MM-703 | Leeks | Roxbury | | |
| MM-704 | Sweet Corn | Woodbury | | |
| MM-705 | Broccoli | Woodbury | | |
| MM-706 | Jalapeno Peppers | Woodbury | | |
| MM-707 | Kale | Woodbury | Flutriafol | 0.03 |
| MM-708 | Garlic | Woodbury | | |
| MM-709 | Eggplant Graffiti | Woodbury | | |
| MM-710 | Organic Pea Greens | Woodbury | | |
| MM-711 | Organic Radish Greens | Woodbury | | |
| MM-712 | Organic Broccoli Greens | Woodbury | | |

Table 1: Human Food Samples Tested for Pesticide Residues in 2023, continued.

| Sample ID | Commodity | Town Collected | Pesticide Found | Amount (mg/kg) |
|-----------|-------------------|----------------|-----------------|----------------|
| MM-714 | Tomatoes | Cheshire | | |
| MM-715 | Cherry Tomatoes | Cheshire | | |
| MM-716 | Green Beans | Cheshire | | |
| MM-717 | Cabbage | Cheshire | | |
| MM-718 | Eggplant | Cheshire | | |
| MM-719 | Butternut Squash | Cheshire | | |
| MM-720 | Bell Peppers | Cheshire | | |
| MM-721 | Italian Peppers | Cheshire | | |
| MM-722 | Tomatoes | Cheshire | | |
| MM-723 | Pickling Cucumber | Cheshire | Propamocarb | 0.05 |
| MM-724 | Cucumber | Cheshire | Propamocarb | 0.022 |
| MM-725 | Yellow Squash | Cheshire | | |
| MM-726 | Eggplant | Cheshire | | |
| MM-727 | Spaghetti Squash | Cheshire | | |
| MM-728 | Butternut Squash | Cheshire | | |
| MM-729 | Acorn Squash | Cheshire | | |
| MM-730 | Longhot Peppers | Cheshire | | |
| MM-731 | Cubanelle Peppers | Cheshire | | |
| MM-732 | Zucchini Squash | Wallingford | | |
| MM-733 | Eggplant | Wallingford | | |
| MM-734 | Broccoli | Wallingford | | |
| MM-735 | Red Chili Peppers | Wallingford | | |
| MM-736 | Habanero Peppers | Wallingford | | |
| MM-737 | Cherry Tomatoes | Wallingford | | |
| MM-738 | Eggplant | Wallingford | | |
| MM-739 | Yellow Squash | Wallingford | | |

Table 1: Human Food Samples Tested for Pesticide Residues in 2023, continued.

| Sample ID | Commodity | Town Collected | Pesticide Found | Amount (mg/kg) |
|------------------|----------------------|-----------------------|------------------------------------|-----------------------|
| MM-740 | Tomatoes | Wallingford | | |
| MM-741 | Scorpion Hot Peppers | Wallingford | | |
| MM-742 | Cubanelle Peppers | Ellington | | |
| MM-743 | Longhot Peppers | Ellington | | |
| MM-744 | Jalapeno Peppers | Ellington | | |
| MM-745 | Acorn Squash | Ellington | Chlorothalonil | 0.508 |
| MM-746 | Spaghetti Squash | Ellington | | |
| MM-747 | Carrots | Enfield | | |
| MM-748 | Pears | Enfield | Acetamiprid Chlorantraniliprole | 0.027 0.016 |
| MM-749 | Onions | Enfield | | |
| MM-750 | Cabbage | Enfield | | |
| MM-751 | Napa Cabbage | Enfield | | |
| MM-752 | Macoun Apple | Enfield | Acetamiprid Chlorantraniliprole | 0.33 0.012 |
| MM-753 | Cortland Apples | Meriden | | |
| MM-754 | Ginger Gold Apples | Meriden | Phosmet | 0.094 |
| MM-755 | Macoun Apples | Meriden | Phosmet | 0.025 |
| MM-756 | Mcintosh Apples | Meriden | Phosmet | 0.014 |

Table 2. Human food samples tested for Aflatoxins in 2023.

