



Department
for Environment,
Food & Rural Affairs

Quarter 3 2025 report on the pesticide residues monitoring programme

March 2026

We are responsible for improving and protecting the environment. We aim to grow a green economy and sustain thriving rural communities. We also support our world-leading food, farming and fishing industries.

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1. Introduction, results summary and actions

Chair's comments

During this year's surveillance programme, we are measuring up to 423 different pesticides in each of the foods we survey. The Quarter 3 programme for Great Britain (GB) surveyed 898 samples of 28 different foods ([Table 1a GB](#) in this report contains a full list). The samples were collected between the beginning of July and the end of September 2025. The Quarter 3 programme for Northern Ireland (NI) surveyed 303 samples of 25 different foods ([Table 1b NI](#) in this report contains a full list). The samples were collected between the beginning of July and the end of September 2025.

Of the 898 Q3 GB samples, we found residues in 452 of them and of these, 21 samples contained residues over the maximum residue level (MRL). Of the 303 Q3 NI samples, we found residues in 142 of them and of these, 8 samples contained residues over the MRL.

Health and Safety Executive (HSE) undertakes screening and detailed risk assessments, as required, for the pesticide residues found. This is to determine whether the residues present could lead to someone eating an amount above a level that is considered safe. HSE also produces [detailed risk assessments](#) for every case where the actual residue level found could lead to an intake above the safety levels.

Following the screening assessment, we needed to consider the potential short-term health effects of only a small minority of the residues found in more detail. We noted that a short-term risk assessment was not possible for ethylene oxide residues (see below regarding the long-term risks), in all other cases, we concluded that effects on health were not expected. Full details are presented in the [detailed risk assessments](#). All other residues found did not cause any concern for short term health.

We also needed to consider the potential genotoxic health effects of some residues found in spices (and one sample of barley containing ethylene oxide). Chlorpyrifos, ethylene oxide, carbofuran and picoxystrobin, all found in spices (5, 22, 3 and 2 samples respectively out of the 60 cumin and turmeric spices samples tested), are not authorised in the UK but can on occasions be found in some imported food. We concluded that at the levels present, a risk of an adverse effect on health due to genotoxicity would be low.

For long term assessment, due to the presence of ethylene oxide in a number of spices samples and one barley sample, following a detailed consideration, we concluded that these residues are unlikely to be of concern to human health. Additionally, none of the other individual commodity long-term exposure screening assessments performed in this quarter (for each of the pesticides found in this report) indicated any potential for adverse long-term health effects. This was based on the assessment of dietary intakes as below the acceptable daily intake (ADI) or other established long-term health-based reference values.

These detailed considerations on the risk assessments as well as links to underlying information are covered in our reports for barley and spices.

Read the [Pesticide Residues in Food reports](#) for full analytical results, details of suppliers and retailers of the foods sampled, these are in ODS (Open Document Spreadsheet) files. We hope this data format is useful for people wanting to look at the individual results in more detail.

Since the UK left the EU, we report the results for samples collected in GB separately from those collected in NI. Surveys have been titled throughout the report as either GB or NI to make clear where the samples were collected. Samples collected in GB are subject to GB MRLs. GB MRLs are set by inclusion in a [GB MRL statutory Register](#), implemented and updated by means of a database. For samples collected in NI, certain aspects of EU food law, including compliance with EU set MRLs, continue to apply under the terms of the Windsor Framework. In the detailed data files HSE is, for 2025 results, still separating out EU from non-EU origin foods in the results.

HSE asked suppliers and the authorities of the exporting countries for an explanation of our findings. Any responses they have received specifically for publication are available in in the sample details section under 'supplier responses'.

If you have any feedback or comments on the monitoring programme or the reports produced, send them to HSE at PesticideResiduesTeam@hse.gov.uk.

Ann Davison
Chair of the Expert Committee on Pesticide Residues in Food

Consumer risk summary

HSE screens each residue detected for any consumer health issues to identify which need to be considered in more detail. The approach that HSE applies to do this work, including follow up risk assessments where they are needed, is explained in [HSE risk assessment methodology](#). We comment on any risks HSE considered in detail in our full report, and the [detailed risk assessments](#) are also published.

HSE liaises with the Food Standards Agency (FSA) on consumer risk assessment, and the FSA also takes part in our meetings.

Table 1a: Overview of the survey results for Q3 Great Britain (GB)

GB surveys that have an asterisk (*) are a requirement of the [Multi-annual GB control plan for pesticide residues](#).

NI surveys that have an asterisk (*) are a requirement of the EU Coordinated Programme required by [Commission Implementing Regulations 2024/989](#).

Survey title (where samples collected)	Number of pesticides sought	Samples tested	Detailed risk assessment presented?	MRL exceedances (samples)
Apple juice (GB)	412	24	No	0
Apples (GB) *	418	18	No	0
Asparagus (GB) *	412	30	No	0
Barley (GB) *	419	24	Yes	1
Beans with pods (GB)	413	22	No	4
Bread (ordinary) (GB)	415	96	No	0
Bread (gluten free) (GB)	417	55	No	0
Cabbage (GB) *	389	24	No	0
Celery (GB)	414	18	No	0
Figs (GB)	388	63	No	4
Fish (tinned) (GB)	117	24	No	0
Grapes (GB)	416	22	No	0
Infant food (animal) (GB)	418	24	No	0
Lettuce (GB) *	419	12	No	1
Mango (GB)	388	33	No	0

Survey title (where samples collected)	Number of pesticides sought	Samples tested	Detailed risk assessment presented?	MRL exceedances (samples)
Mango juice (GB)	388	18	No	0
Milk (GB) *	118	77	No	0
Oats (GB) *	421	18	No	0
Peaches and nectarines (GB)	393	40	No	0
Plant-based protein (GB)	415	24	No	0
Plums (GB)	413	31	No	0
Pork (GB)	120	24	No	0
Potatoes (GB)	415	31	No	0
Prepacked salad (GB)	412	18	No	3
Spices (cumin and turmeric) (GB)	407	60	Yes	3
Spinach (GB)	389	24	No	2
Strawberries (GB)	391	22	No	2
Tomatoes (GB)	423	21	No	1

Table 1b: Overview of the survey results for Q3 Northern Ireland with links to detailed information

Survey title (where samples collected)	Number of pesticides sought	Samples tested	Detailed risk assessment presented?	MRL exceedances (samples)
Apples (NI) *	401	9	No	0
Asparagus (NI)	390	13	No	2

Survey title (where samples collected)	Number of pesticides sought	Samples tested	Detailed risk assessment presented?	MRL exceedances (samples)
Barley (NI) *	403	18	No	0
Beans with pods (NI)	390	9	No	0
Bread (gluten free) (NI)	399	6	No	0
Bread (ordinary) (NI)	399	24	No	0
Cabbage (NI) *	396	9	No	0
Cheese (NI)	39	12	No	0
Figs (NI)	390	12	No	0
Fish (tinned) (NI)	39	15	No	0
Grapes (NI)	397	9	No	0
Infant food (fruit and vegetable) (NI)	396	12	No	0
Lettuce (NI) *	399	10	No	0
Mango (NI)	390	13	No	0
Milk (NI) *	47	11	No	0
Oats (NI) *	403	18	No	0
Peaches and nectarines (NI)	396	12	No	0
Plums (NI)	390	12	No	0
Pork (NI)	44	17	No	0
Potatoes (NI)	396	15	No	0

Survey title (where samples collected)	Number of pesticides sought	Samples tested	Detailed risk assessment presented?	MRL exceedances (samples)
Salad and baby leaf bags (NI)	401	9	No	4
Spinach (NI)	397	15	No	2
Strawberries (NI)	397	6	No	0
Tomatoes (NI)	400	10	No	0
Wine (NI)	396	7	No	0

Samples collected in GB must comply with GB set MRLs unless the goods are qualifying NI goods and are subject to unfettered access under the terms of the UK Internal Market Act 2020. For samples collected in NI, under the Windsor Framework, certain aspects of EU food law, including compliance with EU MRLs apply.

Other issues

Suspected unauthorised uses

Details of possible unauthorised uses from previous surveys are provided in [section 5: issues arising](#) of this report.

Organic samples with residues

The Department for Environment and Rural Affairs' (Defra) Organic Farming branch and the organic certification organisations are responsible for follow up activity related to the presence of pesticide residues in organic samples.

HSE writes to the suppliers of samples of organic produce if they contain a pesticide residue which is not permitted under retained organic regulation Commission Regulation (EC) No 889/2008 and copies these bodies in:

- 2 UK samples of organic prepacked salad (GB) contained residues
 - one sample contained residues of chlorate, dithiocarbamates and spinosad
 - one sample contained dithiocarbamates and spinosad
- one UK sample of organic oats (NI) contained residues of chlormequat and mepiquat
- 3 UK samples of organic oats (GB) contained residues of chlormequat
- 2 UK samples of organic spinach (one sample from GB and one sample from NI) contained residues of chlorate and spinosad
- 2 UK samples of organic spinach (GB) contained residues of chlorate
- one UK sample of organic apple juice (GB) contained a residue of captan

The country of origin listed on some of the samples may not be the same as the country where the samples were grown in. Instead, it may be where the sample was processed or packaged, or where the brand owner is based.

HSE writes to Defra organics if samples of organic produce contain a pesticide residue which is permitted under retained organic regulation Commission Regulation (EC) No 889/2008.

- none found this quarter

Further information

You can find further information on the individual sample details in an accessible format by looking at the [Pesticide Residues in Food quarterly data](#).

This includes:

- brand name, sampling point and origin information
- pesticides sought and residues found
- HSE detailed risk assessments

Introduction to the work of the Expert Committee on Pesticide Residues in Food (PRiF)

The UK Expert Committee on Pesticide Residues in Food (the PRiF) is established to provide independent scientific advice to:

- Department for Environment, Food and Rural Affairs (Defra)
- Health and Safety Executive (HSE) (accountable to the Department of Work and Pensions)
- Department of Agriculture, Environment and Rural Affairs for Northern Ireland (DAERA)
- Food Standards Agency (FSA)
- Scottish Government
- Welsh Government

Read the [PRiF Terms of Reference and Code of Practice](#).

In relation to the published reports this includes advice on:

- the government's presentation of findings resulting from monitoring programmes of pesticide residues in food in GB and NI – in particular to ensure that results can be readily and appropriately understood by the public
- planned and ad-hoc government programmes to monitor pesticide residues in foodstuffs in particular on foods to be surveyed (taking account of changing diets), availability of produce, location and frequency of sampling and pesticides to be sought
- the determination of likely causes of adverse findings detected in government (and where relevant other national and international) monitoring programmes for pesticide residues in food

The Expert Committee on Pesticide Residues in Food (PRiF) was established in 2011. Members have a broad range of expertise relating to the food supply industry. Previously this work was carried out by the Pesticide Residues Committee.

The chair, Ann Davison, has worked in consumer affairs for most of her career, running consumer organisations and networks. The committee also includes members with expertise in food science, public interest and food production and supply.

Information on the membership of the committee can be found on gov.uk: [Expert Committee on Pesticide Residues in Food \(PRiF\)](#).

UK National Monitoring Programmes

The HSE, working under Defra, and the Scottish and Welsh governments' authority has official responsibility to organise a monitoring programme of GB food for pesticide residues. Similarly, HSE working under Defra's authority has official responsibility to organise a monitoring programme of NI food for pesticide residues, including participating in the EU multi-annual control programme.

The programmes are made up of a risk-based rolling programme of surveys and statutory programmes required by GB or EU law. It is a surveillance programme, which is designed based upon evidence gathered in the previous years, including previous results, PRiF advice and border control information. For efficiency reasons, the NI programme may differ in that some lower priority (primarily imported) foods or processed foods are not included. If the GB survey identifies issues in these foods, then they would be included in future testing in NI.

These surveys are not an enforcement programme, and the survey design is generally not adjusted during the year. HSE is responsible for considering the safety of people who eat the food (in co-operation with the FSA if necessary) and for following up adverse or unexpected results. HSE is also responsible for determining whether food is compliant with the law, specifically, whether any pesticide residue found is within the MRL.

