Department of Pesticide Regulation

Gavin Newsom
Governor

Karen Morrison
Director

Yana Garcia
Secretary for Environmental Protection

M E M O R A N D U M

TO: Jacqueline Campion
Deputy Director, Policy & Research
Department of Cannabis Control

THROUGH: Jennifer Teerlink, PhD
Deputy Director and Deputy Science Advisor
Registration and Evaluation Division

FROM: Shelley DuTeaux, PhD MPH, Branch Chief
Svetlana Koshlukova, PhD, Senior Toxicologist
Anna Kalashnikova, PhD, Staff Toxicologist (Specialist)
Brendan Darsie, MPH, Research Scientist
Qiaoxiang (Daisy) Dong, PhD, Staff Toxicologist (Specialist)
Human Health Assessment Branch

DATE: August 5, 2025

SUBJECT: RECOMMENDED REVISIONS TO THE PESTICIDE ACTION LEVELS FOR TESTING EDIBLE CANNABIS PRODUCTS IN CALIFORNIA

OBJECTIVE

The Department of Pesticide Regulation (DPR) developed this memorandum as part of the department's continuing efforts to meet the requirements in Business and Professions Code (BPC) section 26060 et seq. which requires DPR to develop guidelines for pesticide residues in harvested cannabis. To comply with this requirement, DPR provides health-based recommendations for consideration by the Department of Cannabis Control (DCC) in establishing regulatory residue levels for pesticides on processed cannabis (action levels). As new data become available or when other information warrants review, DPR updates its recommendations.

On December 18 2024, DPR provided to DCC revised recommendations for action levels for inhalable and non-inhalable cannabis products based on new toxicology, regulatory guidance levels, and evaluation of analytical data (DPR, 2024) ("DPR 2024 Recommendations"). At the time, consumption data specific to different types of cannabis products were not available to incorporate into the quantitative estimation of action levels. Therefore, DPR used the previously established surrogate method based on agricultural commodities with known consumption data. This method is detailed in the DPR 2024 Recommendations. Since that time, DPR has received the final study data from a commissioned academic survey of legal cannabis use in the California marketplace called the California Cannabis Consumption (C3) Survey (CSUS, 2025).

These data make it possible for DPR to further refine recommended pesticide action levels.

This memorandum supersedes the December 2024 Recommendations relative to non-inhalable cannabis products (e.g., edibles, beverages, topicals) and provides updated recommendations for these products based on the newly available consumption data for edibles, beverages and liquid concentrates. No additional updates to the December 2024 Recommendations relative to inhalable cannabis products are recommended at this time.

Summary of Recommendations

DPR incorporated newly available consumption data for legal cannabis products into its methodologies for establishing action levels for different types of ingested cannabis products.

Cannabis Consumption Survey Data Summary

DPR received consumption data from two pilot surveys conducted in 2019 and a full-scale survey cohort conducted in 2020 and 2023. Acute consumption data were based on survey interviews from a total of 381 respondents across California. The quantitative consumption data for edible cannabis products, liquid concentrates, and beverages have been validated and incorporated into the derivation of revised action levels for these products as described in more detail below.

Updates to Action Levels for Edible Cannabis Products

In its December 2024 Recommendations, DPR provided revised action levels based on the newest toxicology data and recommended establishing health-based action levels for all pesticides as a transition away from a two-category system of pesticide testing. DPR recommends further refinement of the action levels based on the newest consumption data. Currently, action levels are defined in the California Code of Regulations (CCR) Title 4 section 15719 for all non-inhalable cannabis products as a group, including all edible products. However, consumption data collected from the California marketplace showed an approximate 14-fold difference in the total volume and/or mass of cannabis infused beverages (e.g., teas, sodas, etc.) versus edibles (e.g., gummies, cookies, chocolates, crackers, mints and liquid concentrates). As such, DPR is recommending separate action levels for these two groups of products. More details are found below.

Action Levels for Topical Cannabis Products

Title 4 CCR section 15000(j) defines a "Cannabis product" as cannabis that has undergone a process whereby the plant material has been transformed into a concentrate, including, but not limited to, concentrated cannabis, or an edible or topical

product containing cannabis or concentrated cannabis and other ingredients. When the action levels for pesticide residues were originally established, topical products were grouped with non-inhalable cannabis products. DPR recommends continuation of that grouping, and has no updates to the action levels for topically applied cannabis products at this time.

Action Levels for Inhalable Cannabis Products

The December 2024 memorandum recommended establishing new action levels for Category I pesticides and revisions and refinements for the remaining Category II pesticides. These updates were based largely on new toxicology data and revisions to CORESTA and US EPA regulatory values.[1] No additional updates for action levels for inhalable cannabis and cannabis products will be made at this time.

Action Levels for Three Additional Enforcement-related Pesticides

DPR is aware through enforcement efforts that there is evidence of the use of illegal pesticides (those not registered for use in the US) associated with cannabis cultivation. In the December 2024 Recommendations, DPR recommended that DCC take regulatory action to prohibit the sale or distribution of cannabis products with any detectable residue of fenobucarb, isoprocarb and procymidone. No additional updates relative to these three pesticides are recommended at this time.

BACKGROUND

Cannabis remains illegal federally. As a result, the US Environmental Protection Agency (US EPA) has not established any tolerances for pesticides used on cannabis. In California, BPC section 26060(c) established a legal requirement for DPR to develop guidelines for pesticide residue in harvested cannabis. In compliance with this requirement, DPR developed health-based recommendations for consideration by DCC in establishing regulatory residue levels for pesticides on processed cannabis.

---

[1] DPR has adopted the Guidance Residue Levels (GRL) for pesticides on tobacco established by Cooperation Centre for Scientific Research Relative to Tobacco (CORESTA), an international cooperative research center for tobacco headquartered in France (CORESTA, 2016). DPR used the CORESTA GRLs as the action levels for dried cannabis flowers as these levels reflect the highest acceptable residues resulting from agricultural practices, detection limits, and physical and chemical properties. If a GRL has not been established for a pesticide, then the US EPA regulatory level of 0.1 µg/g (0.1 parts per million, ppm) was used as a surrogate action level for inhalable cannabis products. This is the pesticide residue level for tobacco that triggers the US EPA to require pyrolysis testing (US EPA, 1996).

When action levels for pesticide residues in cannabis products were originally recommended, levels were established for cannabis products broadly grouped together as Inhalable Cannabis and Cannabis Products and Non-Inhalable Cannabis Products (4 CCR 15719). Non-inhalable cannabis products include ones defined as an "Edible cannabis product" (4 CCR 15000(w)), that is, a cannabis product intended to be used orally, in whole or in part, for human consumption including cannabis products that dissolve or disintegrate in the mouth, but does not include any product otherwise defined as "cannabis concentrate."

No consumption data for different types of cannabis products were available at the time DPR developed the original action level recommendations. As such, DPR used a methodology already established for its food safety program from which to derive action levels for non-inhalable cannabis products. This method incorporated consumption values for watermelon as a surrogate agricultural commodity since watermelon has the highest consumption rate amongst all the commodities that are tested for pesticide residues in California, and therefore could be considered the most health-protective.

The need for product-specific consumption data became increasingly clear as the legal cannabis market in California expanded and diversified. To address this critical data gap, DPR entered into an agreement with California State University, Sacramento (CSUS) with the purpose of collecting information on the use and consumption of manufactured (legal) cannabis products in California in April 2018. Under this agreement (Agreement Number 17-C0086), the CSUS Public Health Survey Research Program (now known as the Population Research Center) was selected to conduct the California Cannabis Consumption (C3) Survey, designed to determine how much and what types of legal cannabis products consumers use in the California marketplace. Data were collected during two pilot surveys that took place in 2019, and a full-scale survey that started in 2020. The study entered a hiatus in 2020 as a result of the COVID-19 pandemic. Following its resumption in 2023, the data collection was completed in 2023 and the data analysis was completed in 2025 (CSUS, 2025).

Summary of Cannabis Consumption Survey Data

Between the pilot surveys and the full cohort in 2020 and 2023, a total of 381 respondents participated in the C3 survey. Data were collected throughout California, including in the Los Angeles/San Diego area, Central Valley, greater Sacramento area, and North Coast. Participants averaged 38.8 years old (range 18–95 years old), with 54% male and 45% female respondents. Most participants self-identified as White, non-Hispanic (46%) or Hispanic/Latino (32%).