| Sample ID | Brand | Description | Town Collected |
|------------------|------------------|---|-----------------------|
| MM-485 | Silk | Extra Creamy Almond Milk | Cheshire |
| MM-486 | Almond Breeze | Extra Creamy Almond Milk | Cheshire |
| MM-487 | Almond Breeze | Unsweetened Original | Cheshire |
| MM-488 | Almond Breeze | Original | Cheshire |
| MM-489 | Blue Diamond | Chocolate | Southington |
| MM-490 | Blue Diamond | Chocolate Unsweetened | Southington |
| MM-491 | Blue Diamond | Vanilla | Southington |
| MM-492 | Blue Diamond | Vanilla Unsweetened | Southington |
| MM-493 | Silk | Almond Original | Southington |
| MM-494 | Silk | Almond Vanilla | Southington |
| MM-495 | Silk | Almond Unsweetened | Southington |
| MM-503 | Pillsbury | Almond Flour | Thomaston |
| MM-504 | Bob's Red Mill | Natural Almond Flour | Thomaston |
| MM-513 | Bob's Red Mill | Super-Fine Almond Flour | Stratford |
| MM-514 | Woodstock | Almond Butter Smooth & Unsalted | Stratford |
| MM-515 | Woodstock | Almond Butter Crunchy & Unsalted | Stratford |
| MM-516 | PB2 | Powdered Almond Butter | Stratford |
| MM-517 | P fit B | Almond Butter Spread | Stratford |
| MM-522 | Orgain | Organic Almond Milk Unsweetened Vanilla | Stratford |
| MM-523 | Orgain | Organic Almond Milk Lightly Sweetened Vanilla | Stratford |
| MM-524 | Blue Diamond | Almond Breeze Original | Stratford |
| MM-527 | Friendly Farm | Original Almond Milk | Waterford |
| MM-528 | Friendly Farm | Vanilla Almond Milk | Waterford |
| MM-529 | Friendly Farm | Chocolate Almond Milk | Waterford |
| MM-535 | Sweet Harvest | Simply Nature Creamy Almond Butter | Waterford |
| MM-536 | Baker's Choice | Almond Flour | Waterford |
| MM-537 | Barissimo Coffee | Vanilla Almond Creamer | Waterford |
| MM-538 | Barissimo Coffee | Caramel Almond Creamer | Waterford |
| MM-553 | Good & Gather | Creamy Almond Butter | West Hartford |
| MM-554 | Good & Gather | Dark Chocolate Creamy Almond Butter | West Hartford |
| MM-555 | Justin's | Classic Almond Butter | West Hartford |
| MM-562 | Serenity Kids | Super-Fine Almond Flour | Enfield |
| MM-563 | Good & Gather | Blanched Almond Flour | Enfield |

Table 2. Human food samples tested for Aflatoxins in 2023, continued.

| Sample ID | Brand | Description | Town Collected |
|------------------|----------------|---|-----------------------|
| MM-564 | Good & Gather | Honey Creamy Almond Butter No Stir | Enfield |
| MM-565 | Good & Gather | Vanilla Creamy Almond Butter No Stir | Enfield |
| MM-566 | Good & Gather | Cinnamon Creamy Almond Butter No Stir | Enfield |
| MM-567 | Good & Gather | Crunchy Almond Butter | Enfield |
| MM-568 | Good & Gather | Creamy Almond Butter No Stir | Enfield |
| MM-569 | Justin's | Vanilla Almond Butter | Enfield |
| MM-570 | Justin's | Maple Almond Butter | Enfield |
| MM-571 | MaraNatha | Creamy Almond Butter | Enfield |
| MM-572 | MaraNatha | Creamy Almond Butter No Sugar Or Salt Added | Enfield |
| MM-575 | Great Value | Superfine Blanched Almond Flour | Waterford |
| MM-576 | Nature's Eats | Almond Flour Enhanced Formula | Waterford |
| MM-577 | Nature's Eats | Almond Flour Superfine Blanched | Waterford |
| MM-578 | Bob's Red Mill | Super-Fine Almond Flour | Waterford |
| MM-579 | Sam's Choice | Creamy Almond Butter No Sugar Or Salt Added | Waterford |
| MM-580 | Sam's Choice | Creamy Almond Butter Slow Roasted | Waterford |
| MM-581 | Barney | Almond Butter Smooth | Waterford |
| MM-582 | Barney | Almond Butter Crunchy | Waterford |
| MM-583 | Barney | Smooth Almond Butter No Added Sugar Or Salt | Waterford |