MRLs reflect levels of pesticides that could occur in food which has been treated in accordance with good agricultural practice (GAP). Where pesticides do not give rise to readily detectable residues, or are not authorised for use on commodities, MRLs are set at the lowest level which can be identified in routine laboratory analysis. This provides a mechanism for statutory controls on pesticides in food which is put into circulation and for monitoring the correct use of these chemicals.

Table 2: 2025 Survey design

GB surveys that have an asterisk (*) are a requirement of the [Multi-annual Great Britain control plan for pesticide residues](#).

NI surveys that have an asterisk (*) are a requirement of the EU Coordinated Programme required by [Commission Implementing Regulations 2024/989](#).

Table 2a: Fruit and vegetables

Food	Sampling points	Sampled during	Reporting
Apples (GB) *	Retail outlets	Quarterly	Quarterly
Apples (NI) *	Retail outlets	Quarterly	Quarterly
Asparagus (GB)	Retail outlets	Quarters 2 and 3	Quarters 2 and 3
Asparagus (NI)	Retail outlets	Quarters 2 and 3	Quarters 2 and 3
Beans with pods (GB)	Retail outlets and supply chain	Quarterly	Quarterly
Beans with pods (NI)	Retail outlets	Quarterly	Quarterly

Food	Sampling points	Sampled during	Reporting
Cabbage (GB) *	Retail outlets and supply chain	Quarterly	Quarterly
Cabbage (NI) *	Retail outlets	Quarterly	Quarterly
Celery (GB)	Retail outlets	Quarters 3 and 4	Quarters 3 and 4
Figs (GB)	Retail outlets and supply chain	Quarterly	Quarterly
Figs (NI)	Retail outlets	Quarters 3 and 4	Quarters 3 and 4
Grapes (GB)	Retail outlets and supply chain	Quarterly	Quarterly
Grapes (NI)	Retail outlets	Quarterly	Quarters 2, 3 and 4
Lettuce (GB) *	Retail outlets and supply chain	Quarters 2, 3 and 4	Quarters 2, 3 and 4
Lettuce (NI) *	Retail outlets	Quarters 3 and 4	Quarters 3 and 4
Mango (GB)	Retail outlets and supply chain	Quarterly	Quarterly
Mango (NI)	Retail outlets	Quarterly	Quarterly
Peaches and nectarines (GB) *	Retail outlets and supply chain	Quarterly	Quarterly
Peaches and nectarines (NI) *	Retail outlets	Quarterly	Quarterly
Plums (GB)	Retail outlets	Quarters 2 and 3	Quarters 2 and 3
Plums (NI)	Retail outlets	Quarters 2, 3 and 4	Quarters 2, 3 and 4
Potatoes (GB)	Supply chain	Quarterly	Quarterly
Potatoes (NI)	Retail outlets	Quarterly	Quarterly

Food	Sampling points	Sampled during	Reporting
Pre-packed salad (GB)	Retail outlets	Quarterly	Quarterly
Salad and baby leaf bags (NI)	Retail outlets	Quarters 2, 3 and 4	Quarters 2, 3 and 4
Spinach (GB) *	Retail outlets and supply chain	Quarterly	Quarterly
Spinach (NI) *	Retail outlets	Quarterly	Quarterly
Strawberries (GB) *	Retail outlets and supply chain	Quarterly	Quarterly
Strawberries (NI) *	Retail outlets	Quarterly	Quarterly
Tomatoes (GB) *	Retail outlets and supply chain	Quarterly	Quarterly
Tomatoes (NI) *	Retail outlets	Quarterly	Quarterly

Table 2b: Animal products

Food	Sampling points	Sampled during	Reporting
Cheese (NI)	Retail outlets	Quarterly	Quarterly
Fish (tinned) (GB)	Retail outlets	Quarterly	Quarterly
Fish (tinned) (NI)	Retail outlets	Quarterly	Quarterly
Milk (GB) *	Retail outlets	Quarterly	Quarterly
Milk (NI) *	Retail outlets	Quarterly	Quarters 2, 3 and 4
Pork (GB) *	Retail outlets	Quarterly	Quarterly
Pork (NI) *	Retail outlets	Quarterly	Quarterly

Table 2c: Cereal products

Food	Sampling points	Sampled during	Reporting
Barley (GB) *	Retail outlets	Quarterly	Quarterly
Barley (NI) *	Retail outlets	Quarters 2 and 3	Quarters 2 and 3
Bread (gluten free) (GB)	Retail outlets	Quarters 2, 3 and 4	Quarters 3 and 4
Bread (gluten free) (NI)	Retail outlets	Quarters 3 and 4	Quarters 3 and 4
Bread (ordinary) (GB)	Retail outlets	Quarters 2, 3 and 4	Quarters 3 and 4
Bread (ordinary) (NI)	Retail outlets	Quarters 3 and 4	Quarters 3 and 4
Oats (GB) *	Retail outlets	Quarterly	Quarterly
Oats (NI) *	Retail outlets	Quarters 2 and 3	Quarters 2 and 3
Rice (GB)	Retail outlets	Quarters 1 and 2	Quarters 1 and 2

Table 2d: Miscellaneous products

Food	Sampling points	Sampled during	Reporting
Apple juice (GB)	Retail outlets	Quarters 1 and 3	Quarters 1 and 3
Infant food (animal) (GB) *	Retail outlets	Quarter 3	Quarter 3
Infant food (cereal) (NI)*	Retail outlets	Quarter 3	Quarter 3
Mango juice (GB)	Retail outlets	Quarter 3	Quarter 3
Plant-based chocolate (GB)	Retail outlets	Quarter 4	Quarter 4

Food	Sampling points	Sampled during	Reporting
Plant-based protein (GB)	Retail outlets	Quarter 3	Quarter 3
Spices (cumin and turmeric) (GB)	Retail outlets	Quarters 2 and 3	Quarter 3
Tomatoes (processed) (GB)	Retail outlets	Quarter 1	Quarter 1
Wine (GB) *	Retail outlets	Quarterly	Quarters 2 and 4
Wine (NI) *	Retail outlets	Quarters 2 and 3	Quarters 2 and 3

Sampling points

Retail outlets - samples bought by market research contractor shoppers.

Supply chain - samples taken by inspectors from the Animal and Plant Health Agency (APHA) from a range of points in the supply chain (wholesalers, retail depots, ports and import points).

Reporting

Results for certain higher-priority foods are produced, followed up and published more frequently in the [Pesticide Residues in Food data and results](#).

All the results for each quarter are published in the relevant quarterly report. Some surveys are included in every quarter, some are every other quarter and some in just one quarter.

The place of origin listed for the samples tested in this report is in the following categories:

- were imported from outside the EU. In this report this means outside of the EU and outside of the UK
- came from the UK
- came from the EU

Table 3a: Summary of results for Q3 Great Britain

Food	Analysed	With residues at or below the MRL	With residues above the MRL	With residues of non-approved pesticides (UK only)	With multiple residues	Organic samples tested	Organic samples with residues
Apple juice (GB)	24	21	0	0	19	3	1
Apples (GB)	18	11	0	0	9	7	0
Asparagus (GB)	30	3	0	0	0	2	0
Barley (GB)	24	23	1	0	23	0	0
Beans with pods (GB)	22	6	4	0	5	2	0
Bread (GB)	96	96	0	0	46	0	0
Bread (gluten free) (GB)	55	4	0	0	2	0	0
Cabbage (GB)	24	14	0	0	7	6	0
Celery (GB)	18	10	0	0	6	3	0
Figs (GB)	63	13	4	0	2	0	0

Food	Analysed	With residues at or below the MRL	With residues above the MRL	With residues of non-approved pesticides (UK only)	With multiple residues	Organic samples tested	Organic samples with residues
Fish (tinned) (GB)	24	3	0	0	0	0	0
Grapes (GB)	22	22	0	0	22	0	0
Infant food (animal) (GB)	24	0	0	0	0	21	0
Lettuce (GB)	12	7	1	0	4	0	0
Mango (GB)	33	27	0	0	14	0	0
Mango juice (GB)	18	0	0	0	0	0	0
Milk (GB)	77	0	0	0	0	48	0
Oats (GB)	18	9	0	0	4	13	4
Peaches and nectarines (GB)	40	36	0	0	29	0	0
Plant-based protein (GB)	24	6	0	0	0	0	0
Plums (GB)	31	23	0	0	16	4	0

Food	Analysed	With residues at or below the MRL	With residues above the MRL	With residues of non-approved pesticides (UK only)	With multiple residues	Organic samples tested	Organic samples with residues
Pork (GB)	24	0	0	0	0	0	0
Potatoes (GB)	32	16	0	0	2	0	0
Prepacked salad (GB)	18	14	3	0	13	2	2
Spices (cumin and turmeric) (GB)	60	46	3	0	35	3	0
Spinach (GB)	24	19	2	0	16	2	1
Strawberries (GB)	22	19	2	0	20	0	0
Tomatoes (GB)	21	8	1	0	3	4	0

Table 3b: Summary of results for Q3 Northern Ireland

Food	Analysed	With residues at or below the MRL	With residues above the MRL	With residues of non-approved pesticides (UK only)	With multiple residues	Organic samples tested	Organic samples with residues
Apples (NI)	9	4	0	0	4	3	0

Food	Analysed	With residues at or below the MRL	With residues above the MRL	With residues of non-approved pesticides (UK only)	With multiple residues	Organic samples tested	Organic samples with residues
Asparagus (NI)	13	0	2	0	0	0	0
Barley products (NI)	18	16	0	0	15	1	0
Beans with pods (NI)	9	4	0	0	2	0	0
Bread (GF) (NI)	6	1	0	0	0	0	0
Bread (ordinary) (NI)	24	24	0	0	14	0	0
Cabbage (NI)	9	1	0	0	0	3	0
Cheese (NI)	12	0	0	0	0	1	0
Figs (NI)	12	2	0	0	0	0	0
Fish (tinned) (NI)	15	2	0	0	0	0	0
Grapes (NI)	9	9	0	0	8	1	1
Infant food (fruit and vegetable) (NI)	12	0	0	0	0	8	0

Food	Analysed	With residues at or below the MRL	With residues above the MRL	With residues of non-approved pesticides (UK only)	With multiple residues	Organic samples tested	Organic samples with residues
Lettuce (NI)	10	3	0	0	2	1	0
Mango (NI)	13	13	0	0	7	0	0
Milk (NI)	11	0	0	0	0	5	0
Oat products (NI)	18	7	0	0	5	11	1
Peaches and nectarines (NI)	12	11	0	0	9	1	0
Plums (NI)	12	7	0	0	3	2	0
Pork (NI)	17	0	0	0	0	0	0
Potatoes (NI)	15	3	0	0	0	7	1
Salad and baby leaf bags (NI)	9	5	4	0	6	0	0
Spinach (NI)	15	10	2	0	7	4	3

Food	Analysed	With residues at or below the MRL	With residues above the MRL	With residues of non-approved pesticides (UK only)	With multiple residues	Organic samples tested	Organic samples with residues
Strawberries (NI)	6	6	0	0	3	0	0
Tomatoes (NI)	10	1	0	0	0	5	0
Wine (NI)	7	5	0	0	3	0	0

Table 4a: Summary of MRL Exceedances for Q3 Great Britain

Some shorthand has been used in this table. The asterisk symbol “*” means MRLs set at the limit of determination (LOD MRL). These MRLs are set at a default level, for example, at the LOD where analytical methods can reasonably detect the presence of the pesticide. Either insufficient trials data are available on which to set an MRL, or there may be no use of the pesticide on that crop permitted. However, they may be permitted elsewhere.

Where processed goods have been tested, the MRL may be adjusted to take account of processing – see [section 5: Issues arising in this report](#).

Measurement uncertainty is explained in [quarterly reports on the pesticide residues monitoring programme: methodology, background and references](#).