Participants used an average of 2.7 cannabis categories when recalling the last 28 days of cannabis use. Flower was the most commonly used category (324 respondents), followed by vapes (220 respondents). Less than half of the participants reported using

resins, topicals, edibles, beverages, or liquid concentrates. Not all respondents reported their weight, or could recall the amount of cannabis consumed, resulting in the smaller number of respondents with usable consumption data. Besides flower, the most notable differences in consumption rates for different cannabis products was found to be within the broad definition of edible cannabis products. When divided into groups, significant differences were found for consumption of cannabis infused beverages (e.g., teas, sodas, etc.) versus edibles (e.g., gummies, cookies, chocolates, crackers, mints and liquid concentrates) and liquid concentrates. The median, 95th and 99th percentiles of consumption of various cannabis products from the C3 survey are summarized in Table 1. The appropriate percentile consumption for each cannabis product is noted in bold.

Table 1. Summary of Key Consumption Data for Non-Inhalable Cannabis Products from the California Cannabis Consumption (C3) Survey

Cannabis Product	**Number of Respondents**	**Median Consumption**[a] (g/kg-BW)	**95th Percentile Consumption**[b] (g/kg-BW)	**99th Percentile Consumption**[b] (g/kg-BW)
Topicals	43	0.038	0.24	**2.4**
Edible	148	0.11	**1.1**	2.2
Beverages	52	3.4	9.4	**15**
Liquid Concentrates	48	0.011	0.061	**0.075**

Bolded values indicate the appropriate percentile for further assessment for each cannabis product category based on number of respondents. Values are rounded to two significant figures as appropriate.
[a]g/kg-BW – gram cannabis product consumed per kilogram(kg) body weight of respondent.
[b]Consistent with its risk assessment practices, DPR calculated consumption rates (CR) at the 95th and 99th percentiles to capture the individuals at the high-end of the consumption distribution. The 95th percentile CR was used for calculating action levels when adequate consumption records (≥ 100) were available for a specific cannabis product. The 99th percentile CR was used when there were less than <100 consumption records. Median consumption rates are shown for comparison.

REVISIONS TO ACTION LEVELS FOR EDIBLE CANNABIS PRODUCTS AND BEVERAGES

DPR uses a health-based approach to calculate action levels, which requires a reference dose[2] for the specific pesticide (maximum safe daily oral exposure) and a consumption rate using the following equation:

[2] As defined by the US EPA, an acute RfD is an estimate of a daily oral chemical (such as pesticide) exposure for an acute duration (24 hours of less) to the human population including sensitive subgroups that is likely to be without appreciable risk of deleterious effects during a lifetime (US EPA, 2024).

$$\text{Action Level} = \frac{\text{Reference Dose (mg/kg body weight} - \text{day)}}{\text{Cannabis Consumption Rate (g cannabis/kg body weight} - \text{day)}}$$

In past recommendations, DPR used the 95th percentile consumption rate for a surrogate agricultural food commodity to evaluate exposure and potential risk when sufficient consumption records are available. When fewer than 100 records are available, DPR defaults to the 99th percentile consumption rate to ensure a health-protective assessment.

As mentioned above, DPR used a methodology already established for its food safety program with which to derive action levels for non-inhalable cannabis products. This method incorporated consumption values for watermelon as a surrogate agricultural commodity because of its high consumption rate, and therefore, health protectiveness. The new data showed that consumption of cannabis-infused beverages was approximately 14 times greater than other edible cannabis products. So, the decision was made to develop action levels for cannabis-infused beverages separately from the other non-inhalable cannabis products.

Incorporation of Cannabis Consumption Data

Only 52 consumption records were available from the C3 survey for cannabis-infused beverages (e.g., teas, sodas, juices, etc.). The median consumption rate of beverages for these respondents was 3.4 g/kg-BW. Since the number of consumption records was less than 100, DPR selected 99th percentile consumption rate of 15 g/kg-BW to derive a health-protective action levels for cannabis-infused beverages. For the edible cannabis products (e.g., gummies, cookies, chocolates, crackers, mints), 148 consumption records were available from the C3 survey. The median consumption rate was 0.11 g/kg-BW (i.e., 0.11 grams cannabis product per kilogram body weight of respondent). Since there were more than 100 consumption records for edible products from the C3 survey, DPR was able to select the 95th percentile consumption rate of 1.1 g/kg-BW to calculate action levels for edible cannabis products.

It is important to note that in separating out edible cannabis products from beverages results in a more refined assessment of health-based actions levels for both types of products. The revised action level recommendations for edible products is based on a 95th percentile consumption rate of 1.1 g/kg-BW versus the previous default assumption of 20 g/kg-BW, which resulted in the upward revision of 48 action levels (e.g., increased from the December 2024 Recommendations). Likewise, the refinement in consumption rates of cannabis-infused beverages resulted in an upward revision of 48 action levels when compared to the December 2024 Recommendations (Table 2). The values for the pesticide fenoxycarb decreased from the December 2024 Recommendations because

the government value on which it is based also decreased. See Table 2 for more information.

DPR calculated the action levels for edible cannabis products as representative of both edibles and liquid concentrates. Liquid concentrates (cannabis tinctures, elixirs, serums, oils and oral sprays) are cannabis products that are typically taken orally in smaller, more concentrated quantities. The consumption rates for liquid concentrates are typically 10 times lower than other edible cannabis products. However, the C3 survey found that liquid concentrates are the least frequently used cannabis product in the California marketplace, even less frequent than topical products (CSUS, 2025). Therefore, DPR recommends that separate action levels not be calculated for liquid concentrates and that these products be group with edible cannabis products at this time. DPR also recommends continuing to group topical products with non-inhalable cannabis products as the most appropriate approach at this time.

Use of US EPA Tolerance or European Commission Maximum Residue Levels as Ceiling Limits to Health-based Action Levels

By law, US EPA is responsible for regulating the pesticides that are used by growers to protect crops grown for human food and animal feed and for setting limits on the concentration of pesticides that may remain in or on foods sold in the US. Tolerances are the maximum amount of pesticide allowed to remain in or on food. US EPA establishes these values for specific crops based on a risk assessment that considers aggregate exposure from the pesticide through diet and drinking water and from pesticides used in and around the home, the cumulative effects from exposure to pesticides that have a common mechanism of toxicity (that is, two or more pesticide chemicals or other substances that cause a common toxic effect(s) by the same, or essentially the same, sequence of major biochemical events, interpreted as mode of action), whether there is increased susceptibility to infants and children or other sensitive subpopulations, and whether the pesticide is considered an endocrine disrupter. Specific tolerances for each pesticide and crop treated can be found in Title 40 of the Code of Federal Regulations (CFR) Part 180. Tolerances and Exemptions for Pesticide Chemical Residues in Food. https://ecfr.io/Title-40/pt40.26.180.

Action levels for edible cannabis products are not equivalent to US EPA tolerances. In establishing tolerances for pesticide residues in food, US EPA conducts a dietary risk assessment to account for the eating habits of different segments of the population and combines that information with other lifetime routes of exposure to ensure that the pesticide can be used with reasonable certainty of no harm. When establishing tolerances, US EPA also considers expected residue levels from labeled pesticides use, another dataset unavailable for cannabis at this time since no pesticides are designated as legal at the federal level for application on cannabis as a crop.

With no tolerances established for cannabis, DPR recommends that the proposed action levels for edible cannabis products not exceed established US EPA tolerances for appropriate agricultural crops. DPR reviewed the approved labels and crop-use for pesticides to confirm the establishment of US EPA tolerances and allowable uses in California. Once calculated, DPR reviewed the action levels to ensure they did not exceed the established US EPA tolerances. If a health-based action limit was higher than the tolerance value, the latter was substituted as the upper limit so that the action level did not exceed values established in statue.

In the case of daminozide and fenoxycarb, no US EPA tolerance is available to compare to the calculated health-based action level. Daminozide is registered for use in the US, but not on agricultural crops. Fenoxycarb has been cancelled in the US, and its tolerances revoked. However, the European Union/European Commission has established maximum residues levels (MRLs) for these two pesticides. MRLs are generally equivalent to US EPA tolerances and are defined as the highest pesticide residue level legally tolerated in or on food or feed when pesticides are applied correctly. The MRLs for daminozide and fenoxycarb were used as reasonable ceiling limits because the calculated health based action levels exceeded 100 µg/g. Refer to DPR, 2024 for more detail. A summary of the proposed edible action levels is found in Appendix A.