Table 2. Human food samples tested for Aflatoxins in 2023, continued.

| Sample ID | Brand | Description | Town Collected |
|------------------|----------------|---------------------------------|-----------------------|
| MM-584 | RX | Vanilla Almond Butter | Waterford |
| MM-586 | MaraNatha | Organic Raw Almond Butter | Waterford |
| MM-585 | MaraNatha | Natural Almond Butter Crunchy | Middlebury |
| MM-588 | Fisher | Almond Flour | Ansonia |
| MM-589 | King Arthur | Almond Flour | Ansonia |
| MM-590 | Bob's Red Mill | Super-Fine Almond Flour | Ansonia |
| MM-591 | Bob's Red Mill | Super-Fine Almond Flour | Ansonia |
| MM-587 | Field Day | Almond Flour | Middlebury |
| MM-624 | King Arthur | Almond Flour | Trumbull |
| MM-625 | Bob's Red Mill | Super-Fine Almond Flour | Trumbull |
| MM-627 | Good & Gather | Almond Flour | Trumbull |
| MM-628 | Bob's Red Mill | Almond Flour | Trumbull |
| MM-632 | Bob's Red Mill | Super-Fine Almond Flour | Shelton |
| MM-633 | Bob's Red Mill | Super-Fine Natural Almond Flour | Shelton |
| MM-634 | Bowl & Basket | Almond Flour | Shelton |
| MM-639 | Great Value | Almond Flour | Norwalk |
| MM-640 | Great Value | Nature's Eats Almond Flour | Norwalk |
| MM-642 | Great Value | Nature's Eats Almond Flour | Norwalk |

Table 3. Human food samples tested for Patulin in 2023.

| Sample ID | Brand | Description | Town Collected |
|------------------|------------------|---|-----------------------|
| MM-480 | Rogers' Orchards | Pure Sweet Cider | Cheshire |
| MM-482 | R.W. Knudsen | Organic Apple | Cheshire |
| MM-484 | Martinelli's | Apple Juice | Cheshire |
| MM-497 | Market | Sweet Apple Cider | Southington |
| MM-500 | Market | Pics Apple Juice - From Concentrate with Added Ingredient | Southington |
| MM-502 | Market | Pics Apple Juice - With Added Calcium and Vitamin C | Southington |
| MM-505 | Seven Mills | Seven Farms Organic Sweetened Applesauce | Thomaston |
| MM-506 | Seven Mills | Seven Farms Organic Unsweetened Applesauce | Thomaston |
| MM-507 | Mott's | Applesauce | Thomaston |
| MM-508 | Mott's | Applesauce Cinnamon | Thomaston |
| MM-509 | Mott's | Applesauce No Sugar Added | Thomaston |
| MM-510 | IGA | Original Applesauce | Thomaston |
| MM-511 | IGA | Cinnamon Applesauce | Thomaston |
| MM-512 | IGA | Unsweetened Applesauce | Thomaston |
| MM-519 | Vermont Village | Organic Unsweetened Apple Sauce with Cinnamon | Stratford |
| MM-520 | R.W. Knudsen | Organic Apple Juice | Stratford |
| MM-446 | Gerber | Apple Juice | Naugatuck |
| MM-478 | Stop and Shop | Premium Apple Cider | Cheshire |
| MM-518 | Vermont Village | Organic Unsweetened Apple Sauce | Stratford |
| MM-521 | Apple & Eve | Organics Apple Juice | Stratford |
| MM-530 | Nature's Nectar | 100% Apple Juice | Waterford |
| MM-531 | Simply Nature | Organic 100% Apple Juice | Waterford |
| MM-532 | Sweet Harvest | Original Applesauce | Waterford |
| MM-533 | Sweet Harvest | Cinnamon Applesauce | Waterford |