Barley (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
1392/2025	Pearl barley	Lebanon	Ethylene oxide (sum)	0.1	0.02*	Yes	Yes

Beans with pods (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
5179/2025	Fine green beans	Rwanda	BAC (partial sum)	0.2	0.1	Yes	No
5411/2025	Long beans	Sri Lanka	Chlorothalonil	0.2	0.01*	Yes	No
5412/2025	Yard long beans	Thailand	Chlorfenapyr	0.2	0.01*	Yes	No
5412/2025	Yard long beans	Thailand	Propiconazole	0.1	0.01*	Yes	No
5623/2025	Long beans	Thailand	Buprofezin	0.05	0.01*	Yes	No
5623/2025	Long beans	Thailand	Fipronil (Sum)	0.03	0.005*	Yes	No

Figs (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
1488/2025	Black Bursa figs	Turkey	Azoxystrobin	0.03	0.01*	Yes	No

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
1488/2025	Black Bursa figs	Turkey	Chlorantraniliprole	0.02	0.01*	Yes	No
3723/2025	Siyah figs	Turkey	Cyflumetofen	0.03	0.01*	Yes	No
5611/2025	Figs	Turkey	Deltamethrin	0.02	0.01*	No	No
5619/2025	Figs	Egypt	Cyfluthrin (Sum)	0.05	0.02*	Yes	No
5619/2025	Figs	Egypt	Dithiocarbamates	0.6	0.05*	Yes	No
5619/2025	Figs	Egypt	Fludioxonil	0.02	0.01*	Yes	No

Lettuce (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
5567/2025	Flat lettuce	UK	Oxadixyl	0.02	0.01*	No	No

Prepacked salad (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
3214/2025	Bistro style salad	UK	Chlorate	1.3	0.7	No	No
4558/2025	Mixed tender baby leaf	UK	Chlorate	1.5	0.7	Yes	No
4570/2025	Baby leaf and herb salad	UK	Chlorate	2.6	0.7	Yes	No

Spices (cumin and turmeric) (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
3111/2025	Ground cumin	UK	Chlorpyrifos	0.02	0.01*	No	Yes
3111/2025	Ground cumin	UK	Dinotefuran	0.02	0.01	Yes	No
3111/2025	Ground cumin	UK	Fonicamid (Sum)	0.2	0.1*	No	No

3111/2025	Ground cumin	UK	Imidacloprid	0.1	0.05*	Yes	No
3111/2025	Ground cumin	UK	Tricyclazole	0.7	0.05*	Yes	No
3645/2025	Cumin	China	Chlorpyrifos	0.1	0.01*	Yes	Yes
3645/2025	Cumin	China	Kresoxim-Methyl	0.1	0.05*	No	No
3645/2025	Cumin	China	Picoxystrobin	0.08	0.05*	No	Yes
3645/2025	Cumin	China	Tricyclazole	0.5	0.05*	Yes	No
3984/2025	Turmeric	UK	Chlorpyrifos	0.03	0.01*	Yes	Yes

Spinach (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
2592/2025	Spinach	UK	Deltamethrin	0.03	0.01*	Yes	No
5263/2025	Fresh spinach	UK	Cypermethrin (Sum)	0.9	0.7	No	No

Strawberries (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
5730/2025	Lady Emma strawberries	UK	Cyflufenamid	0.06	0.04	No	No
5732/2025	Strawberries	USA	Flonicamid (Sum)	0.1	0.03*	Yes	No

Tomatoes (GB)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
5178/2025	Tomatoes	The Netherlands	2-phenylphenol (partial sum)	0.05	0.01*	Yes	No

Samples collected in GB must comply with GB set MRLs unless the goods are qualifying Northern Ireland goods and are subject to unfettered access under the terms of the UK Internal Market Act for 2020. For samples collected in Northern Ireland, under the Windsor Framework, certain aspects of EU food law, including compliance with EU set MRLs, continue to apply.

Table 4b: Summary of MRL Exceedances for Q3 Northern Ireland

Where processed goods have been tested, the MRL may be adjusted to take account of processing – see [section 5: issues arising](#) in this report.

Measurement uncertainty is explained in [quarterly reports on the pesticide residues monitoring programme: methodology, background and references](#).

Asparagus (NI)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
0841/2025	Asparagus	Mexico	Linuron	0.023	0.01*	Yes	No
4720/2025	Asparagus	Peru	Fludioxonil	0.011	0.01*	No	No

Salad and baby leaf bags (NI)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
0979/2025	Tender baby leaf salad leaves	Ireland	Chlorate	0.72	0.7	No	No
2541/2025	Mixed leaf salad	UK	Chlorate	0.84	0.7	No	No
3093/2025	Iceberg lettuce	UK	Chlorate	0.72	0.7	No	No
4322/2025	Radicchio lambs' lettuce and frisee	UK	Chlorate	1.7	0.7	Yes	No

Spinach (NI)

Sample ID	Food type	Country of origin	Pesticide detected	Residue detected (mg per kg)	MRL (mg per kg)	MRL exceedance after allowing for measurement uncertainty	Sent to FSA for consideration
0750/2025	Baby leaf spinach	UK	Chlorate	3.7	0.7	Yes	No
0770/2025	Baby leaf spinach	UK	Chlorate	1.5	0.7	Yes	No

Samples collected in GB must comply with GB set MRLs unless the goods are qualifying NI goods and are subject to unfettered access under the terms of the UK Internal Market Act for 2020. For samples collected in NI, under the Windsor Framework, certain aspects of EU food law, including compliance with EU set MRLs, continue to apply.

Action taken by HSE

HSE wrote to:

- the suppliers of all samples containing residues above the MRL
- the authorities of the exporting countries of all samples containing residues above the MRL
- the suppliers of GB and NI samples that contained residues of actives which do not have a plant protection product authorised for the crop they were detected in
- the Organics branch of Defra about samples that were labelled as organic and contained any residues of pesticides which is not permitted under retained organic regulation Commission Regulation (EC) No 889/2008

Recipients of the letters are given 4 weeks to provide a statement for inclusion in the report. The Expert Committee on Pesticide Residues in Food reviews any replies received.

Supplier responses

None.

2. Findings by food in Great Britain (GB) and the UK: detailed risk assessments

Summary

For more information on the results, read the:

- [summary table of results in this report](#)
- [survey design in this report](#)
- [glossary in this report](#)
- [risk assessment - dietary intake assessments in this report](#)
- [HSE risk assessment methodology](#)
- [detailed pesticide residues in food quarterly data](#), which includes brand name, sampling point and origin information, pesticides sought, and residues found

Apple juice (GB)

Samples tested

24 samples were tested for up to 412 pesticide residues.

- 22 samples came from the UK
- 2 samples came from the EU

The country of origin for the apple juice stated on the apple juice samples may not be the same as the country where the apples were grown. Instead, it may be where the juice was processed or packaged, or where the brand owner is based.

Pesticide residues detected of those sought

- 3 samples contained no residues of those sought
- 21 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL. The MRL may have been adjusted, if the apple juice was processed, to allow for the effect of processing - further information can be found in [section 5: issues arising in this report](#)
- 3 samples were labelled as organic, one contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Apples (GB)

Samples tested

18 samples were tested for up to 418 pesticide residues

Eating

- 17 samples were imported from outside the EU
- one sample came from the EU

Pesticide residues detected of those sought

- 7 samples contained no residues of those sought
- 11 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 7 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Asparagus (GB)

Samples tested

30 samples were tested for up to 412 pesticide residues.

30 samples were imported from outside the EU.

Pesticide residues detected of those sought

- 27 samples contained no residues of those sought
- 3 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 2 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Barley (GB)

Samples tested

24 samples were tested for up to 419 pesticide residues.

Pearl barley

- 23 samples came from the UK
- one sample was imported from outside the EU

The country of origin for the barley samples may not be the same as the country where the barley is grown. Instead, it may be where the barley is packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- All samples contained residues
- one sample contained residues above the MRL. The MRL may have been adjusted, if the barley were processed, to allow for the effect of processing. Further information can be found in [section 5: issues arising](#) in this report.
- none of the samples were labelled as organic

Risk assessments

One sample of pearl barley contained a residue of ethylene oxide where the effect on health needed to be considered in more detail. The amount detected in the sample was 0.1 mg per kg, above the level of the MRL at 0.02* mg per kg.

The residue definition includes both ethylene oxide and its metabolite 2-chloroethanol. The residue determined in the sample of pearl barley was in the form of 2-chloroethanol, which is expected since the conversion to 2-chloroethanol is rapid.

Whilst there are no formal toxicological reference values set for ethylene oxide there are international approaches to consumer risk assessment and management that have been followed previously. HSE has applied such an approach to the detailed assessment. Full details are presented in the [detailed risk assessments](#) in this report.

HSE has presented the information on possible genotoxicity for 2-chloroethanol. The use of ethylene oxide in food production is not permitted in the UK as the substance can have mutagenic and carcinogenic effects (can cause genetic damage and can potentially lead to cancer). The evidence for 2-chloroethanol being mutagenic and carcinogenic is more uncertain than the data for ethylene oxide. This is because of a less than fully satisfactory data set for 2-chloroethanol which has also not been independently evaluated. The HSE assessment has taken the precautionary approach in assuming that, in the absence of further data, the residues of 2-chloroethanol should be regarded as potentially genotoxic (cause genetic damage) and carcinogenic.

As a short-term reference value is not available, based on the understanding of the toxicity profile, HSE has presented a long-term exposure assessment applying a margin of exposure (MOE) approach. HSE derived that the highest long-term estimate of exposure is 185,000 times lower than the benchmark dose lower confidence limit (BMDL₁₀) for the formation of tumours, so the margin of exposure is more than 10,000. HSE concludes that these findings are unlikely to be of concern.

Overall, HSE concludes that the residue finding of ethylene oxide is not indicative of an expectation of effects on health, although the risk assessment approach does not exclude the possibility of adverse health effects. On a precautionary basis any findings of 2-chloroethanol in food are undesirable due to concerns regarding genotoxicity. Any risks of adverse health effects are low at the highest levels of exposure after eating large portions (97.5th percentile consumption) of the barley containing 0.1 mg per kg ethylene oxide.

Other risk assessment screening work undertaken did not indicate any other expectation of effects on health. Refer to [HSE risk assessment methodology](#) for further details.

Note that residues of ethylene oxide were also found in spices. Refer to the spices section for more details.

Combined risk assessments

Some samples contained residues of more than one pesticide. Some of these residues are from pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant samples. We would not expect any of these combinations of pesticides in these samples to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

We needed to consider the risk assessment for one sample of barley containing a residue of ethylene oxide in more detail. Due to the concerns regarding genotoxicity any findings of 2-chloroethanol in food are undesirable. HSE has concluded that any adverse effect on health is low due to low levels in the diet. We welcome the action being taken by FSA to minimise that see below.

Further details about the risk assessment conducted can be found in [section 4: Risk assessment - dietary intake assessments](#) in this report and in the genotoxicity section [Substances which might be genotoxic](#).

Residues measured above the MRL

The laboratory detected one sample with residues above the MRL in barley. Details are available in [Table 4a: Summary of MRL exceedances for Q3 GB](#).

HSE passed the details of the one sample to FSA for further consideration. As a precautionary approach, the importer removed the product from the market and recalled the product from their customers. The FSA recommended a withdrawal of any remaining stock and also contacted the Lebanese authorities to make them aware.

Beans with pods (GB)

Samples tested

22 samples were tested for up to 413 pesticide residues.

Dwarf beans

- 2 samples came from the UK

Fine beans

- 3 samples came from the UK
- 2 samples were imported from outside the EU

Green beans

- 6 samples came from the UK
- one sample was imported from outside the EU

Runner beans

- one sample came from the UK
- one sample was imported from outside the EU

Speciality beans

- 5 samples were imported from outside the EU
- one sample came from the EU

Pesticide residues detected of those sought

- 12 samples contained no residues of those sought
- 10 samples contained residues above the reporting limit
- 4 samples contained residues above the MRL
- 2 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. One of these samples contained residues of pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant sample. We would not expect this combination of pesticides in this sample to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Residues measured above the MRL

The laboratory detected 6 samples with residues above the MRL in beans with pods. Details are available in [Table 4a: Summary of MRL exceedances for Q3 GB](#).