Table 2. Recommended Revisions to Actions Levels for Edible Cannabis Products and Cannabis-Containing Beverages

Pesticide	**CAS RN**	**Current Action Level**[a] (µg/g)	**December 2024 Other Cannabis Goods**[a] **Action Level** (µg/g)	**Proposed Cannabis Beverage**[b] **Action Level** (µg/g)	**Proposed Edible Cannabis**[b] **Action Level** (µg/g)
Abamectin	65195-55-3	0.3	0.10	0.10	0.10
Acephate	30560-19-1	5	0.14	0.18	2.5
Acequinocyl	57960-19-7	4	3.7	4.0	4.0
Acetamiprid	135410-20-7	5	5.0	6.5	15
Aldicarb	116-06-3	LOD	0.014	0.020	0.25
Azoxystrobin†	131860-33-8	40	30	30	30
Bifenazate	149877-41-8	5	5.0	6.5	7.0
Bifenthrin	82657-04-3	0.5	1.6	2.0	4.0
Boscalid	188425-85-6	10	11	14	70
Buprofezin†	69327-76-0	N/A	60	60	60
Captan + THPI[c]	133-06-2, 85-40-5	5	5.0	6.5	50
Carbaryl	63-25-2	0.5	0.50	0.65	9.3
Carbendazim[g]	10605-21-7	N/A	5.0	6.5	93
Carbofuran	1563-66-2	LOD	0.0050	0.0065	0.093
Chlorantraniliprole†	500008-45-7	40	40	40	40
Chlordane[d,g]	cis-chlordane 5103-71-9, trans-chlordane 5103-74-2	LOD	0.050	0.065	0.10
Chlorfenapyr	122453-73-0	LOD	2.5	3.3	47
Chlorpyrifos	2921-88-2	LOD	0.0050	0.0065	0.093

Table 2. Recommended Revisions to Actions Levels for Edible Cannabis Products and Cannabis-Containing Beverages

Pesticide	**CAS RN**	**Current Action Level**[a] (µg/g)	**December 2024 Other Cannabis Goods**[a] **Action Level** (µg/g)	**Proposed Cannabis Beverage**[b] **Action Level** (µg/g)	**Proposed Edible Cannabis**[b] **Action Level** (µg/g)
Clofentezine	74115-24-5	0.1	0.65	0.85	3.0
Coumaphos	56-72-4	LOD	0.010	0.012	0.15
Cyfluthrin	68359-37-5	2.0	0.59	0.77	7.0
Cypermethrin	52315-07-8	1.0	0.70	0.92	13
Cyprodinil[†]	121552-61-2	N/A	50	50	50
Dacthal (DCPA)	1861-32-1	N/A	0.050	0.070	0.93
Daminozide[gl]	1596-84-5	LOD	0.10	0.10	0.10
Diazinon	333-41-5	0.1	0.15	0.20	0.75
DDVP (Dichlorvos)	62-73-7	LOD	0.042	0.050	0.50
Dimethoate[†]	60-51-5	LOD	2.0	2.0	2.0
Dimethomorph	110488-70-5	2.0	13	16	30
Ethoprop(phos)[†]	13194-48-4	LOD	0.020	0.020	0.020
Etofenprox[†]	80844-07-1	LOD	5.0	5.0	5.0
Etoxazole[†]	153233-91-1	0.1	1.5	1.5	1.5
Fenhexamid	126833-17-8	0.1	19	25	30
Fenoxycarb[gl]	72490-01-8	LOD	3.0	0.050	0.050
Fenpyroximate[†]	111812-58-9	0.1	4.0	4.0	4.0
Fipronil[†]	120068-37-3	LOD	0.030	0.030	0.030
Flonicamid	158062-67-0	0.1	6.0	7.9	16
Fludioxonil[†]	131341-86-1	0.1	25	30	30

Table 2. Recommended Revisions to Actions Levels for Edible Cannabis Products and Cannabis-Containing Beverages

Pesticide	**CAS RN**	**Current Action Level**[a] (µg/g)	**December 2024 Other Cannabis Goods**[a] **Action Level** (µg/g)	**Proposed Cannabis Beverage**[b] **Action Level** (µg/g)	**Proposed Edible Cannabis**[b] **Action Level** (µg/g)
Fluopyram	658066-35-4	N/A	25	33	50
Hexythiazox[†]	78587-05-0	0.1	6.0	6.0	6.0
Imazalil	35554-44-0	LOD	5.0	6.5	10
Imidacloprid	138261-41-3	0.1	3.0	3.9	4.0
Kresoxim-methyl[†]	143390-89-0	0.1	1.0	1.0	1.0
Malathion[†]	121-75-5	0.5	8.0	8.0	8.0
Metalaxyl[†]	57837-19-1	2	15	15	15
Methamidophos	10265-92-6	N/A	0.049	0.064	0.92
Methiocarb[g]	2032-65-7	LOD	0.015	0.020	0.20
Methomyl	16752-77-5	1	0.075	0.10	1.4
Methyl parathion[g]	298-00-0	LOD	0.0013	0.0016	0.023
Mevinphos[g]	7786-34-7	LOD	0.017	0.022	0.31
Monocrotophos[g]	6923-22-4	N/A	0.0030	0.0039	0.056
Myclobutanil[†]	88671-89-0	0.1	9.0	9.0	9.0
Naled	300-76-5	0.1	0.16	0.21	3.0
Omethoate[†]	1113-02-6	N/A	1.8	2.0	2.0
Oxamyl	23135-22-0	0.5	0.13	0.17	2.4
Paclobutrazol[g]	76738-62-0	LOD	5.0	6.5	93
Pentachloro-nitrobenzene[†]	82-68-8	0.1	1.0	1.0	1.0

Table 2. Recommended Revisions to Actions Levels for Edible Cannabis Products and Cannabis-Containing Beverages

Pesticide	**CAS RN**	**Current Action Level**[a] (µg/g)	**December 2024 Other Cannabis Goods**[a] **Action Level** (µg/g)	**Proposed Cannabis Beverage**[b] **Action Level** (µg/g)	**Proposed Edible Cannabis**[b] **Action Level** (µg/g)
Permethrin[†]	52645-53-1	0.5	20	20	20
Phosmet	732-11-6	0.1	0.070	0.092	1.3
Piperonyl butoxide[†]	51-03-6	3	8.0	8.0	8.0
Prallethrin[†]	23031-36-9	0.1	1.0	1.0	1.0
Propiconazole[†]	60207-90-1	0.1	20	20	20
Propoxur[g]	114-26-1	LOD	0.019	0.025	0.35
Pymetrozine	123312-89-0	N/A	0.40	0.52	0.60
Pyraclostrobin	175013-18-0	N/A	2.5	3.3	40
Pyrethrins[e†]	8003-34-7	0.5	1.0	1.0	1.0
Pyridaben[†]	96489-71-3	0.1	3.0	3.0	3.0
Pyrimethanil	53112-28-0	N/A	15	15	15
Spinetoram	935545-74-7	0.1	2.5	3.2	8.0
Spinosad[f]	131929-60-7, 168316-95-8	0.1	2.5	3.2	10
Spiromesifen	283594-90-1	0.1	1.9	2.5	12
Spirotetramat[†]	203313-25-1	0.1	13	13	13
Spiroxamine[†]	118134-30-8	LOD	0.70	0.70	0.70
Tebuconazole	107534-96-3	0.1	1.5	2.0	9.0
Thiacloprid[†]	111988-49-9	LOD	1.0	1.0	1.0
Thiamethoxam	153719-23-4	5.0	4.5	4.5	4.5

Table 2. Recommended Revisions to Actions Levels for Edible Cannabis Products and Cannabis-Containing Beverages

Pesticide	**CAS RN**	**Current Action Level**[a] (µg/g)	**December 2024 Other Cannabis Goods**[a] **Action Level** (µg/g)	**Proposed Cannabis Beverage**[b] **Action Level** (µg/g)	**Proposed Edible Cannabis**[b] **Action Level** (µg/g)
Trifloxystrobin	141517-21-7	0.1	30	30	30

CAS RN – Chemical Abstract Service Registration Number; LOD – limit of detection; N/A – not applicable as these are new pesticides proposed for testing. See DPR, 2024 for more information; µg/g – microgram pesticide residue per gram of cannabis product. Values were rounded to two significant figures as appropriate.

[a]As defined in the California Code of Regulations (CCR), Title 4, § 15000 et seq.; Current Residual Pesticides Testing levels are found CCR Title 4, § 15719; https://www.law.cornell.edu/regulations/california/4-CCR-15719.

[b]Proposed Cannabis Action Levels for edibles and beverages are based on cannabis product-specific consumption rates from the C3 survey (CSUS, 2025).