Table 3. Human food samples tested for Patulin in 2023.

| Sample ID | Brand | Description | Town Collected |
|------------------|------------------|---------------------------------------|-----------------------|
| MM-534 | Simply Nature | Unsweetened Applesauce | Waterford |
| MM-556 | Good & Gather | Homestyle Applesauce | West Hartford |
| MM-557 | Good & Gather | Unsweetened Applesauce | West Hartford |
| MM-548 | Gerber | Apple Juice | Canton |
| MM-592 | Stop & Shop | 100% Apple Juice Original | Ansonia |
| MM-593 | Stop & Shop | 100% Apple Juice Honeycrisp Style | Ansonia |
| MM-594 | Mott's | 100% Juice Apple | Ansonia |
| MM-595 | Mott's | For Tots Apple Juice | Ansonia |
| MM-596 | Nature's Promise | Organic Sweetened Cinnamon Applesauce | Ansonia |
| MM-597 | North Coast | Organic Applesauce | Ansonia |
| MM-598 | Mussleman's | Cinnamon Applesauce | Ansonia |
| MM-599 | Mussleman's | Unsweetened Applesauce | Ansonia |
| MM-600 | Nature's Promise | Organic Apple Juice | Old Saybrook |
| MM-601 | Nature's Promise | Organic Honeycrisp Style Apple Juice | Old Saybrook |
| MM-602 | Gerber | Apple Juice | Old Saybrook |
| MM-614 | Good & Gather | Strawberry Applesauce | Trumbull |
| MM-615 | Good & Gather | Cinnamon Applesauce | Trumbull |
| MM-617 | Good & Gather | Homestyle Applesauce | Trumbull |
| MM-618 | Good & Gather | Organic Unsweetened Applesauce | Trumbull |
| MM-619 | Mott's | Strawberry No Sugar Added Applesauce | Trumbull |
| MM-620 | Mott's | Cinnamon No Sugar Added Applesauce | Trumbull |
| MM-621 | Good & Gather | Organic Apple Juice | Trumbull |
| MM-622 | Market Pantry | Apple Juice | Trumbull |
| MM-623 | Martinelli's | Apple Juice | Trumbull |

Table 4 Findings of Toxic Elements in Maple Syrup Samples Tested in 2023

| | | Pb |
|-----------|--|--------|
| Sample ID | Brand Name Commodity | |
| MM-636 | Butternut Mountain Farm Maple Syrup | < 10.1 |
| MM-637 | Spring Tree Maple Syrup | < 8.8 |
| MM-638 | Crown Maple Syrup | < 9.3 |
| MM-643 | Parker's Maple Syrup | < 9.4 |
| MM-644 | Maple Grove's Farm Maple Syrup | < 9.0 |
| MM-645 | Maple Grove's Farm Organic Maple Syrup | < 8.7 |
| MM-646 | SAPJACK Organic Maple Syrup Salted Caramel | < 9.2 |
| MM-647 | SAPJACK Organic Maple Syrup Bourbon Aged | < 9.0 |
| MM-648 | SAPJACK Organic Maple Syrup Grade A Amber | < 9.4 |
| MM-649 | Brad's Organic Maple Syrup | < 9.1 |
| MM-650 | Field Day Organic Maple Syrup | < 9.3 |
| MM-651 | Brown Family Farm Maple Syrup | 6.4 TR |
| MM-652 | Brown Family Farm Maple Syrup Jug | < 9.5 |
| MM-653 | Maple Grove Farms Strawberry Syrup | < 9.9 |
| MM-654 | The Maple Guild Pumpkin Spice Maple Syrup | < 10.0 |
| MM-655 | Crown Maple Syrup | < 2 |