Bread (gluten free) (GB)

Samples tested

55 samples were tested for up to 417 pesticide residues.

- 51 samples came from the UK
- 4 samples came from the EU

The country of origin for the bread (gluten free) samples may not be the same as the country where the bread is produced. Instead, it may be where the products were packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- 51 samples contained no residues of those sought
- 4 samples contained residues above the reporting limit
- no MRLs were applied to gluten free bread because they contained varying and multiple non-cereal ingredients
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Two samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Bread (ordinary) (GB)

Samples tested

96 samples were tested for up to 415 pesticide residues.

Ordinary bread: granary

- 6 samples came from the UK

Ordinary bread: other

- 16 samples came from the UK

Ordinary bread: white

- 54 samples came from the UK

Ordinary bread: wholemeal

- 20 samples came from the UK

The country of origin for the bread (ordinary) samples may not be the same as the country where the bread is produced. Instead, it may be where the products were packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- all samples contained residues
- none of the samples contained residues above the MRL. The MRL may have been adjusted, if the bread (ordinary) were processed, to allow for the effect of processing. Further information can be found in [section 5: issues arising in this report](#)
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

All samples contained residues with some samples containing residues of more than one pesticide. One of these samples contained residues of pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant sample. We would not expect this combination of pesticides in this sample to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Cabbage (GB)

Samples tested

24 samples were tested for up to 389 pesticide residues.

24 samples came from the UK.

Pesticide residues detected of those sought

- 10 samples contained no residues of those sought
- 14 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 6 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Celery (GB)

Samples tested

18 samples were tested for up to 414 pesticide residues.

18 samples came from the UK.

Pesticide residues detected of those sought

- 8 samples contained no residues of those sought
- 10 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 3 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Figs (GB)

Samples tested

63 samples were tested for up to 388 pesticide residues.

- 53 samples were imported from outside the EU
- 10 samples came from the EU

Pesticide residues detected of those sought

- 46 samples contained no residues of those sought
- 17 samples contained residues above the reporting limit
- 4 samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Two samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Residues measured above the MRL

The laboratory detected 4 samples with residues above the MRL in figs. Details are available in [Table 4a: Summary of MRL Exceedances for Q3 Great Britain](#)

Fish (tinned) (GB)

Samples tested

24 samples were tested for up to 117 pesticide residues.

Anchovy

- 4 samples were imported from outside the EU
- 2 samples came from the EU

Crab

- 3 samples were imported from outside the EU

Kippers

- 5 samples came from the EU

Mackerel

- one sample came from the EU

Pilchards

- one sample came from the EU

Sardines

- one sample came from the UK

Sild

- one sample came from the EU

Tuna

- 6 samples were imported from outside the EU

Where no sea area information is available, the country of origin on the packaging does not necessarily indicate where the fish (tinned) was caught or farmed. It could be where it was landed or processed or where it was packed for retail sale.

Pesticide residues detected of those sought

- 21 samples contained no residues of those sought
- 3 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

Three samples contained residues of DDT in the form of DDE which indicates presence in the environment from historical use. View in [section 5: issues arising in this report](#).

The tinned fish may be stored in brine, oil or water; therefore, the presence of some pesticide residues may be due to the storage media. Read more information on this in the [MRL section in the glossary of this report](#).

Grapes (GB)

Samples tested

22 samples were tested for up to 416 pesticide residues.

- 9 samples were imported from outside the EU
- 13 samples came from the EU

Pesticide residues detected of those sought

- all samples contained residues
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

All samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Infant food (animal) (GB)

Samples tested

24 samples were tested for up to 418 pesticide residues.

- 8 samples came from the UK
- 16 samples came from the EU

The country of origin for the infant food (animal) samples may not be the same as the country where the infant food is produced. Instead, it may be where the products were packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- 24 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 21 samples were labelled as organic, none contained residues of those sought

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Lettuce (GB)

Samples tested

12 samples were tested for up to 419 pesticide residues.

Gem hearts

- 3 samples came from the UK

Iceberg

- 6 samples came from the UK
- one sample came from the EU

Little gem

- one sample came from the UK

Round

- one sample came from the UK

Pesticide residues detected of those sought

- 4 samples contained no residues of those sought
- 8 samples contained residues above the reporting limit
- one sample contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

HSE comment

HSE has found oxadixyl residues in UK flat lettuce at 0.02 mg per kg. HSE understands that the residue found is from historical use due to its persistence in soil. Oxadixyl has not been approved for use since 2003 as it was not supported by the manufacturer for assessment for Annex 1 listing under Directive 91/414/EEC. HSE does not expect these residues to have an effect on health.

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Residues measured above the MRL

The laboratory detected one sample with residue above the MRL in lettuce. Details are available in [Table 4a: Summary of MRL Exceedances for Q3 Great Britain](#).

Mango (GB)

Samples tested

33 samples were tested for up to 388 pesticide residues.

Fresh

- 32 samples were imported from outside the EU
- one sample came from the EU

Pesticide residues detected of those sought

- 6 samples contained no residues of those sought
- 27 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Mango juice (GB)

Samples tested

18 samples were tested for up to 388 pesticide residues.

- 13 samples came from the UK
- 4 samples were imported from outside the EU
- one sample came from the EU

The country of origin for the mango juice stated on the mango juice samples may not be the same as the country where the mangos were grown. Instead, it may be where the juice was processed or packaged, or where the brand owner is based.

Pesticide residues detected of those sought

- 18 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Milk (GB)

Samples tested

77 samples were tested for up to 118 pesticide residues.

Cows milk

- 74 samples came from the UK

Goats milk

- 3 samples came from the UK

Pesticide residues detected of those sought

- 77 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 48 samples were labelled as organic, none contained residues of those sought

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Oats (GB)

Samples tested

18 samples were tested for up to 421 pesticide residues.

- 15 samples came from the UK
- 3 samples came from the EU

The country of origin for the oat samples may not be the same as the country where the oats are grown. Instead, it may be where the oats are packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- 9 samples contained no residues of those sought
- 9 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL. The MRL may have been adjusted, if the oats were processed, to allow for the effect of processing. Further information can be found in [section 5: issues arising](#) in this report.
- 13 samples were labelled as organic, 4 contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. All of these samples contained pesticide residues which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant samples. We would not expect this combination of pesticides in these samples to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Peaches and nectarines (GB)

Samples tested

40 samples were tested for up to 393 pesticide residues.

Nectarines

- 22 samples came from the EU

Peaches

- 2 samples were imported from outside the EU
- 16 samples came from the EU

Pesticide residues detected of those sought

- 4 samples contained no residues of those sought
- 36 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. One of these samples contained residues from pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant sample. We would not expect this combination of pesticides in this sample to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Plant-based protein (GB)

Samples tested

24 samples were tested for up to 415 pesticide residues.

Plant-based protein burgers

- 15 samples came from the UK
- one sample came from the EU

Plant-based protein kebabs

- one sample came from the UK

Plant-based protein sausages

- 7 samples came from the UK

The country of origin for the plant-based protein samples may not be the same as the country where the plant-based protein is produced. Instead, it may be where the plant-based protein is packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- 18 samples contained no residues of those sought
- 6 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Plums (GB)

Samples tested

31 samples were tested for up to 413 pesticide residues.

- 5 samples came from the UK
- 26 samples came from the EU

Pesticide residues detected of those sought

- 8 samples contained no residues of those sought
- 23 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 4 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Pork (GB)

Samples tested

24 samples were tested for up to 120 pesticide residues.

- 22 samples came from the UK
- 2 samples came from the EU

Pesticide residues detected of those sought

- 24 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Potatoes (GB)

Samples tested

31 samples were tested for up to 415 pesticide residues.

31 samples came from the UK.

Pesticide residues detected of those sought

- 16 samples contained no residues of those sought
- 15 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Two samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Prepacked salad (GB)

Samples tested

18 samples were tested for up to 412 pesticide residues.

Mixed leaf

- 18 samples came from the UK

The country of origin for the pre-packed salad samples may not be the same as the country where the pre-packed salad are grown. Instead, it may be where the pre-packed salad are packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- one sample contained no residues of those sought
- 17 samples contained residues above the reporting limit
- 3 samples contained residues above the MRL
- 2 samples were labelled as organic, 2 contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Residues measured above the MRL

The laboratory detected 3 samples with residue above the MRL in prepacked salad. Details are available in [Table 4a: Summary of MRL Exceedances for Q3 Great Britain](#).

Spices (GB)

Samples tested

60 samples were tested for up to 406 pesticide residues.

Cumin

- 24 samples came from the UK
- one sample was imported from outside the EU

Turmeric

- 32 samples came from the UK
- 3 samples were imported from outside the EU

Pesticide residues detected of those sought

- 11 samples contained no residues of those sought
- 49 samples contained residues above the reporting limit
- 3 samples contained residues above the MRL
- 3 samples were labelled as organic, none contained residues of those sought

Risk assessments

Following screening, there were 3 pesticides where the effect on health needed to be considered in more detail. The risk assessment is outlined below. Refer to [section 4: Risk assessment - dietary intake assessments](#) in this report for the full details of the HSE assessment of the risks.

Picoxystrobin (2 residues in cumin samples, one below the MRL of 0.05* mg kg, and one above the MRL found at 0.08 mg per kg).

- Based on the HSE assessment for picoxystrobin we conclude a short-term effect on health is not expected. In 2016, EFSA reviewed picoxystrobin and concluded that no toxicological reference values could be determined for picoxystrobin, due to possible concerns for genotoxicity (whether damage to genetic material can occur). At the anticipated highest exposure, an effect on health is not expected based on short-term toxicity. Refer to [section 4: Risk assessment - dietary intake assessments](#) in this report for full details of the risk assessment. We conclude that on a precautionary basis any findings of picoxystrobin are undesirable due to the uncertainty regarding genotoxicity. Due to the low level of dietary intake of picoxystrobin arising in the samples of spices from the residues (0.04 and 0.08 mg per kg) in these samples, we consider any risks of adverse health effects are low.

Chlorpyrifos (5 residues in cumin and turmeric samples, 3 above the MRL of 0.01* mg per kg found up to 0.1 mg per kg, and 2 at the MRL).

- Based on the HSE assessment for chlorpyrifos we conclude a short-term effect on health is not expected as outlined in [section 4: Risk assessment – dietary intake assessments](#). EFSA issued a 2019 statement on the human health assessment of chlorpyrifos which included a consideration of the potential for genotoxicity (whether damage to genetic material can occur). We conclude that on a precautionary basis any findings of chlorpyrifos are undesirable due to the uncertainty regarding genotoxicity. Due to the low level of dietary intake of chlorpyrifos arising in the samples of spices from the residues (0.01 to 0.1 mg per kg) in these samples, we consider any risks of adverse health effects are low.

Ethylene oxide (22 residues in cumin and turmeric samples up to 0.05 mg per kg (all below the level of the MRL 0.1* mg per kg)).