[c]Captan metabolizes and degrades in the environment rapidly into tetrahydrophthalimide (THPI), which is detected on crops. US EPA considers THPI to have equivalent toxicity to the parent captan and US EPA includes THPI in the residue tolerances established for captan. Cannabis products should be tested for both captan and THPI. If detected, THPI should be converted to captan equivalent and added to the parent to calculate a total captain residue.

[d]Chlordane exists as an isomeric mixture in combination with many related chemicals. Sixty to 85% of technical chlordane consists of the stereoisomers cis- and trans-chlordane, the ratio of which depends on the manufacturing process (ATSDR, 2018).

[e]Pyrethrins refer to the insecticidal active ingredients present in pyrethrum extracts obtained from the flowers of the pyrethrum plant, Chrysanthemum cinerariaefolium. Individual pyrethrins in the mixture include pyrethrin I and II, cinerin I and II and jasmolin I and II. The action levels are based on toxicity of the mixture (CAS RN 8003-34-7) and residue testing should be based on measurements of pyrethrin I and II.

[f]Spinosad exists as a two-component mixture comprised of spinosyn A (CAS RN 131929-60-7) and spinosyn D (CAS RN 131929-63-0) in a ratio of approximately 5:1. Obtained from the fermentation of the naturally occurring soil dwelling bacterium Saccharopolyspora spinosa. https://pubchem.ncbi.nlm.nih.gov/#query=Spinosad

[g]Carbendazim, daminozide, paclobutrazol and propoxur are registered for use in the US but have no registered food uses (i.e., can be used for other purposes but not on agricultural crops) and have no active tolerances. Chlordane, fenoxycarb, methiocarb, methyl parathion, mevinphos, and monocrotophos have all been cancelled in the US, and their tolerances revoked. Except for daminozide and fenoxycarb, the proposed action levels are the calculated health-based values with updated consumption rates based on the C3 survey.

[l]Because the risk-based action levels for daminozide and fenoxycarb were ≥ 100 µg/g, European Union/European Commission (EU) maximum residue limits (MRL) were adopted as the ceiling limit (EU, 2017; EU, 2024, respectively).

[†]DPR capped the health-based action levels at the established US EPA tolerance per 40 CFR 180.

CONCLUSIONS

DPR is proposing refinements to the action level for edible cannabis products and cannabis-infused beverages as part of the department's ongoing efforts to provide health-based and data-driven recommendations to the Department of Cannabis Control. The latest refinements incorporate cannabis consumption data DPR received and validated from an academic survey of cannabis consumption across California. As part of its evaluation and assessment, DPR is recommending establishing an additional category for cannabis beverages based on consumption results and the much larger volume of the product consumed. The edible category, based on consumption of products such as gummies, cookies, and candies, will continue to include topicals and tinctures.

DPR is committed to the ongoing collaboration with DCC in protecting California consumers. The recommendations herein reflect an ongoing and continuous evaluation of the potential for pesticide exposure from cannabis products to human health. DPR will continue to periodically update recommendations based on the best available science including knowledge of cannabis consumption, pesticide toxicological information, health impacts, and information on additional pesticides of concern.

If you have questions regarding this memorandum, please contact Dr. Shelley DuTeaux of DPR's Human Health Assessment Branch at 916-445-4268 or Shelley.DuTeaux@cdpr.ca.gov.

REFERENCES

ATSDR (2018). Toxicological Profile for Chlordane. Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention, US Department of Health and Human Services, Atlanta, GA. February 2018. Available at https://www.atsdr.cdc.gov/toxprofiles/tp31.pdf

CSUS, 2025. California Cannabis Consumption Study (C3). Methodology and Outcomes Report, April 2025. Population Research Center, California State University, Sacramento, CA.

CORESTA (2016). Guidance No. 1 Agrochemical Guidance Residue Levels. Agro-Chemical Advisory Committee (ACAC), Centre de Coopération pour les Recherches Scientifiques Relatives au Tabac (CORESTA), July 2016. https://www.coresta.org/agrochemical-guidance-residue-levels-grls-29205.html

DPR (2024). Recommended Revisions to the Pesticide Action Levels for Testing Cannabis Products in California. Memorandum from Shelley DuTeaux, Chief Human Health Assessment (through Jennifer Teerlink, Deputy Director), Department of Pesticide Regulation to Jacqueline Campion, Deputy Director, Policy & Research, Department of Cannabis Control, December 18, 2024.

EU Pesticides Database (v.3.3). European Union/European Commission. Directorate-General for Health and Food Safety. https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/start/screen/mrls (accessed 28 July 2025). Daminozide (2017): https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/start/screen/mrls/details?lg_code=EN&pest_res_id_list=190,67&product_id_list=; Fenoxycarb (2024): https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/start/screen/mrls/details?lg_code=EN&pest_res_id_list=299&product_id_list=

FDA (2000). Guidance for Industry: Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed. US Food and Drug Administration, Washington, DC. FDA-2020-D-1956. July 2000. https://www.regulations.gov/document/FDA-2020-D-1956-0001

US EPA (1996). Residue Chemistry Test Guidelines, Office of Prevention, Pesticides, and Toxic Substances. OPPTS 860.1000 August 1996. US Environmental Protection Agency. Pyrolysis Study, Item (B)(3), pg. 8. https://www.epa.gov/test-guidelines-pesticides-and-toxic-substances/series-860-residue-chemistry-test-guidelines

US EPA (2024). Integrated Risk Information System (IRIS) Glossary. Integrated Risk Information System, US Environmental Protection Agency. https://www.epa.gov/iris/iris-glossary

APPENDIX A.

DETAILED LIST OF REVISED EDIBLE PESTICIDE ACTION LEVELS FOR LEGALLY GROWN CANNABIS IN CALIFORNIA

Table A. Detailed list of revised pesticide action levels for edible cannabis products in California

Pesticides (CAS RN)	**RfD**[c] (mg/kg/day)	**Risk-based Action Level for Cannabis Beverages**[e] (µg/g)	**Risk-based Action Level for Edible and Other Goods**[e] (µg/g)	**Tolerance**[d] (µg/g)	**Proposed Action Level for Cannabis Beverage**[f] (µg/g)	**Proposed Action Level for Edible and Other Goods**[f] (µg/g)	**RfD Reference**
Abamectin (71751-41-2)	0.0025	0.16	2.3	0.1	0.10	0.10	US EPA, 2018a
Acephate (30560-19-1)	0.003	0.18	2.5	10	0.18	2.5	US EPA, 2023a
Acequinocyl (57960-19-7)	0.073	4.8	68	4	4.0	4.0	US EPA, 2021a
Acetamiprid (135410-20-7)	0.1	6.5	93	15	6.5	15	US EPA, 2020a
Aldicarb* (116-06-3)	0.00027	0.018	0.25	0.5	0.018	0.25	US EPA, 2021b
Azoxystrobin (131860-33-8)	0.67	44	622	30	30	30	US EPA, 2023b
Bifenazate (149877-41-8)	0.1	6.5	93	7	6.5	7.0	US EPA, 2014a
Bifenthrin (82657-04-3)	0.031	2.0	29	4	2.0	4.0	US EPA, 2020b
Boscalid (188425-85-6)	0.22	14	205	70	14	70	US EPA, 2021c
Buprofezin** (69327-76-0)	2	131	1865	60	60	60	US EPA, 2022a
Captan[g] [as THPI equivalents] (133-06-2)	0.1	6.5	93	50	6.5	50	US EPA, 2018b
Carbaryl (63-25-2)	0.01	0.65	9.3	21	0.65	9.3	DPR, 2014
Carbendazim**[k] (10605-21-7)	0.1	6.5	93	NA	6.5	93	US EPA, 2020n
Carbofuran* (1563-66-2)	0.0001	0.0065	0.093	0.2	0.0065	0.093	DPR, 2006
Chlorantraniliprole (500008-45-7)	1.58	103	1473	40	40	40	US EPA, 2020c

Table A. Detailed list of revised pesticide action levels for edible cannabis products in California