Table 5: Findings of Toxic Elements in Baby Food Samples Tested in 2023

| Sample ID | Brand Name Commodity | As μg/kg | iAs | Cd | Hg | Pb |
|-----------|--|-------------|-----|--------|--------|--------|
| MM-361 | Happy Baby Sweet Potato and Carrot Puffs | 414.5 | 69 | < 20.1 | < 20.1 | 29 |
| MM-362 | Gerber Rice Cereal | 112.7 | 72 | < 20.8 | < 20.8 | < 20.8 |
| MM-407 | Gerber White Grape Juice | 11.7 | 8.9 | < 1.9 | < 1.9 | 3.6 |
| MM-438 | Gerber Apple Juice | 4.9 | | < 2.0 | < 2.0 | 2.5 |
| MM-439 | Parent's Choice Mixed Fruit Juice | 2.5 | | < 2.0 | < 2.0 | < 2.0 |
| MM-440 | Gerber Rice Cereal | 119.5 | 93 | 34.6 | < 16.0 | < 16.0 |
| MM-441 | Parent's Choice Pear Juice | 4.3 | | < 2.0 | < 2.0 | < 2.0 |
| MM-442 | Gerber Apple Banana with Oatmeal Cereal | < 3.6 | | < 3.6 | < 3.6 | < 3.6 |
| MM-443 | Gerber Turkey Rice Dinner | 9.6 | | 3.5 | < 3.3 | 5.2 |
| MM-444 | Gerber Turkey and gravy | 13.3 | | < 3.8 | < 3.8 | < 3.8 |
| MM-457 | Gerber Chicken Noodle | 7.7 | | 14.8 | < 3.4 | 4.6 |
| MM-458 | Gerber Teether Wheels | 61.6 | | 13.5 | < 18.3 | < 18.3 |
| MM-459 | Happy Baby Puffs Sweet Potato & Carrot | 174 | 51 | < 19.2 | < 19.2 | 21.5 |
| MM-460 | Happy Baby Teethers Pea & Spinach | 136.9 | 66 | < 17.9 | < 17.9 | 46.1 |
| MM-461 | Earth's Best Whole Grain Mult-Grain Cereal | < 20.5 | | 25.4 | < 20.5 | < 20.5 |
| MM-462 | Beech Nut Organic Pear | 5.5 | | < 4.9 | < 4.9 | < 4.9 |
| MM-463 | Nursery Purified Water | < 2.0 | | < 2.0 | < 2.0 | < 2.0 |
| MM-464 | Gerber White Grape | 10.5 | 8.6 | < 2.0 | < 2.0 | 2.3 |
| MM-465 | Gerber Apple Mango with Rice Cereal | 15.6 | | < 4.0 | < 4.0 | < 4.0 |
| MM-539 | Beech Nut Organics Pear | 5.5 | | 3.2 T | < 2 | < 2 |
| MM-540 | Gerber Rice | 113 | 114 | < 9.0 | < 9.0 | < 9.0 |
| MM-541 | Gerber Apple Banana with Oatmeal Cereal | 3.7 T | | < 2 | < 2 | < 2 |
| MM-542 | Gerber Apple Mango with Rice Cereal | 16 | | < 2 | < 2 | 2.3 T |
| MM-543 | Gerber Turkey Rice | 10 | | 2.5 T | < 2 | 5.5 |
| MM-544 | Gerber Chicken Noodle | 7.9 | | 11 | < 2 | 6 |
| MM-545 | Gerber Turkey and Gravy | 15 | | < 2 | < 2 | < 2 |
| MM-546 | Gerber White Grape Juice | 10.5 | 8 | < 1.0 | < 1.0 | 2.3 |
| MM-547 | Gerber Apple Juice | 5 | | < 1.0 | < 1.0 | 2.5 |
| MM-549 | Nursery Purified Water | < 1.0 | | < 1.0 | < 1.0 | < 1.0 |
| MM-550 | Gerber Teether Wheels Apple Harvest | 59 | | 13 T | < 9.0 | < 9.0 |
| MM-551 | Happy Baby Puffs Sweet Potato & Carrots | 314 | 70 | 13 T | < 10.0 | 10.8 T |