- The residue definition includes both ethylene oxide and its metabolite 2-chloroethanol. The residues determined in the spice samples were all in the form of 2-chloroethanol, which is expected since the conversion to 2-chloroethanol is rapid.
- Whilst there is no formal toxicological reference values set for ethylene oxide there are international approaches to consumer risk assessment and management that have been followed previously. HSE has applied such an approach to the detailed assessment. Full details are presented in [section 4: Risk assessment – dietary intake assessments](#) in this report.
- HSE has presented the information on possible genotoxicity for 2-chloroethanol. The use of ethylene oxide in food production is not permitted in the UK as the substance can have mutagenic and carcinogenic effects (can cause genetic damage and can potentially lead to cancer). The evidence for 2-chloroethanol being mutagenic and carcinogenic is more uncertain than the data for ethylene oxide. This is because of a less than fully satisfactory data set for 2-chloroethanol which has also not been independently evaluated.
- The HSE assessment has taken the precautionary approach in assuming that, in the absence of further data, the residues of 2-chloroethanol should be regarded as potentially genotoxic (cause genetic damage) and carcinogenic.
- Due to the presence of residues in 22 samples of cumin and turmeric powders, HSE has presented a long-term exposure assessment applying a MOE approach. HSE derived that the highest long-term estimate of exposure for spices is 1850,000 x lower than the BMDL₁₀ for the formation of tumours, so the margin of exposure is more than 10,000. HSE concludes that these findings are unlikely to be of concern.
- Overall, HSE concludes that the residue findings of ethylene oxide (found in the spice samples only as it's metabolite 2-chloroethanol) are not indicative of an expectation of effects on health, although the risk assessment approach does not exclude the possibility of adverse health effects. On a precautionary basis any findings of 2-chloroethanol in food are undesirable due to concerns regarding genotoxicity. Any risks of adverse health effects are low at the highest levels of exposure after eating large portions (97.5th percentile consumption) of the cumin or turmeric samples containing the levels found in this report.

Note that a residue of ethylene oxide was also found in a barley sample. Refer to the [section on barley](#) for details.

Additionally, carbofuran was found in 3 samples of spices at low levels (below 0.01 mg per kg). Refer to [section 4: Risk assessment – dietary intake assessments](#) for full details of the risk assessment, section on genotoxicity. We conclude that on a precautionary basis any findings of carbofuran are undesirable due to the uncertainty regarding genotoxicity. Due to the low level of dietary intake of carbofuran arising in the samples of spices from the residues (all less than 0.01 mg per kg) in these samples, we consider any risks of adverse health effects are low.

Other risk assessment screening work undertaken did not indicate any other expectation of effects on health. Refer to the [section 4: Risk assessment – dietary intake assessments](#) for further details.

Combined risk assessments

Some samples contained residues of more than one pesticide. Some of these residues are from pesticides which belong to similar chemical groups and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant samples.

A sample of cumin contained carbofuran, profenofos and chlorpyrifos in the same sample. CRD's combined risk assessment on this combination showed that the presence of these organophosphate and carbamate pesticides together at the calculated relatively low dietary intake levels is not expected to inhibit acetyl cholinesterase, and a short-term effect on health is not expected.

A sample of ground turmeric contained pirimiphos-methyl and chlorpyrifos in the same sample. CRD's combined risk assessment on this combination showed that the presence of these organophosphate pesticides together at the calculated relatively low dietary intake levels is not expected to inhibit acetyl cholinesterase, and a short-term effect on health is not expected.

See [section 4: Risk assessment – dietary intake assessments](#), for HSE's full assessment of the risks for these samples.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

This type of dried product is often made up of several sources of fresh produce grown by different farmers. This can account for the wider number of residues in any one composite sample. We needed to consider the risk assessment for some samples of cumin or turmeric containing residues of either chlorpyrifos, ethylene oxide, picoxystrobin or carbofuran in more detail due to concerns regarding genotoxicity. HSE has concluded that any adverse effect on health is low due to low levels in the diet. We welcome the action being taken by FSA to minimise that see below.

The reporting limits for ethylene oxide in this survey are 5 times lower than when spices were sampled in the PRiF monitoring in 2022. It has been agreed to look at levels below the MRL for some pesticides because of the importance of these residues to consumers.

Picoxystrobin is an unusual residue and a detailed risk assessment for this pesticide has not been presented previously. PRiF noted that as well as drawing a precautionary conclusion due to uncertainty regarding concerns for genotoxicity, HSE had also taken a precautionary approach for short-term assessment that was consistent with earlier UK Committee advice.

Further details about the risk assessment conducted can be found in [section 4: Risk assessment - dietary intake assessments](#) in this report and in the genotoxicity section [Substances which might be genotoxic](#).

Residues measured above the MRL

The laboratory detected 3 samples with residue above the MRL in spice (cumin and turmeric) Details are available in [Table 4a: Summary of MRL exceedances for Q3 GB](#).

HSE passed the details of 3 samples to the FSA for further consideration. For 2 of the samples, the FSA recommended a withdrawal of any remaining stock.

Spinach (GB)

Samples tested

24 samples were tested for up to 389 pesticide residues.

Baby leaf - fresh

- 11 samples came from the UK
- one sample came from the EU

Spinach - fresh

- 11 samples came from the UK
- one sample came from the EU

Pesticide residues detected of those sought

- 3 samples contained no residues of those sought
- 21 samples contained residues above the reporting limit
- 2 samples contained residues above the MRL
- 2 samples were labelled as organic, one contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Residues measured above the MRL

The laboratory detected 2 samples with residue above the MRL in spinach. Details are available in [Table 4a: Summary of MRL exceedances for Q3 GB](#).

Strawberry (GB)

Samples tested

22 samples were tested for up to 391 pesticide residues.

Fresh

- 20 samples came from the UK
- one sample was imported from outside the EU
- one sample came from the EU

Pesticide residues detected of those sought

- one sample contained no residues of those sought
- 21 samples contained residues above the reporting limit
- 2 samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. One of these samples contained residues from pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant sample. We would not expect this combination of pesticides in this sample to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Residues measured above the MRL

The laboratory detected one sample with residue above the MRL in strawberries. Details are available in [Table 4a: Summary of MRL exceedances for Q3 GB](#).

Tomatoes (GB)

Samples tested

21 samples were tested for up to 423 pesticide residues.

Cherry

- one sample was imported from outside the EU

Plum

- one sample came from the UK
- one sample was imported from outside the EU
- one sample came from the EU

Round

- 6 samples came from the EU

Salad

- 3 samples came from the EU

Vine

- 3 samples came from the UK
- 5 samples came from the EU

Pesticide residues detected of those sought

- 12 samples contained no residues of those sought
- 9 samples contained residues above the reporting limit
- one sample contained residues above the MRL
- 4 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and noted that detection of 2-phenylphenol was considered unusual although it is used in a various processes as a plant protection product or a biocide.

Residues measured above the MRL

The laboratory detected one sample with residue above the MRL in tomatoes. Details are available in [Table 4a: Summary of MRL exceedances for Q3 GB](#).

3. Findings by food in Northern Ireland (NI) and risk assessments

Summary

For more information on the results, read the:

- [summary table of results in this report](#)
- [survey design](#) in this report
- [glossary](#) in this report
- [risk assessment - dietary intake assessments](#) in this report
- [HSE risk assessment methodology](#)
- [detailed pesticide residues in food quarterly data](#), which includes brand name, sampling point and origin information, pesticides sought, and residues found

Apples (NI)

Samples tested

9 samples were tested for up to 401 pesticide residues.

Eating

- 5 samples were imported from outside the EU
- 4 samples came from the EU

Pesticide residues detected of those sought

- 5 samples contained no residues of those sought
- 4 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 3 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Asparagus (NI)

Samples tested

13 samples were tested for up to 390 pesticide residues.

Fresh

- 13 samples were imported from outside the EU

Pesticide residues detected of those sought

- 11 samples contained no residues of those sought
- 2 samples contained residues above the reporting limit
- 2 samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Residues measured above the MRL

The laboratory detected 2 residues above the MRL in asparagus. Details are available in [Table 4b: Summary of MRL Exceedances for Q3 Northern Ireland](#).

Barley products (NI)

Samples tested

18 samples were tested for up to 403 pesticide residues.

Barley flakes

- one sample came from the EU

Pearl barley

- 17 samples came from the UK

The country of origin for the barley samples may not be the same as the country where the barley is grown. Instead, it may be where the barley is packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- 2 samples contained no residues of those sought
- 16 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- one sample was labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. Some of these residues are from pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant samples. We would not expect any of these combinations of pesticides in these samples to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Beans with pods (NI)

Samples tested

9 samples were tested for up to 390 pesticide residues.

Fine beans

- one sample came from the UK
- 6 samples were imported from outside the EU

Green beans

- one sample came from the UK

Runner beans

- one sample came from the UK

Pesticide residues detected of those sought

- 5 samples contained no residues of those sought
- 4 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. One of these samples contained residues from pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant sample. We would not expect this combination of pesticides in this sample to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Bread (gluten free) (NI)

Samples tested

6 samples were tested for up to 399 pesticide residues.

- 3 samples came from the UK
- 3 samples came from the EU

The country of origin for the bread (gluten free) samples may not be the same as the country where the bread is produced. Instead, it may be where the products were packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- 5 samples contained no residues of those sought
- one sample contained residues above the reporting limit
- No MRLs were applied to gluten free bread because they contained varying and multiple non-cereal ingredients
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Bread (ordinary) (NI)

Samples tested

24 samples were tested for up to 399 pesticide residues.

Ordinary bread: other

- 8 samples came from the UK

Ordinary bread: white

- 9 samples came from the UK
- 3 samples came from the EU

Ordinary bread: wholemeal

- 4 samples came from the UK

The country of origin for the bread (ordinary) samples may not be the same as the country where the bread is produced. Instead, it may be where the products were packaged for consumer sale or the address of the brand owner.

Pesticide residues detected of those sought

- all samples contained residues
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Cabbage (head) (NI)

Samples tested

9 samples were tested for up to 396 pesticide residues.

- 7 samples came from the UK
- 2 samples came from the EU

Pesticide residues detected of those sought

- 8 samples contained no residues of those sought
- one sample contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 3 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Cheese (hard) (NI)

Samples tested

12 samples were tested for up to 39 pesticide residues.

Hard cheese

- 3 samples came from the UK
- 9 samples came from the EU

Pesticide residues detected of those sought

- 12 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- one sample was labelled as organic, none contained residues of those sought

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Figs (NI)

Samples tested

12 samples were tested for up to 390 pesticide residues.

- 9 samples were imported from outside the EU
- 3 samples came from the EU

Pesticide residues detected of those sought

- 10 samples contained no residues of those sought
- 2 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results in detail and felt it did not need to make any additional comments.

Fish (tinned) (NI)

Samples tested

15 samples were tested for up to 39 pesticide residues.

Anchovy

- one sample came from the EU

Kippers

- 2 samples came from the EU

Mackerel

- 2 samples were imported from outside the EU

Salmon

- 4 samples were imported from outside the EU

Sild

- one sample came from the EU

Tuna

- 4 samples were imported from outside the EU
- one sample came from the EU

Where no sea area information is available, the country of origin on the packaging does not necessarily indicate where the fish (tinned) was caught or farmed. It could be where it was landed or processed or where it was packed for retail sale.

Pesticide residues detected of those sought

- 13 samples contained no residues of those sought
- 2 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

Two samples contained residues of DDT in the form of DDE which indicates presence in the environment from historical use. View in [section 5 issues arising](#) in this report.

The tinned fish may be stored in brine, oil or water; therefore, the presence of some pesticide residues may be due to the storage media. Read more information on this in the [MRL section in the glossary in this report](#).

Grapes (NI)

Samples tested

9 samples were tested for up to 397 pesticide residues.

Table grapes

- 4 samples were imported from outside the EU
- 5 samples came from the EU

Pesticide residues detected of those sought

- all samples contained residues
- none of the samples contained residues above the MRL
- one sample was labelled as organic, one contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Infant food (fruit and vegetable) (NI)

Samples tested

12 samples were tested for up to 396 pesticide residues.

- 9 samples came from the UK
- 3 samples came from the EU

The country of origin for the samples of infant food (fruit and vegetable) may not be the same as the country where the infant food (fruit and vegetable) was produced. It may be where the samples were packed for consumer purchase or the address of the brand owner.

Pesticide residues detected of those sought

- 12 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 8 samples were labelled as organic, none contained residues of those sought

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Lettuce (NI)

Samples tested

10 samples were tested for up to 399 pesticide residues.