Pesticides (CAS RN)	**RfD**[c] (mg/kg/day)	**Risk-based Action Level for Cannabis Beverages**[e] (µg/g)	**Risk-based Action Level for Edible and Other Goods**[e] (µg/g)	**Tolerance**[d] (µg/g)	**Proposed Action Level for Cannabis Beverage**[f] (µg/g)	**Proposed Action Level for Edible and Other Goods**[f] (µg/g)	**RfD Reference**
Chlordane*[hk] (cis-chlordane 5103-71-9, trans-chlordane 5103-74-2)	0.001	0.065	0.93	NA	0.065	0.10	ATSDR, 2018
Chlorfenapyr* (122453-73-0)	0.05	3.3	47	80	3.3	47	US EPA, 2020d
Chlorpyrifos* (2921-88-2)	0.0001	0.0065	0.093	15	0.0065	0.093	DPR, 2018
Clofentezine (74115-24-5)	0.013	0.85	12	3	0.85	3.0	US EPA, 2019a
Coumaphos* (56-72-4)	0.00019	0.012	0.18	0.15	0.012	0.15	US EPA, 2016a
Cyfluthrin (68359-37-5)	0.0117	0.77	11	7	0.77	7.0	US EPA, 2019b
Cypermethrin (52315-07-8)	0.014	0.92	13	14	0.92	13	US EPA, 2020e
Cyprodinil** (121552-61-2)	2	131	1865	50	50	50	US EPA, 2023c
Dacthal (DCPA) (1861-32-1)	0.001	0.07	0.93	5	0.070	0.93	USEPA, 2023d
Daminozide*[kl] (1596-84-5)	3.9	255	3636	NA	0.10	0.10	US EPA, 2014b; EU, 2014
Diazinon (333-41-5)	0.003	0.20	0.75	0.75	0.20	0.75	US EPA, 2016b
DDVP (Dichlorvos)* (62-73-7)	0.00083	0.054	0.77	0.5	0.050	0.50	US EPA, 2020f
Dimethoate* (60-51-5)	0.24	16	224	2	2.0	2.0	US EPA, 2023e
Dimethomorph (110488-70-5)	0.25	16	233	30	16	30	US EPA, 2015a
Ethoprop(hos)* (13194-48-4)	0.0004	0.027	0.39	0.02	0.020	0.020	US EPA, 2015b

Table A. Detailed list of revised pesticide action levels for edible cannabis products in California

Pesticides (CAS RN)	**RfD**[c] (mg/kg/day)	**Risk-based Action Level for Cannabis Beverages**[e] (µg/g)	**Risk-based Action Level for Edible and Other Goods**[e] (µg/g)	**Tolerance**[d] (µg/g)	**Proposed Action Level for Cannabis Beverage**[f] (µg/g)	**Proposed Action Level for Edible and Other Goods**[f] (µg/g)	**RfD Reference**
Etofenprox* (80844-07-1)	0.255	17	238	5	5.0	5.0	US EPA, 2022b
Etoxazole (153233-91-1)	0.046	3.0	43	1.5	1.5	1.5	US EPA, 2019c
Fenhexamid (126833-17-8)	0.38	25	354	30	25	30	US EPA, 2019d
Fenoxycarb*[kl] (72490-01-8)	2	131	1865	NA	0.050	0.050	EFSA, 2010; EFSA, 2018
Fenpyroximate (111812-58-9)	0.375	25	350	4	4.0	4.0	US EPA, 2020g
Fipronil* (120068-37-3)	0.008	0.52	7.5	0.03	0.030	0.030	DPR, 2023
Flonicamid (158062-67-0)	0.12	7.9	112	16	7.9	16	US EPA, 2024a
Fludioxonil (131341-86-1)	0.5	33	466	30	30	30	US EPA, 2023f
Fluopyram** (658066-35-4)	0.5	33	466	50	33	50	US EPA 2023g
Hexythiazox (78587-05-0)	0.3	20	280	6	6.0	6.0	US EPA, 2020h
Imazalil* (35554-44-0)	0.1	6.5	93	10	6.5	10	US EPA, 2018c
Imidacloprid (138261-41-3)	0.06	3.9	56	4	3.9	4.0	DPR, 2024
Kresoxim-methyl (143390-89-0)	1.09	71	1016	1	1.0	1.0	US EPA, 2016c
Malathion (121-75-5)	2.43	159	2265	8	8.0	8.0	US EPA, 2024b
Metalaxyl (57837-19-1)	0.5	33	466	15	15	15	US EPA, 2020i
Methamidophos** (10265-92-6)	0.000986	0.064	0.92	1	0.064	0.92	US EPA 2023a

Table A. Detailed list of revised pesticide action levels for edible cannabis products in California

Pesticides (CAS RN)	**RfD**[c] (mg/kg/day)	**Risk-based Action Level for Cannabis Beverages**[e] (µg/g)	**Risk-based Action Level for Edible and Other Goods**[e] (µg/g)	**Tolerance**[d] (µg/g)	**Proposed Action Level for Cannabis Beverage**[f] (µg/g)	**Proposed Action Level for Edible and Other Goods**[f] (µg/g)	**RfD Reference**
Methiocarb*[k] (2032-65-7)	0.0003	0.020	0.28	NA	0.020	0.20	US EPA, 2017a
Methomyl (16752-77-5)	0.0015	0.10	1.40	6	0.10	1.4	US EPA, 2018d
Methyl parathion*[k] (298-00-0)	0.000025	0.0016	0.023	NA	0.0016	0.023	DPR, 2010; US EPA, 2015c
Mevinphos*[k] (7786-34-7)	0.0003	0.022	0.31	NA	0.022	0.31	US EPA, 2000
Monocrotophos**[k] (6923-22-4)	0.00006	0.0039	0.056	NA	0.0039	0.056	FAO/UNEP, 2005
Myclobutanil (88671-89-0)	0.6	39	559	9	9.0	9.0	US EPA, 2021d
Naled (300-76-5)	0.003	0.21	3.0	3	0.21	3.0	US EPA, 2020j
Omethoate** (1113-02-6)	0.036	2.4	34	2	2.0	2.0	US EPA, 2023e
Oxamyl (23135-22-0)	0.0026	0.17	2.4	10	0.17	2.4	US EPA, 2017b
Paclobutrazol*[k] (76738-62-0)	0.1	6.5	93	NA	6.5	93	US EPA 2015d
Pentachloronitrobenzene (82-68-8)	0.12	7.9	112	1	1.0	1.0	US EPA, 2021e
Permethrin (52645-53-1)	0.44	29	410	20	20	20	US EPA, 2020k
Phosmet (732-11-6)	0.0014	0.092	1.3	25	0.092	1.3	US EPA, 2016d
Piperonyl butoxide (51-03-6)	5	327	4661	8	8.0	8.0	US EPA, 2017c
Prallethrin (23031-36-9)	0.025	1.6	23	1	1.0	1.0	US EPA, 2020l

Table A. Detailed list of revised pesticide action levels for edible cannabis products in California

Pesticides (CAS RN)	**RfD**[c] (mg/kg/day)	**Risk-based Action Level for Cannabis Beverages**[e] (µg/g)	**Risk-based Action Level for Edible and Other Goods**[e] (µg/g)	**Tolerance**[d] (µg/g)	**Proposed Action Level for Cannabis Beverage**[f] (µg/g)	**Proposed Action Level for Edible and Other Goods**[f] (µg/g)	**RfD Reference**
Propiconazole (60207-90-1)	1	65	932	20	20	20	US EPA, 2022c
Propoxur*[k] (114-26-1)	0.00038	0.025	0.35	NA	0.025	0.35	US EPA, 2015e
Pymetrozine** (123312-89-0)	0.008	0.52	7.5	0.6	0.52	0.60	US EPA, 2018e
Pyraclostrobin** (175013-18-0)	0.05	3.3	47	40	3.3	40	US EPA, 2021f
Pyrethrins[i] (8003-34-7)	0.2	13	186	1	1.0	1.0	US EPA, 2017d; US EPA, 2019e
Pyridaben (96489-71-3)	0.44	29	410	3	3.0	3.0	US EPA, 2020m
Pyrimethanil** (53112-28-0)	1	65	932	15	15	15	US EPA, 2024c
Spinetoram (935545-74-7)	0.049	3.2	46	8	3.2	8.0	US EPA, 2023h
Spinosad[j] (131929-60-7, 168316-95-8)	0.049	3.2	46	10	3.2	10	US EPA, 2023h
Spiromesifen (283594-90-1)	0.038	2.5	35	12	2.5	12	US EPA, 2024d
Spirotetramat (203313-25-1)	1	65	932	13	13	13	US EPA, 2017e
Spiroxamine* (118134-30-8)	0.1	6.5	93	0.7	0.70	0.70	US EPA, 2010
Tebuconazole (107534-96-3)	0.03	2.0	28	9	2.0	9.0	US EPA, 2021g
Thiacloprid* (111988-49-9)	0.044	2.9	41	1	1.0	1.0	US EPA, 2012
Thiamethoxam (153719-23-4)	0.35	23	326	4.5	4.5	4.5	US EPA, 2022d

Table A. Detailed list of revised pesticide action levels for edible cannabis products in California

Pesticides (CAS RN)	**RfD**[c] (mg/kg/day)	**Risk-based Action Level for Cannabis Beverages**[e] (µg/g)	**Risk-based Action Level for Edible and Other Goods**[e] (µg/g)	**Tolerance**[d] (µg/g)	**Proposed Action Level for Cannabis Beverage**[f] (µg/g)	**Proposed Action Level for Edible and Other Goods**[f] (µg/g)	**RfD Reference**
Trifloxystrobin (141517-21-7)	250	163	2331	30	30	30	US EPA, 2023i

*Indicates former Category I pesticide; **Indicates new pesticides proposed for mandatory testing. Values were rounded to two significant figures as appropriate.