| | | | | | | |
|---------------|---|--------|------------|--------|--------|--------|
| MM-552 | Earth's Best Multi-grain Cereal | < 10.0 | | 26.6 | < 10.0 | < 10.0 |
| MM-558 | Happy Baby Organic Teethers Pea & Spinach | 144 | 87 | 15.6 T | < 8.0 | 33 |
| MM-559 | Serenity Kids Turkey | 9.6 | | 5.7 | < 2 | < 2 |
| MM-560 | Serenity Kids Beef | 5.4 | | 2.4 T | < 2 | < 2 |
| MM-561 | Serenity Kids Chicken | 3.9 T | | 3 T | < 2 | < 2 |
| MM-573 | Parent's Choice Pear Juice | 3.2 | | < 1.0 | < 1.0 | 1 |
| MM-574 | Parent's Choice Mixed Fruit Juice | 2.6 | | < 1.0 | < 1.0 | < 1.0 |
| MM-603 | Gerber Apple Juice | 2.9 | | < 1.0 | < 1.0 | 3.1 |
| MM-604 | Gerber Rice | 112 | 96 | 31 | < 23 | < 23 |
| MM-605 | Gerber Teether Wheels | 57.1 | | 8.6 Tr | < 7.1 | < 7.1 |
| MM-606 | Gerber Turkey and Gravy | 22 | | < 2.0 | < 2.0 | < 2.0 |
| MM-607 | Gerber Apple Banana with Oatmeal Cereal | 2.7 Tr | | 2.2 Tr | < 2.0 | < 2.0 |
| MM-608 | Nursery Purified Water | < 1.0 | | < 1.0 | < 1.0 | < 1.0 |
| MM-609 | Happy Baby Puffs Sweet Potato & Carrot | 216 | 56 (Trace) | < 18 | < 18 | < 18 |
| MM-610 | Beech-Nut Pear Organics | 6.9 | | 2.3 Tr | < 2 | < 2 |
| MM-611 | Earth's Best Whole Grain Multi-Grain Cereal | 12.9 | | < 8.1 | < 8.1 | < 8.1 |
| MM-612 | Serenity Chicken | 2.6 Tr | | 2.3 Tr | < 1.6 | < 1.6 |
| MM-613 | Serenity Beef | 12.9 | | 2.0 Tr | < 1.6 | 2.9 Tr |
| MM-616 | Happy Baby Organic Teethers Pea & Spinach | 116 | 72 | < 19 | < 19 | 24 |
| MM-626 | Gerber Chicken Noodle | 7.1 | | 7.9 | < 1.6 | 3.3 Tr |
| MM-629 | Gerber White Grape Juice | < 2 | | < 2 | < 2 | < 2 |
| MM-630 | Gerber Turkey Rice Dinner | 9.8 | | 3.6 | < 1.6 | 5.3 |
| MM-631 | Gerber Apple Mango with Rice Cereal | 13.6 | | < 1.6 | < 1.6 | < 2.6 |
| MM-635 | Serenity Turkey | 4.1 | | < 1.6 | < 1.6 | < 1.6 |
| MM-641 | Parent's Choice Pear Juice | 4.1 | | 1.0 Tr | < 0.9 | < 0.9 |
| MM-656 | Mott's Mighty Flying Fruit Punch | < 9 | | < 9 | < 9 | < 9 |
| NS-01 | Serenity Kids Free Range Chicken | < 3.7 | | < 3.7 | < 3.7 | < 3.7 |
| NS-02 | Serenity Kids Grass Fed Beef | 11.6 | | < 3.4 | < 3.4 | < 3.4 |
| NS-03 | Serenity Kids Pasture Raised Turkey | 10.8 | | 4.1 | < 4.1 | < 4.1 |