Iceberg

- one sample came from the EU

Lettuce

- one sample came from the EU

Little gem

- 3 samples came from the UK
- one sample came from the EU

Other

- 2 samples came from the UK

Romaine

- 2 samples came from the UK

Pesticide residues detected of those sought

- 7 samples contained no residues of those sought
- 3 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- one sample was labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Mango (NI)

Samples tested

13 samples were tested for up to 390 pesticide residues.

Fresh

- 13 samples were imported from outside the EU

Pesticide residues detected of those sought

- all samples contained residues
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Milk (NI)

Samples tested

11 samples were tested for up to 47 pesticide residues.

Cow's milk

- 7 samples came from the UK
- 3 samples came from the EU

Goat's milk

- one sample came from the UK

Pesticide residues detected of those sought

- 11 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 5 samples were labelled as organic, none contained residues of those sought

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Oats products (NI)

Samples tested

18 samples were tested for up to 403 pesticide residues.

- 13 samples came from the UK
- 5 samples came from the EU

The country of origin for the samples of oats may not be the same as the country where the oats were grown. It may be where the samples of oats were packed for consumer purchase or the address of the brand owner.

Pesticide residues detected of those sought

- 11 samples contained no residues of those sought
- 7 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 11 samples were labelled as organic, one contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. Two of these samples contained residues of pesticides which belong to a similar chemical group and may have similar toxicological effects. So, the risk assessors needed to consider their possible impacts on human health, both on their own and in combination.

HSE carried out a combined risk assessment of the relevant samples. We would not expect this combination of pesticides in these samples to have an effect on health.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Peaches and nectarines (NI)

Samples tested

12 samples were tested for up to 396 pesticide residues.

Nectarines

- 6 samples came from the EU

Peaches

- 6 samples came from the EU

Pesticide residues detected of those sought

- one sample contained no residues of those sought
- 11 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- one sample was labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Plums (NI)

Samples tested

12 samples were tested for up to 390 pesticide residues.

- 3 samples came from the UK
- 9 samples came from the EU

Pesticide residues detected of those sought

- 5 samples contained no residues of those sought
- 7 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 2 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Pork (NI)

Samples tested

17 samples were tested for up to 44 pesticide residues.

- 13 samples came from the UK
- 4 samples came from the EU

Pesticide residues detected of those sought

- 17 samples contained no residues of those sought
- none of the samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The laboratory did not detect any residues, so we did not carry out a risk assessment.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF has no comments as no residues were found.

Potatoes (NI)

Samples tested

15 samples were tested for up to 396 pesticide residues.

- 9 samples came from the UK
- one sample was imported from outside the EU
- 5 samples came from the EU

Pesticide residues detected of those sought

- 12 samples contained no residues of those sought
- 3 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 7 samples were labelled as organic, one contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Salad and baby leaf bags (NI)

Samples tested

9 samples were tested for up to 401 pesticide residues.

- 7 samples came from the UK
- 2 samples came from the EU

The country of origin for the samples of salad and baby leaf bags may not be the same as the country where the baby leaf was grown. It may be where the samples were packed for consumer purchase or the address of the brand owner.

Pesticide residues detected of those sought

- all samples contained residues
- 4 samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Spinach (NI)

Samples tested

15 samples were tested for up to 397 pesticide residues.

Fresh

- 14 samples came from the UK
- one sample came from the EU

Pesticide residues detected of those sought

- 3 samples contained no residues of those sought
- 12 samples contained residues above the reporting limit
- 2 samples contained residues above the MRL
- 4 samples were labelled as organic, 3 contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Strawberry (NI)

Samples tested

6 samples were tested for up to 397 pesticide residues.

Fresh

- 3 samples came from the UK
- 3 samples came from the EU

Pesticide residues detected of those sought

- all samples contained residues
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Tomatoes (NI)

Samples tested

10 samples were tested for up to 400 pesticide residues.

Cherry

- one sample came from the UK
- one sample came from the EU

Plum

- one sample was imported from outside the EU
- one sample came from the EU

Round

- 2 samples came from the EU

Salad

- one sample came from the EU

Vine

- one sample came from the UK
- 2 samples came from the EU

Pesticide residues detected of those sought

- 9 samples contained no residues of those sought
- one sample contained residues above the reporting limit
- none of the samples contained residues above the MRL
- 5 samples were labelled as organic, none contained residues of those sought

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

None of the samples contained more than one residue, so we did not carry out a combined risk assessment.

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

Wine (NI)

Samples tested

7 samples were tested for up to 396 pesticide residues.

Red

- 2 samples were imported from outside the EU
- 3 samples came from the EU

White

- one sample was imported from outside the EU
- one sample came from the EU

The country of origin for the samples of wine may not be the same as the country where the wine grapes were grown. It may be where the samples were packed for consumer purchase or the address of the brand owner.

Pesticide residues detected of those sought

- 2 samples contained no residues of those sought
- 5 samples contained residues above the reporting limit
- none of the samples contained residues above the MRL
- none of the samples were labelled as organic

Risk assessments

The residues detected by the laboratory would not be expected to have an effect on health.

Combined risk assessments

Some samples contained residues of more than one pesticide. We do not expect these residues to have an effect on health, either separately or in combination. The pesticide residues found in each sample do not include more than one of the pesticides from the groups that the Health and Safety Executive (HSE) considers for combined risk assessment.

Further information of how HSE considers combined risk assessments is in [HSE risk assessment methodology](#).

Additional comments by the PRiF

PRiF considered these results and felt it did not need to make any additional comments.

4. Risk assessment – dietary intake assessments

Screening assessments have been done for all pesticides to check that predicted intakes are within the relevant health-based reference values. A short term (acute) exposure assessment is not done for pesticides which are not acutely toxic where it has been established that an ARfD is not required. Read the [GB toxicological reference values database](#). EU toxicological endpoints can be found in the [EU Pesticides database](#).

Toxicological reference values set by the JMPR - The Joint Food and Agriculture Organisation (FAO) and World Health Organization (WHO) Meeting on Pesticide Residues - can be found in individual pesticide evaluations at [JMPR Evaluations](#) (an up to date index to pesticide evaluations is available in the latest report).

The screening assessment uses the internationally agreed approach to long term (chronic) and short term (acute) consumer exposure assessment with UK food consumption data as detailed within the UK NEDI and NESTI models which are available on the [HSE website](#).

For the Q3 2025 assessments, the following approaches have been taken to refine these assessments according to case-by-case issues and to ensure that appropriate consumption values are used for less frequently consumed commodities where available food consumption data may be limited:

Apple juice

Specific consumption data on apple juice was used.

Asparagus

Data on asparagus were used for adults and vegetarians and data on broccoli were used for the other groups for asparagus, after taking account of the low numbers of consumers of asparagus in the survey data for other groups and the comparison to other data.

Barley

Data on barley were used for all forms of barley, including pearl barley.

Beans with pods

Data on beans with pods were used for all forms of green beans, including speciality beans.

Bread

Data on bread were used for all types of bread, including gluten free bread.

Figs

Data on figs were used. There are a low number of consumers in several of the sub-groups. However, use of these consumption data was considered reasonable after comparison with alternative data.

Fish (tinned)

Data on fish were used for all forms of tinned fish.

Lettuce

Data on lettuce were used for all forms of lettuce; a variability factor of 7 instead of 5 was used for smaller varieties such as little gem which typically have a unit weights of <250g.

Mango

Data on mango were used despite a low number of consumers in several of the sub-groups. However, use of these consumption data was considered reasonable after comparison with alternative data.

Oats

Data on oats were used for all forms of oats, including oat flakes, porridge and rolled oats.

Peach and nectarines

Data on peaches were used for peaches and nectarines.

Plant-based protein burgers

Data on meat (excluding poultry and offal) were used for plant-based protein burgers.

Pork

Data on meat (excluding poultry and offal) were used for pork.

Pre-prepared salad bags

For salad leaves (in pre-prepared bags) lettuce data without a variability factor were used. The constituent salad leaves are small, and a whole product consideration which takes account of unit-to-unit variability is not considered relevant.

Spices

Data on all forms of spices were used for cumin and turmeric.

Tomatoes

Data on tomato, with a variability factor of 7 and a unit weight of 85g, were used for all fresh tomato samples including round, salad and vine. This is considered a suitable screening assessment for residues found in all these forms of tomatoes.

Wine

Data on wine were used for both red and white wine.

Short-term dietary risk assessment – single substance assessments where exceedance of the ARfD has been identified during screening (tables 5a to 5d)

Table 5a: Barley (GB)

In this table, 'critical group intake' means the highest intake of all 10 consumer groups, or intakes for all consumer groups that exceed the ARfD.

Pesticide	Highest residue (mg per kg)	Adult intake (mg per kg bw per day)	Critical group intake (mg per kg bw per day)	ARfD (mg per kg bw)	Source
Ethylene oxide (2-chloroethanol, expressed as ethylene oxide)	0.1	0.000068	0.00056 (7 to 10 year olds) 0.00018 (4 to 6 year olds) 0.000074 (vegetarians) 0.000072 (toddlers) 0.000068 (adults) 0.000061 (15 to 18 year olds) 0.000049 (elderly own home) 0.000044 (11 to 14 year olds) 0.000033 (elderly residential) (no infants were reported as consuming barley)	No toxicological reference values established	Not applicable

Comment on risk assessment

The residue definition includes both ethylene oxide and its metabolite 2-chloroethanol. The definition for MRLs and monitoring comprises: sum of ethylene oxide and 2-chloroethanol, expressed as ethylene oxide. The residue determined in the barley sample was in the form of 2-chloroethanol, which is expected since the conversion of ethylene oxide to 2-chloroethanol is rapid. The residue found is at a level of 0.2 mg per kg 2-chloroethanol, which is equivalent to 0.1 mg per kg ethylene oxide (expression of the residue in terms of ethylene oxide following molecular weight adjustment). The level of 0.1 mg per kg ethylene oxide is above the level of the MRL (0.02* mg per kg).

The use of ethylene oxide in food production is not permitted in the UK as the substance can have mutagenic and carcinogenic effects (can cause genetic damage and can potentially lead to cancer). The evidence for 2-chloroethanol being mutagenic and carcinogenic is more uncertain than the data for ethylene oxide; however, the HSE assessment has taken the precautionary approach in assuming that, in the absence of further data, the residues of 2-chloroethanol should be regarded as potentially genotoxic (cause genetic damage) and carcinogenic.

There are no formal toxicological reference values (TRVs) set for ethylene oxide or 2-chloroethanol, no ARfD, and no relevant data on which to propose TRVs. Therefore, an acute exposure risk assessment cannot be performed. Concern following exposure to ethylene oxide and its metabolite 2-chloroethanol, even on a single day exposure, is due to its potential for genotoxicity and carcinogenicity. This is further discussed below in the sections on [Long-term dietary risk assessments needed following screening assessment of samples](#) and [Substances that might be genotoxic](#).

Table 5b: Spices (GB)

In this table, 'critical group intake' means the highest intake of all 10 consumer groups, or intakes for all consumer groups that exceed the ARfD.

Pesticide	Highest residue (mg per kg)	Adult intake (mg per kg bw per day)	Critical group intake (mg per kg bw per day)	ARfD (mg per kg bw)	Source
Ethylene oxide (2-chloroethanol, expressed as ethylene oxide)	0.05	0.000005	0.000009 (4 to 6 year olds) 0.000007 (7 to 10 year olds) 0.000006 (11 to 14 year olds) 0.000006 (15 to 18 year olds) 0.000005 (adults) 0.000003 (toddlers) 0.000002 (elderly own home) 0.000008 (elderly residential) (no infants were reported as consuming spices, no consumption data available for vegetarian consumers)	No toxicological reference values established	Not applicable

Comment on risk assessment

The residue definition includes both ethylene oxide and its metabolite 2-chloroethanol. The definition for MRLs and monitoring comprises of sum of ethylene oxide and 2-chloroethanol, expressed as ethylene oxide. The residue determined in the spices samples was in the form of 2-chloroethanol, which is expected since the conversion of ethylene oxide to 2-chloroethanol is rapid. The highest residue found was in a turmeric sample at a level of 0.1 mg per kg 2-chloroethanol, which is equivalent to 0.05 mg per kg ethylene oxide (expression of the residue in terms of ethylene oxide following molecular weight adjustment). The level of 0.05 mg per kg ethylene oxide is below the level of the MRL (0.1* mg per kg).