[a]POD – Point of departure; In toxicology, the POD is related to the dose at which a biological response is first observed and is a basis for making extrapolations needed for assessing risks. This toxicity threshold is the dose/concentration of a substance below which adverse effects are not seen. Generally based on observational data from animal experiments corresponding to an estimated low effect level or no effect level. It marks the beginning of extrapolation to toxicological reference dose (RfD) or reference concentration (RfC).

[b]UF_{TOTAL} – Total uncertainty factors. Uncertainty factors account for uncertainty in experimental, observed, or derived data and are often applied to points of departure (POD) in the calculation of reference doses (RfDs) or reference concentrations (RfCs). When deriving RfDs/RfCs from experimental data, the total uncertainty factor (Total UF or UF_{TOTAL}) is generally comprised of a factor of 10x to account for interspecies extrapolation sensitivity (UF_A) and a factor of 10x to account for intraspecies (human) variability (UF_H).

[c]RfD – Reference Dose. As defined by US EPA, an acute RfD is an estimate of a daily oral chemical (such as pesticide) exposure for an acute duration (24 hours of less) to the human population including sensitive subgroups that is likely to be without appreciable risk of deleterious effects during a lifetime (US EPA, Integrated Risk Information System (IRIS) Glossary. https://www.epa.gov/iris/iris-glossary). These values are calculated by dividing the critical endpoint values (points of departure, PODs) by the total uncertainty factor (UF_{TOTAL}).

[d]Tolerance – The US Environmental Protection Agency (US EPA) sets tolerances, which are the maximum amount of a pesticide allowed to remain in or on food, as part of the process of regulating pesticides. By law, US EPA is responsible for regulating the pesticides that are used by growers to protect crops grown for human food and animal feed and for setting limits on the concentration of pesticides that may remain in or on foods sold in the US. US EPA establishes there values for specific crops based on a risk assessment that considers aggregate exposure from the pesticide through diet and drinking water and from pesticides used in and around the home, the cumulative effects from exposure to pesticides that have a common mechanism of toxicity (that is, two or more pesticide chemicals or other substances that cause a common toxic effect(s) by the same, or essentially the same, sequence of major biochemical events, interpreted as mode of action), whether there is increased susceptibility to infants and children or other sensitive subpopulations, and whether the pesticide is considered an endocrine disrupter. Specific tolerances for each pesticide and crop treated can be found in the Code of Federal Regulations, CFR Title 40, Part 180. Tolerances and Exemptions for Pesticide Chemical Residues in Food. https://ecfr.io/Title-40/pt40.26.180.

[e]Risk Based Action Level– Risk based action levels are based on reference doses derived from mammalian toxicity tests and estimated human consumption. Risk based action levels for cannabis-infused beverages (µg pesticide/g cannabis product) are calculated by dividing the RfD (mg

pesticide/kg body weight per day) by the 99th percentile consumption rate of 15 g/kg body weight per day from the C3 survey (CSUS, 2025). Risk-based action levels for Edible and Other Goods (µg pesticide/g cannabis product) are calculated by dividing the RfD (mg pesticide/kg body weight per day) by the 95th percentile consumption rate of 1.1 g/kg body weight per day from the C3 survey.

[f]Proposed Action Level – The proposed action level will be one of two options: 1) the risk based action level as described above if lower than the corresponding US EPA tolerance for the pesticide in appropriate agricultural commodities, or 2) the US EPA tolerance if it is lower than the risk based action level. At this time, the proposed action levels for other cannabis goods are based on reference doses and the 95th consumption rate of edible cannabis products.

[g]Captan metabolizes and degrades in the environment rapidly into tetrahydrophthalimide (THPI), which is detected on crops. US EPA considers THPI to have equivalent toxicity to the parent captan and US EPA includes THPI in the residue tolerances established for captan. Cannabis products should be tested for both captan and THPI. If detected, THPI should be converted to captan equivalent and added to the parent to calculate a total captain residue.

[h]Chlordane exists as an isomeric mixture in combination with many related chemicals. Sixty to 85% of technical chlordane consists of the stereoisomers cis- and trans-chlordane, the ratio of which depends on the manufacturing process (ATSDR, 2018).

[i]Pyrethrins refer to the insecticidal active ingredients present in pyrethrum extracts obtained from the flowers of the pyrethrum plant, Chrysanthemum cinerariaefolium. Individual pyrethrins in the mixture include pyrethrin I and II, cinerin I and II and jasmolin I and II. The action levels are based on toxicity of the mixture (CAS RN 8003-34-7) and residue testing should be based on measurements of pyrethrin I and II.

[j]Spinosad exists as a two-component mixture comprised of spinosyn A (CAS RN 131929-60-7) and spinosyn D (CAS RN 131929-63-0) in a ratio of approximately 5:1. Obtained from the fermentation of the naturally occurring soil dwelling bacterium Saccharopolyspora spinosa, it is used for the topical treatment of head lice. https://pubchem.ncbi.nlm.nih.gov/#query=Spinosad

[k]Carbendazim, daminozide, paclobutrazol and propoxur are registered for use in the US but have no registered food uses (i.e., can be used for other purposes but not on agricultural crops), and have no active tolerances. Chlordane, fenoxycarb, methiocarb, methyl parathion, mevinphos, and monocrotophos have all been cancelled in the US, and their tolerances revoked (marked NA). Except for daminozide and fenoxycarb, the proposed action levels are the calculated health-based values with updated consumption rates based on the C3 survey.

[l]Because the calculated action levels for daminozide and fenoxycarb were ≥ 100 µg/g European Union/European Commission (EU) maximum residue limits (MRL) were adopted as the ceiling limit (EU, 2017; EU, 2024, respectively),

References for Appendix A

ATSDR (2018). Toxicological Profile for Chlordane. Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention, US Department of Health and Human Services, Atlanta, GA. February 2018. https://www.atsdr.cdc.gov/toxprofiles/tp31.pdf.

DPR (2006). Carbofuran Risk Characterization Document. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA. January 2006. https://www.cdpr.ca.gov/docs/risk/rcd/carbofuran.pdf.

DPR (2010). Methyl Parathion Risk Characterization Document. Occupational, Ambient Air and Aggregate Exposures. Addendum to the 2004 Risk Characterization Document for Methyl Parathion Dietary and Ambient Air Exposures. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA. October 2010. https://www.cdpr.ca.gov/docs/risk/rcd/meth_para_add.pdf.

DPR (2014). Carbaryl (1-naphthyl methylcarbamate) Occupational and Bystander Risk Characterization Document. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA. June 2014. https://www.cdpr.ca.gov/docs/risk/rcd/carbaryl_final.pdf.

DPR (2018). Final Toxic Air Contaminant Evaluation of Chlorpyrifos. Risk Characterization of Spray Drift, Dietary, and Aggregate Exposures to Residential Bystanders. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA. July 2018. https://www.cdpr.ca.gov/docs/whs/pdf/chlorpyrifos_final_tac.pdf.

DPR (2023). Fipronil Risk Characterization Document. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA. March 2023. https://www.cdpr.ca.gov/docs/risk/rcd/fipronil_rcd.pdf.