Table 6: Findings of Toxic Elements in Baby Food Samples Tested in 2023

| Sample ID | Brand Name Commodity | As | iAs | Cd | Hg | Pb |
|-----------|---|-------|-------|-------|-------|-------|
| MM-437 | Sweet Cider | < 2.0 | < 0.7 | | | |
| MM-445 | Gerber Apple Juice | 4.9 | 4.4 | | | |
| MM-452 | Gala Apple Cider | < 1.9 | < 0.7 | | | |
| MM-453 | First Press Apple Cider | < 2.0 | < 0.7 | | | |
| MM-454 | Honeycrisp Apple Cider | 2.4 | 1.4 | | | |
| MM-455 | Organic Apple Juice | 2.2 | 1.6 | | | |
| MM-456 | Stew Leonard's | < 2.0 | < 0.7 | | | |
| MM-466 | Rogers' Orchards 100% Honeycrisp Sweet Cider | < 2.0 | < 0.7 | | | |
| MM-467 | Rogers' Orchards 100% Gala Sweet Cider | < 2.0 | < 0.7 | | | |
| MM-468 | Juicy Juice 100% Apple Juice | < 2.0 | < 0.7 | | | |
| MM-472 | Mott's Apple Cider | < 2.0 | < 0.7 | | | |
| MM-477 | Stop & Shop Premium Apple Cider | < 2.0 | < 0.7 | | | |
| MM-479 | Rogers' Orchards Pure Sweet Cider | < 2.0 | 1.3 | | | |
| MM-481 | R.W. Knudsen Organic Apple | 3 | 4.2 | | | |
| MM-483 | Martinelli's Apple Juice | 2.5 | 4.4 | | | |
| MM-496 | Market Sweet Apple Cider | < 2.0 | < 0.7 | | | |
| MM-499 | Pics Apple Juice - from concentrate with added ingredient | 2.5 | 1.4 | | | |
| MM-501 | Pics Apple Juice - with added calcium and vitamin C | < 2.0 | < 0.7 | | | |
| MM-758 | Apple & Eve Apple Juice Boxes | 4.1 | | < 1.0 | < 1.0 | < 1.0 |
| MM-759 | Mott's 100% Apple Juice | < 1.0 | | < 1.0 | < 1.0 | 2.2 |
| MM-760 | Apple & Eve Apple Juice | < 1.0 | | < 1.0 | < 1.0 | < 1.0 |
| MM-761 | Apple & Eve Apple Juice | < 1.0 | | < 1.0 | < 1.0 | < 1.0 |
| MM-762 | Juicy Juice Apple Juice | < 1.0 | | < 1.0 | < 1.0 | < 1.0 |
| MM-763 | Wellsley Farms Apple Juice | 1.6 | | < 1.0 | < 1.0 | < 1.0 |
| MM-764 | Apple & Eve Apple Juice | 1.1 | | < 1.0 | < 1.0 | 4.6 |
| MM-765 | Juicy Juice Apple Juice | 1.7 | | < 1.0 | < 1.0 | 1.6 |
| MM-766 | Juicy Juice Apple Juice | 1.7 | | < 1.0 | < 1.0 | 1.1 |
| MM-767 | Juicy Juice Apple Juice | 1.5 | | < 1.0 | < 1.0 | < 1.0 |
| MM-768 | Apple & Eve Apple Juice | 1.1 | | < 1.0 | < 1.0 | 1.5 |
| MM-769 | Bowl & Basket Apple Juice | 5 | | < 1.0 | < 1.0 | 4.3 |
| MM-770 | Apple & Eve Big Bird's Apple Juice | 3.2 | | < 1.0 | < 1.0 | < 1.0 |
| MM-771 | Mott's 100% Apple Juice | 3.1 | | < 1.0 | < 1.0 | 2.6 |

| | | | |
|---------------|-------------------------|-------|----------|
| NES-15 | Big Y Apple Cider | < 2.0 | < 0.7 |
| NES-16 | Premium Apple Cider | < 2.0 | < 0.7 |
| NES-17 | Martinelli's Gold Medal | 13.6 | 12.2 |
| NES-18 | Martinelli's Gold Medal | 13.3 | 12.4 |
| NES-19 | Mott's | < 2.0 | < 0.7 |
| NES-20 | Food Club | < 2.0 | < 0.7 |
| NES-21 | Langers | < 2.0 | 1 |

* The US FDA has established an action level of 100 µg/kg of inorganic arsenic in rice.

** The US FDA has proposed an action level of 10 ug/kg of inorganic arsenic in apple juice.

iAs indicates the value of inorganic As. As is total arsenic, organic and inorganic.

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