The use of ethylene oxide in food production is not permitted in the UK as the substance can have mutagenic and carcinogenic effects (can cause genetic damage and can potentially lead to cancer). The evidence for 2-chloroethanol being mutagenic and carcinogenic is more uncertain than the data for ethylene oxide; however, the HSE assessment has taken the precautionary approach in assuming that, in the absence of further data, the residues of 2-chloroethanol should be regarded as potentially genotoxic (cause genetic damage) and carcinogenic.

There are no formal toxicological reference values (TRVs) set for ethylene oxide or 2-chloroethanol, no ARfD, and no relevant data on which to propose TRVs. Therefore, an acute exposure risk assessment cannot be performed. Concern following exposure to ethylene oxide and its metabolite 2-chloroethanol, even on a single day exposure, is due to its potential for genotoxicity and carcinogenicity. This is further discussed below in the sections on [Long-term dietary risk assessments needed following screening assessment of samples](#) and [Substances that might be genotoxic](#).

Table 5c: Spices GB

In this table, 'critical group intake' means the highest intake of all 10 consumer groups, or intakes for all consumer groups that exceed the ARfD.

Pesticide	Highest residue (mg per kg)	Adult intake (mg per kg bw per day)	Critical group intake (mg per kg bw per day)	ARfD (mg per kg bw)	Source
Ethylene oxide (2-chloroethanol, expressed as ethylene oxide)	0.1	0.000010	0.000017 (4 to 6 year olds) 0.000014 (7 to 10 year olds) 0.000013 (11 to 14 year olds) 0.000011 (15 to 18 year olds) 0.000010 (adults) 0.000007 (toddlers) 0.000004 (elderly own home) 0.000002 (elderly residential) (no infants were reported as consuming spices, no consumption data available for vegetarian consumers)	No toxicological reference values established	EU, 2019

Comment on risk assessment

An [EFSA assessment](#) from 2019 has indicated that no toxicological reference values could be determined for chlorpyrifos, due to concerns over genotoxicity. Additionally, EFSA raised concerns over neurological effects in the developing foetus and young child. Chlorpyrifos is not approved in the EU and UK and pesticide products containing chlorpyrifos were withdrawn in 2020.

HSE considers that for short-term risk assessment, an indicative toxicological reference value of 0.0003 mg per kg bw can be used based on the LOAEL set by EFSA for a developmental neurotoxicity study and applying a safety factor of 1000 to account for the severe nature of the findings (effects on brain measurements in a developmental neurotoxicity study). Toxicologists usually use safety factors of between 100 and a 1000 when a NOAEL cannot be determined within a study. HSE proposed indicative toxicological reference value is conservative as it uses the highest uncertainty factor applied by toxicologists and is based on a LOAEL from a study with repeated dosing.

Overall, HSEs approach is considered precautionary in protecting the nervous system in the developing foetus and child.

None of the intakes exceeded the HSE proposed indicative toxicological reference value for short term assessment. Based on the low short-term intakes, HSE concludes that a short-term effect on health is not expected.

Refer to the section below on [Substances that might be genotoxic](#) in this report, for HSE's conclusions regarding potential genotoxicity.

Table 5d: Spices (GB)

In this table, 'critical group intake' means the highest intake of all 10 consumer groups, or intakes for all consumer groups that exceeded the ARfD.

Pesticide	Highest residue (mg per kg)	Adult intake (mg per kg bw per day)	Critical group intake (mg per kg bw per day)	ARfD (mg per kg bw)	Source
Picoxystrobin	0.08	0.000008	0.000014 (4 to 6 year olds) 0.000011 (7 to 10 year olds) 0.000010 (11 to 14 year olds) 0.000009 (15 to 18 year olds) 0.000008 (adults) 0.000006 (toddlers) 0.000003 (elderly own home) 0.000001 (elderly residential) (no infants were reported as consuming spices, no consumption data available for vegetarian consumers)	No toxicological reference values established	EU, 2017

Comment on risk assessment

Following the EU renewal assessment of picoxystrobin, based on the EFSA 2016 Conclusion, the [EU 2017 renewal report](#) has indicated that no toxicological reference values could be determined for picoxystrobin, due to concerns over genotoxicity. Picoxystrobin is not approved in the EU and UK and pesticide products containing picoxystrobin were withdrawn in 2018.

Prior to the EU renewal assessment, the first EU assessment (2003) did not allocate an ARfD as it was not considered necessary. In 2001, the UK PSD (predecessor of CRD, HSE) proposed an ARfD of 0.05 mg per kg bw for short term assessment, which was endorsed by the ACP (predecessor to ECP) in 2001. This was based on reduced food consumption and body weight during the first week of the available dog studies dosed for 90 days and one year. The JMPR also set an ARfD in 2012 based on these studies, although they determined a higher overall NOAEL and so established the ARfD at a level of 0.09 mg per kg bw.

A new rat neurotoxicity study was evaluated in the EU renewal assessment, with evidence of toxic effects observed after a single day of dosing at the lowest dose of 200 mg per kg bw (LOAEL). This study did not show neurotoxic potential and supported the overall conclusion that picoxystrobin is not neurotoxic (EFSA, 2016). In the absence of a NOAEL,

applying a safety factor of 1000 to the LOAEL would derive an indicative short term reference value of 0.2 mg per kg bw. This is above the level of the ARfDs that were proposed in the earlier evaluations on the basis of the dog studies. With regards to short term oral toxicity, EFSA (2016) concluded that the dog was the most sensitive species, and that based on the available 1-year dog study the relevant NOAEL for short term toxicity was 4.57 mg per kg bw. The JMPR 2012 also evaluated the neurotoxicity study and observed that the JMPR proposed ARfD of 0.09 mg per kg bw was supported by a benchmark dose analysis of the motor activity changes seen at the lowest dose in the acute neurotoxicity study.

Since an ARfD is not currently derived due to concerns relating to genotoxicity, HSE proposes an indicative short term reference value of 0.05 mg per kg bw (in line with the original UK ACP endorsed value, reflecting the NOAEL noted by EFSA and covering the effects seen in the acute neurotoxicity study) for the short term exposure risk assessment for the monitoring samples containing residues of picoxystrobin. Considering the evidence from the neurotoxicity study, this is likely to be precautionary for short term assessment. Based on this assessment all dietary intakes are within the HSE indicative short term reference value for picoxystrobin and a short-term effect on health is not expected.

Refer to the section below on [Substances that might be genotoxic](#) in this report, for HSE's conclusions regarding potential genotoxicity.

Short-term dietary risk assessment – multiple assessments needed following screening assessment of samples (tables 6a to 6b)

Samples which contain more than one pesticide from the groups we consider, and where a more detailed assessment was needed following screening:

- triazoles
- organophosphates and, or carbamates
- captan and folpet
- DDAC and BAC
- chlormequat and mepiquat

Table 6a: Spices – values represent the critical consumer group (4 to 6 year olds) for a sample containing this combination of active ingredients.

Pesticide	Residue (mg per kg)	Intake (mg per kg bw)	Intake Percentage ARfD	ARfD	Source
Carbofuran	0.009	0.000002	1.0	0.00015	EFSA, 2009
Profenofos	0.08	0.000014	0.001	1	JMPR, 2007
Chlorpyrifos	0.1	0.000017	Not applicable	Not established	EU, 2019

The total (sum of the dietary intakes of each pesticide taken together in that commodity (when expressed as a percentage of its own reference value)) could not be calculated in this screening assessment.

Comment on risk assessment

This sample of spices contained residues of carbofuran (a carbamate insecticide) and chlorpyrifos and profenofos (both organophosphate insecticides). The known effect of each of these pesticides is on acetyl cholinesterase (AChE). These highest calculated dietary intakes are relatively low, and we conclude that for this combined assessment of these residues, of carbofuran, profenofos and chlorpyrifos together in the same sample, a short-term effect on health is not expected. The estimated highest intake of chlorpyrifos represents 6 percent of the HSE proposed indicative toxicological reference value for short term assessment of 0.0003 mg per kg bw for chlorpyrifos (see single substance assessment reported above). The estimated highest intake of carbofuran and profenofos represents 1.0 and 0.001 percent respectively of their own ARfDs.

Therefore, the presence of the organophosphate and carbamate pesticides together at these relatively low dietary intake levels is not expected to inhibit acetyl cholinesterase, and a short-term effect on health is not expected.

Refer to the section [Substances that might be genotoxic](#) in this report for HSE's conclusions regarding potential genotoxicity.

Table 6b: Spices – values represent the critical consumer group (4 to 6 year olds) for a sample containing this combination of active ingredients.

Pesticide	Residue (mg per kg)	Intake (mg per kg bw)	Intake Percentage ARfD	ARfD	Source
Pirimiphos-methyl	0.04	0.000007	0.005	0.15	EFSA, 2005
Chlorpyrifos	0.01	0.000002	Not applicable	Not established	EU, 2019

The total (sum of the dietary intakes of each pesticide taken together in that commodity (when expressed as a percentage of its own reference value)) could not be calculated in this screening assessment.

Comment on risk assessment

This sample of spices contained residues of chlorpyrifos and pirimiphos-methyl (both organophosphate insecticides). The known effect of each of these pesticides is on acetyl cholinesterase (AChE). These highest calculated dietary intakes are low, and we conclude that for this combined assessment of these residues of pirimiphos-methyl and chlorpyrifos together in the same sample, a short-term effect on health is not expected. The estimated highest intake of chlorpyrifos represents 0.6 percent of the HSE proposed indicative toxicological reference value for short term assessment of 0.0003 mg per kg bw for chlorpyrifos. The estimated highest intake of pirimiphos-methyl represents 0.005 percent of its own ARfD.

Therefore, the presence of the organophosphate pesticides together at these low dietary intake levels is not expected to inhibit acetyl cholinesterase, and a short term effect on health is not expected.

Refer to the section [Substances that might be genotoxic](#) in this report, for HSE’s conclusions regarding potential genotoxicity.

Long-term dietary risk assessments needed following screening assessment of samples (tables 7a to 7b)

As noted in [section 4](#), total long-term dietary assessments across all commodities are not performed for these quarterly assessments. The issue is more fully considered in regulatory contexts pre-authorisation and at the time of MRL review. Then the issue is considered across all commodities (so more precautionary) by pesticide levels determined in GAP compliant trials, intended to address highest likely residues that might arise following pesticide use according to label recommendations.

However, for the PRiF quarterly assessments, HSE does perform a screening exercise for all of the residues found for an individual commodity to see if the long-term intakes (commodity by commodity) show any indication of exceedance of the ADI. If an exceedance was observed, then HSE would consider further, and we would present a more detailed risk assessment.

In HSE's long-term exposure screening assessment for this report NI and GB samples were combined.

Aside from ethylene oxide (see below for the long-term assessment for ethylene oxide), none of these individual commodity long-term exposure screening assessments performed in this quarter (for each of the pesticides found in this report) indicated potential for adverse long-term health effects. HSE assessed the dietary intakes to be below the ADI or other established long-term health based reference value.

Ethylene oxide

Typically, long term dietary intake assessments only need to be performed (following the screening assessments) when a number of samples contain the pesticide to address the potential for exposure to these residues in the long-term.

In barley, there is only one sample containing a residue of ethylene oxide out of 24 samples tested, at a level of 0.1 mg per kg above the MRL of 0.02* mg per kg.

In spices (cumin and turmeric), there are 22 samples containing a residue of ethylene oxide out of 60 samples tested, at a level of 0.01 to 0.05 mg per kg, all below the MRL of 0.1* mg per kg.