DPR (2024). Imidacloprid Risk Characterization Document. Draft Human Health Risk Characterization Document for Non-Agricultural and Residential Uses of Imidacloprid. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA. March 2024. https://www.cdpr.ca.gov/docs/whs/active_ingredient/imidacloprid.htm

EFSA (2010). Conclusion on the peer review of the pesticide risk assessment of the active substance fenoxycarb. European Food Safety Authority. Parma, Italy. August 2010. EFSA Journal 2010;8(12): 1779. doi:10.2903/j.efsa.2010.1779. https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2010.1779

EFSA, 2018. Reasoned opinion on the review of the existing maximum residue levels for fenoxycarb according to Article 12 of Regulation (EC) No 396/2005. European Food Safety Authority, Brancato A, Brocca D, De Lentdecker C, et al. EFSA Journal 2018;16(1): 5155, 34 pp. https://doi.org/10.2903/j.efsa.2018.5155

European Union, 2014. Commission Regulation (EU) No 87/2014 of 31 January 2014 amending Annexes II, III and V to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for acetamiprid, butralin, chlorotoluron, daminozide, isoproturon, picoxystrobin, pyrimethanil and trinexapac in or on certain products. European Union and Commission. https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2014:035:0001:0048:EN:PDF

FAO/UNEP (2005). Rotterdam Convention - Operation of the Prior Informed Consent (PIC) procedure for banned or severely restricted chemicals in international trade. Decision Guidance Document Monocrotophos. Food and Agriculture Organization of the United Nations/United Nations Environment Programme. Rotterdam, Netherlands. February 2005. http://www.pic.int/Portals/5/DGDs/DGD_Monocrotophos_EN.pdf.

US EPA (2000). Mevinphos. Revised Human Health Risk Assessment. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. May 2000. https://www.epa.gov/system/files/documents/2022-07/mevinphos-memo-2000.pdf.

US EPA (2010). Spiroxamine. Human Health Risk Assessment for Spiroxamine on Imported Artichoke, Asparagus and Fruiting Vegetables (Crop Group 8). US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2010. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0136-0004

US EPA (2012). Thiacloprid. Human Health Risk Assessment of New Uses on Stone Fruit and Peppers. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. October 2012. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0311-0005.

US EPA (2014a). Bifenazate. Human Health Risk Assessment. Section 3 Registration Request to Add New Uses on Timothy Forage and Hay; Herb, Subgroup 19A; and to Expand Existing Uses on Pome Fruit, Group 11, and Fruiting Vegetables, Group 8. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2014. https://www.regulations.gov/document/EPA-HQ-OPP-2012-0633-0018.

US EPA (2014b). Daminozide (Alar). Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. December 2014. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0242-0013

US EPA (2015a). Dimethomorph. Pesticide Tolerances. Federal Register, 80 (168): 52403-52408, EPA-HQ-OPP-2014-531; FRL-9932-26. US Environmental Protection Agency, Office of Pesticide Programs, Washington, DC. August 2015. https://www.govinfo.gov/content/pkg/FR-2015-08-31/pdf/2015-21192.pdf.

US EPA (2015b). Ethoprop. Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2015. https://www.regulations.gov/document/EPA-HQ-OPP-2008-0560-0028

US EPA (2015c). Literature Review on Neurodevelopment Effects & FQPA Safety Factor Determination for the Organophosphate Pesticides. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2015. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0056-0046

US EPA (2015d). Paclobutrazol: Final Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. January 2015. https://www.regulations.gov/document/EPA-HQ-OPP-2006-0109-0036

US EPA (2015e). Propoxur. Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. May 2015. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0806-0023.

US EPA (2016a). Coumaphos: REVISED Acute and Steady State Aggregate Dietary (Food and Drinking Water) Exposure and Risk Assessments to Support Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. November 2016. https://www.regulations.gov/document/EPA-HQ-OPP-2008-0023-0048

US EPA (2016b). Diazinon. Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2016. https://www.regulations.gov/document/EPA-HQ-OPP-2008-0351-0093.

US EPA (2016c). Kresoxim-Methyl. Revised Human Health Draft Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide

Programs, Health Effects Division, Washington, DC. September 2016. https://www.regulations.gov/document/EPA-HQ-OPP-2012-0861-0017

US EPA (2016d). Phosmet. Draft Human Health Risk Assessment to Support Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2016. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0316-0022.

US EPA (2017a). Methiocarb. Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2017. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0278-0020

US EPA (2017b). Oxamyl. Draft Human Health Risk Assessment in Support of Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2017. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0028-0027.

US EPA (2017c). Piperonyl Butoxide (PBO). Draft Human Health Risk Assessment Registration Review and for Proposed New Used on Edible Fungi Crop Group 21. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2017. https://www.regulations.gov/document?D=EPA-HQ-OPP-2010-0498-0021.

US EPA (2017d). Pyrethrins. Preliminary Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2017. https://www.regulations.gov/document/EPA-HQ-OPP-2011-0885-0061

US EPA (2017e). Spirotetramat. Human Health Risk Assessment for the Tolerance Petition for Residues in/on Sugar Beet and Carrot and Crop Group Conversions for Tree Nut Group 14-12 and Fruit, Stone, Group 12-12. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. April 2017. https://www.regulations.gov/document/EPA-HQ-OPP-2016-0255-0009.

US EPA (2018a). Abamectin. Human Health Risk Assessment for Petitions for the Establishment of Permanent Tolerances for Residues in/on Banana and Tea without U.S. Registrations. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. December 2018. https://www.regulations.gov/document/EPA-HQ-OPP-2018-0037-0008

US EPA (2018b). Captan. Draft Human Health Risk Assessment in Support of Registration Review. US Environmental Protection Agency, Office of Pesticide

Programs, Health Effects Division, Washington, DC. September 2018. https://www.regulations.gov/document/EPA-HQ-OPP-2013-0296-0044.

US EPA (2018c). Imazalil and Imazalil Sulfate. Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. July 2018. https://www.regulations.gov/document/EPA-HQ-OPP-2013-0305-0024.

US EPA (2018d). Methomyl and Thiodicarb. Draft Human Health Risk Assessment in Support of Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. December 2018. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0751-0024.

US EPA (2018e). Pymetrozine. Addendum to the Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. December 2018. https://www.regulations.gov/document/EPA-HQ-OPP-2013-0368-0032

US EPA (2019a). Clofentezine. Human Health Risk Assessment to Support a Section 3 New Uses on Guava. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. May 2019. https://www.regulations.gov/document/EPA-HQ-OPP-2018-0275-0007.

US EPA (2019b). Cyfluthrins. Revised Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. December 2019. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0684-0114.

US EPA (2019c). Etoxazole. Draft Human Health Risk Assessment for Registration Review and a Proposed Section 3 Use on Sugar Beets. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2019. https://www.regulations.gov/document/EPA-HQ-OPP-2018-0644-0007.

US EPA (2019d). Fenhexamid. Human Health Risk Assessment for Section 3 Registration for New Uses in/on Onion Bulb Subgroup 3-07A; Onion Green Subgroup 3-07B; Fuzzy Kiwifruit; Crop Group Conversions/Expansions for Fruit Small Vine Climbing, except Fuzzy Kiwifruit Subgroup 13-07F; Beny Low Growing Subgroup 13-07G; Caneberry Subgroup 13-07 A; Bushberry Subgroup 13-07B; Fruit Stone Group 12-12, except Plum, Prune Fresh; Leafy Greens Subgroup 4-16A except Spinach; Vegetable Fruiting Group 8-10 except Nonbell Pepper; and to Establish Individual Tolerances on Arugula; Garden cress; Upland Cress. US Environmental Protection Agency, Office of Pesticide

Programs, Health Effects Division, Washington, DC. November 2019. https://www.regulations.gov/document/EPA-HQ-OPP-2018-0560-0008

US EPA (2019e). US EPA Office of Pesticide Programs' Re-Evaluation of the FQPA Safety Factor for Pyrethroids: Updated Literature and CAPHRA Program Data Review. US Environmental Protection Agency, Office of Pesticide Programs, Washington, DC. July 2019. https://www.epa.gov/sites/default/files/2019-08/documents/2019-pyrethroid-fqpa-caphra.pdf

US EPA (2020a). Acetamiprid. Human Health Risk Assessment for Proposed Use on Tropical and Subtropical, Medium to Large Fruit, Smooth, Inedible Peel Subgroup 24B; Greenhouse-grown Peppers; and Crop Group Conversions and Expansions. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. January 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2018-0784-0010

US EPA (2020b). Bifenthrin. Revised Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. March 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0384-0279.

US EPA (2020c). Chlorantraniliprole. Scoping Document and Draft Risk Assessments for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. March 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2020-0034-0002.

US EPA (2020d). Chlorfenapyr. Human Health Risk Assessment for the Proposed New Uses on Greenhouse-Grown Basil, Chive, Cucumber, and Small Tomatoes. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. January 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2018-0783-0007

US EPA (2020e). Cypermethrin, Zeta-cypermethrin, and Alpha-cypermethrin. Revised Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2012-0167-0145.

US EPA (2020f). DDVP. Acute and Steady-State Aggregate Dietary (Food and Drinking Water) Exposure and Risk Assessment for Residues of Dichlorvos (DDVP) resulting from the uses of DDVP, Naled (including Mosquito Control), and Trichlorfon to Support Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC.

June 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0209-0020.

US EPA (2020g). Fenpyroximate. Human Health Risk Assessment to Support the Petition for Tolerance for Residues in/on Peanuts and Tropical and Subtropical, Medium to Large Fruit, Smooth, Inedible Peel, Subgroup 24B, Except Banana. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. March 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2019-0386-0008.

US EPA (2020h). Hexythiazox. Human Health Risk Assessment for Amended Tolerances on Caneberry Subgroup 13-07A and Dates, Dried Fruit and Establishment of a Tolerance Without U.S. Registration for Residues in Tea. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. July 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2006-0114-0041

US EPA (2020i). Mefenoxam (Metalaxyl-M). Human Health Risk Assessment for the Proposed New Use in/on Tree Nuts, Crop Group 14-12 and the Establishment of a Permanent Tolerance. Health Effects Division, Office of Chemical Safety and Pollution Prevention, US Environmental Protection Agency. July 29, 2020. Docket No. EPA-HQ-OPP-2019-0346-0008. https://www.regulations.gov/document/EPA-HQ-OPP-2019-0346-0008.

US EPA (2020j). Naled. Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0053-0053.

US EPA (2020k). Permethrin. Human Health Risk Assessment for New Use on “Fruit, Small, Vine Climbing, Except Fuzzy Kiwifruit, Subgroup 13-07F”; Multiple Crop Group Conversions/Expansions; and the Establishment of a Tolerance without a U.S. Registration for Tea, AND the Revised Draft Risk Assessment (DRA) for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. March 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2011-0039-0130.

US EPA (2020l). Prallethrin Revised Updated Human Health Draft Risk Assessment in Support of Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2011-1009-0070

US EPA (2020m). Pyridaben. Revised Occupational and Residential Exposure Assessment for Registration Review of Existing Uses of Pyridaben. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. March 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2010-0214-0044.

US EPA (2020n). Thiophanate-Methyl and Carbendazim. Amended Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. August 2020. https://www.regulations.gov/document/EPA-HQ-OPP-2014-0004-0096.

US EPA (2021a). Acequinocyl. Human Health Risk Assessment for the Proposed New Use on Tropical and Subtropical, Medium to Large Fruit, Smooth, Inedible Peel (Crop Subgroup 24B). US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. July 2021. https://www.regulations.gov/document/EPA-HQ-OPP-2020-0475-0008.

US EPA (2021b). Aldicarb. Revised Acute Aggregate Dietary (Food and Drinking Water) Exposure and Risk Assessments Supporting Domestic Uses on Orange and Grapefruit. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. January 2021. https://www.regulations.gov/document/EPA-HQ-OPP-2020-0600-0019.

US EPA (2021c). Boscalid. Human Health Risk Assessment for the Establishment of a Permanent Tolerance Without a U.S. Registration on Tea. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. April, 2021. https://www.regulations.gov/document/EPA-HQ-OPP-2020-0050-0004

US EPA (2021d). Myclobutanil. Addendum to the Human Health Risk Assessment for Registration Review (D448816). Health Effects Division, Office of Chemical Safety and Pollution Prevention, US Environmental Protection Agency. June 17, 2021. Docket No. EPA-HQ-OPP-2015-0053-0029. https://www.regulations.gov/document/EPA-HQ-OPP-2015-0053-0046.

US EPA (2021e). Pentachloronitrobenzene (PCNB). Draft Human Health Risk Assessment in Support of Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. September 2021. https://www.regulations.gov/document/EPA-HQ-OPP-2015-0348-0019

US EPA (2021f). Pyraclostrobin. Human Health Risk Assessment for a New Use on Pomegranate. US Environmental Protection Agency, Office of Pesticide

Programs, Health Effects Division, Washington, DC. August 2021. https://www.regulations.gov/document/EPA-HQ-OPP-2020-0227-0006

US EPA (2021g). Registration Review Draft Risk Assessment for the Antimicrobial Use of Tebuconazole. US Environmental Protection Agency, Office of Pesticide Programs, Antimicrobials Division, Washington, DC. March 2021. https://www.regulations.gov/document/EPA-HQ-OPP-2015-0378-0020.

US EPA (2022a). Buprofezin. Human Health Risk Assessment for Proposed New Use on Bushberry Crop Subgroup 13-07B and Proposed Amendments to Expand Use on Succulent Beans to All Members of Proposed Edible Podded Bean Legume Vegetable Subgroup 6-XXA and Use on Greenhouse-Grown Tomatoes and Peppers to All Members of Fruiting Vegetable Crop Group 8-10. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. January 2022. https://www.regulations.gov/document/EPA-HQ-OPP-2020-0235-0011

US EPA (2022b). Etofenprox: Revised Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. August 2022. https://www.regulations.gov/document/EPA-HQ-OPP-2007-0804-0070

US EPA (2022c). Propiconazole. Revised Draft Human Health Risk Assessment of the Conventional Uses to Support Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. March 2022. https://www.regulations.gov/document/EPA-HQ-OPP-2015-0459-0074.

US EPA (2022d). Thiamethoxam. Human Health Risk Assessment for Use on Imported Pineapple. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. April 2022. https://www.regulations.gov/document/EPA-HQ-OPP-2021-0453-0005.

US EPA (2023a). Acephate. Second Revised Draft Human Health Risk Assessment (DRA) in Support of Registration Review. Health Effects Division, Office of Chemical Safety and Pollution Prevention, US Environmental Protection Agency. August 24, 2023. Docket No. EPA-HQ-OPP-2008-0915-0054. https://www.regulations.gov/document/EPA-HQ-OPP-2008-0915-0054.

US EPA (2023b). Azoxystrobin. Human Health Risk Assessment for the Establishment of Tolerances for Residues in/on Mango and Papaya and Establishment of a Tolerance for Residues in/on Imported Palm Oil. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC.

February 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2021-0729-0005

US EPA (2023c). Cyprodinil. Human Health Risk Assessment to Support the Registration of the Proposed New Use on Cranberry. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. October 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2022-0645-0007

US EPA (2023d). DCPA. Occupational and Residential Exposure Assessment for the Registration Review of DCPA. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. May 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2011-0374-0081.

US EPA (2023e). Dimethoate. Second Revised Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. December 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0059-0073

US EPA (2023f). Fludioxonil. Human Health Risk Assessment for the Proposed Tolerances without a U.S. Registration for Residues of Fludioxonil in/on Mango and Papaya. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. February 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2021-0744-0004

US EPA (2023g). Fluopyram. Human Health Risk Assessment for Proposed Uses on Coffee, Green Bean, Papaya, Peppermint, Spearmint, and Crop Group Expansions/Conversions. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. January 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2021-0449-0010.

US EPA (2023h). Spinosad and Spinetoram. Human Health Risk Assessment in Support of Proposed Uses on Stalk and Stem Vegetables (22A) and Greenhouse-Grown Cucumbers, Lettuce, Pepper, and Tomato; and Crop Group Conversion for Spice Group 26. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. June 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2022-0384-0006

US EPA (2023i). Trifloxystrobin. Human Health Risk Assessment for Proposed New Uses on Bulb Onion (Subgroup 3-07 A), Green Onion (Subgroup 3-07B), and Individual Commodities of Proposed Subgroup 6-1 8A, and for Crop Group Conversions and Expansions. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. March 2023. https://www.regulations.gov/document/EPA-HQ-OPP-2021-0448-0011

US EPA (2024a). Flonicamid. Human Health Risk Assessment for the Petition for Amendment of Tolerances in/on Low Growing Berry Subgroup 13-07G. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. April 2024. https://www.regulations.gov/document/EPA-HQ-OPP-2023-0280-0004

US EPA (2024b). Malathion. Updated Draft Human Health Risk Assessment for Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. January 2024. https://www.regulations.gov/document/EPA-HQ-OPP-2009-0317-0161.

US EPA (2024c). Pyrimethanil. Draft Human Health Risk Assessment to Support Registration Review. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. April 2024. https://www.regulations.gov/document/EPA-HQ-OPP-2019-0380-0014.

US EPA (2024d). Spiromesifen. Revised Section 3 Human Health Risk Assessment for Tolerances without U.S. Registration on Oranges from Brazil. US Environmental Protection Agency, Office of Pesticide Programs, Health Effects Division, Washington, DC. May 2024. https://www.regulations.gov/document/EPA-HQ-OPP-2023-0639-0006