There are no formal toxicological reference values (TRVs) set for ethylene oxide or 2-chloroethanol, no ARfD, and no relevant data on which to propose TRVs. Therefore, an acute exposure risk assessment cannot be performed. Concern following exposure to ethylene oxide and its metabolite 2-chloroethanol, even on a single day exposure, is due to its potential for genotoxicity and carcinogenicity.

Therefore, the below long-term assessment has been performed based on the toxicity profile of ethylene oxide and considers the long term dietary intakes since it is not possible to present an acute dietary intake assessment.

The residue definition includes both ethylene oxide and its metabolite 2-chloroethanol. The definition for MRLs and monitoring comprises sum of ethylene oxide and 2-chloroethanol,

expressed as ethylene oxide. The residue determined in the barley and spices (cumin and turmeric) samples was in the form of 2-chloroethanol, which is expected since the conversion of ethylene oxide to 2-chloroethanol is rapid. Ethylene oxide itself was sought and not found in all the samples above its reporting limit of 0.01 mg per kg.

The residues found are at a level of 0.2 mg per kg 2-chloroethanol in barley (single sample containing this residue) and 0.01 to 0.1 mg per kg 2-chloroethanol in spices, which is equivalent to a level of 0.1 mg per kg ethylene oxide in barley and 0.006 to 0.05 mg per kg ethylene oxide in spices (expression of the residue in terms of ethylene oxide following molecular weight adjustment).

Barley

Long term dietary assessment usually considers a median residue level to seek to address residues that are more representative of long term exposures. Given the finding of 0.1 mg per kg ethylene oxide is in only one barley sample, where the residues were sought but not found in the other 23 barley samples, HSE has taken an approach to conduct the long term dietary intake assessment using an estimated median residue level of 0.005 mg per kg of 2-chloroethanol (which is equivalent to 0.0025 mg per kg ethylene oxide). This estimated median level is assumed to be at a level of half the reporting limit (RL) for analytical determination of 2-chloroethanol.

Spices

As a number of residues of 2-chloroethanol were found in cumin and turmeric samples (22 out of 60 samples), a long-term risk assessment was conducted using a worst case estimated median residue of 0.005 mg per kg expressed as ethylene oxide. This value corresponds to the reporting limit of 2-chloroethanol of 0.01 mg per kg. Residues of 2-chloroethanol were found in 22 samples of cumin and turmeric in the range of 0.01 mg per kg to 0.1 mg per kg (expressed as 2-chloroethanol) representing 0.006 to 0.05 mg per kg expressed as ethylene oxide. Across, the samples, the median residue would be less than 0.01 mg per kg (expressed as 2-chloroethanol) and less than 0.005 mg per kg (expressed as ethylene oxide).

Table 7a: Barley (GB)

In this table, 'critical group intake' means the highest intake of all 10 consumer groups, or intakes for all consumer groups that exceed the ADI.

Pesticide	Median residue (mg per kg)	Adult intake (mg per kg bw per day)	Critical group intake (mg per kg bw per day)	ADI (mg per kg bw per day)	Source
Ethylene oxide (2-chloroethanol, expressed as ethylene oxide)	0.0025	0.0000006	0.000002 (7 to 10 year olds) 0.0000009 (4 to 6 year olds) 0.0000008 (toddlers) 0.0000006 (vegetarians) 0.0000006 (elderly own home) 0.0000006 (adults) 0.0000006 (15 to 18 year olds) 0.0000005 (11 to 14 year olds) 0.0000004 (elderly residential) (no infants were reported as consuming barley)	No toxicological reference values established	Not applicable

Table 7b: Spices (GB)

In this table, 'critical group intake' means the highest intake of all 10 consumer groups, or intakes for all consumer groups that exceed the ADI.

Pesticide	Median residue (mg per kg)	Adult intake (mg per kg bw per day)	Critical group intake (mg per kg bw per day)	ADI (mg per kg bw per day)	Source
Ethylene oxide (2-chloroethanol, expressed as ethylene oxide)	0.005	0.0000001	0.0000002 (7 to 10 year olds) 0.0000002 (4 to 6 year olds) 0.0000001 (15 to 18 year olds) 0.0000001 (toddlers) 0.0000001 (elderly own home) 0.0000001 (adults) 0.0000001 (11 to 14 year olds) 0.00000004 (elderly residential) (no infants were reported as consuming spices, no consumption data available for vegetarian consumers)	No toxicological reference values established	Not applicable

Comment on risk assessment (relevant to both barley and spices)

For ethylene oxide, no formal long term toxicological reference values, such as an ADI or TDI have been established.

The use of ethylene oxide in food production is not permitted in the UK as the substance can have mutagenic and carcinogenic effects (can cause genetic damage and can potentially lead to cancer). The evidence for 2-chloroethanol being mutagenic and carcinogenic is more uncertain than the data for ethylene oxide. However, the HSE assessment has taken the precautionary approach in assuming that, in the absence of further data, the residues of 2-chloroethanol should be regarded as potentially genotoxic (cause genetic damage) and carcinogenic.

Whilst there is no formal toxicological reference values set for ethylene oxide there are international approaches to consumer risk assessment and management that have been followed previously.

The BfR (German Regulatory Authority) in 2021 used a margin of exposure approach in proposing a preliminary risk assessment. The approach considers that where exposures are at least 10,000 x lower than a dose predicted to cause a 10 percent increase in tumour formation in experimental animals (the BMDL₁₀) they are unlikely to be of concern. This approach is endorsed by both the [UK Committee on Carcinogenicity \(2019\)](#) and by [EFSA \(2005\)](#). For ethylene oxide, BfR derived a BMDL₁₀ value of 0.37 mg per kg bw per day, and they applied this to risk assessments of both ethylene oxide and 2-chloroethanol as the genotoxic and carcinogenic potency of 2-chloroethanol was not expected to exceed that of ethylene oxide. Therefore, exposures of less than 0.037 microgrammes per kg bw are not expected to raise concerns for carcinogenicity. The level is not a safety threshold, as the approach does not establish a level at which health effects would not be expected. In regard of long-term assessment, the highest intake for barley (calculated and presented in the above tables) was approximately ten fold higher than that for spices. HSE derived that the highest intake (that for 7 to 10 year old children in barley) is 185,000 x lower than the BMDL₁₀ for the formation of tumours, so the margin of exposure is more than 10,000. Therefore, HSE concludes on this basis that the residue findings are unlikely to be of concern. On a precautionary basis any findings of 2-chloroethanol in food are undesirable due to concerns regarding genotoxicity. Refer to the section below on [Substances that might be genotoxic](#) in this report, for HSE's conclusions regarding potential genotoxicity.

Substances that might be genotoxic (see explanation in the section on HSE's assessment of risk)

Read an explanation of genotoxicity in the section on [HSE's assessment of risk](#).

During regulatory assessment, careful consideration is given to any pesticides that may exhibit any potential to be genotoxic (able to damage genetic material) in live animals, so we need to consider the significance to the consumer when these residues are found.

There are a small number of examples of older pesticides that might be genotoxic, where modern data to investigate the true genotoxic potential is not expected to be made available. It is likely that these will only be found in imported foods. For many of these old pesticides, the toxicological reference doses are low and PRiF uses low reporting limits to ensure that these residues are found even at very low levels, as we know they are of particular interest to consumers. The evaluation of possible health implications for PRiF findings is complex as tests for genotoxicity are commonly performed at higher doses (orders of magnitude higher) than the dietary exposure levels that are assessed in PRiF reports. As such it is difficult to conclude specifically, and to extrapolate the findings in the laboratory to the context of findings in the PRiF monitoring and the presence of residues at low levels in foods. Where relevant some reassurance that any risks are likely to be small can be gained if increased cancer incidence, which may be due to gene mutations, does not occur in long term animal feeding studies, designed to detect such observations. Where relevant we will indicate this. Due to the uncertainty about the potential for genetic damage (genotoxicity) at low doses, PRiF will always conclude that on a precautionary basis any findings of genotoxic substances in food are undesirable.

Assessment of genotoxicity (Q3 2025) and conclusions:

Substances that might be genotoxic

Residues found in this report that have genotoxic potential (concluded from laboratory studies on animals): none.

Residues found in this report where toxicological data are suggestive of genotoxicity but not certain: carbofuran, chlorpyrifos, 2-chloroethanol and picoxystrobin.

It is unclear whether these pesticides can damage genetic material (are genotoxic).

Regarding chlorpyrifos, carbofuran, and picoxystrobin there is some evidence from studies performed in vitro, in vivo, or both, that they may be genotoxic. Whilst there are negative results in the available in vivo studies, the currently recommended in vivo follow up studies, that may clarify the genotoxic potential of these pesticides, have not been performed. There is some reassurance that risks of developing ill health effects following single or repeat exposures are likely to be low, since they did not cause cancer in cancer or other long-term studies with repeat daily doses in animals over their lifespan. The doses used in these studies were orders of magnitude higher than the exposures estimated in this assessment. It is not known if lower doses which are not toxic also have this effect.

Regarding 2-chloroethanol, all the ethylene oxide residues in this report were found as 2-chloroethanol. This is expected as conversion of ethylene oxide to 2-chloroethanol is rapid. As stated in [Long-term dietary risk assessments needed following screening assessment of samples](#), the use of ethylene oxide in food production is not permitted in the UK as it is known to be mutagenic and carcinogenic. Although genotoxicity tests were conducted using 2-chloroethanol, the evidence of genotoxicity is more uncertain than the data for ethylene oxide. This is because of a less than fully satisfactory data set for 2-chloroethanol which has also not been independently evaluated. The HSE assessment has taken the precautionary approach in assuming that, in the absence of further reliable data, the residues of 2-chloroethanol should be regarded as potentially genotoxic (cause genetic damage).

Conclusions

Overall, we conclude that on a precautionary basis any residue finding of carbofuran, chlorpyrifos, 2-chloroethanol and picoxystrobin is undesirable due to the uncertainty regarding genotoxicity at low doses. However, we consider any risks of adverse health effects are low at the highest levels of exposure after eating large portions (97.5th percentile consumption) of the foods containing the levels of these pesticides found in this report.

5. Issues arising in this report, follow-up from previous reports and plans for the quarter 4 2025 report

Chlorate

We have been testing a limited number of foods for chlorate since 2016. The pesticide sodium chlorate is a residual broad action weed killer that is not authorised for use in the EU or UK. However, we are confident that the residues we are detecting come from use of chlorine-based disinfectants used to maintain microbiological safety (control microorganisms that cause food poisoning). Because these residues are unavoidable, and important for the maintaining of microbiological control vital for food safety, we are not treating these results as breaches of the MRL. We are not advising that food companies change their existing practices because of our findings, but they should be aware about the ongoing discussion in this area.

We are only part of the work going on across government and beyond to consider what to do about chlorate residues in food and water.

How chlorate MRLs take account of use of biocides

The footnote included in the chlorate MRLs allow for chlorate residues incurred during the processing of food (from treated water or processing aids, such as biocides). The footnote exceptionally specifies that for considering compliance with chlorate MRLs, simple types of processing, such as packing, washing, chopping and freezing can be considered. Chlorate in irrigation water is allowed for in the MRLs as set and no further adjustment can be considered.

The responsibility for providing evidence showing that residues from processing can be considered, lies with the food business operator, and so we will be interested to see such evidence where appropriate. HSE will decide whether the footnote can be applied and if so, this will be reflected in our reports.

The Food and Biocides Industry Group have produced more detailed information and guidance on this topic which is available on the [Chilled Food Association's website](#).

Infant food

Infant food MRLs are set under separate legislation managed by UK health departments. The footnote that applies to other foods cannot be used for infant foods, although residues occur for the same reasons. UK health departments are working with HSE and FSA to resolve this.

Sanitisers

The presence of low-level residues of chlorate in food results from measures taken by the food and water industries to protect food safety by reducing microbiological contamination of food and drink (including drinking water, which is a significant source of chlorate in food). Chlorate itself is not used as a disinfectant, but chlorine-based sanitisers contain small amounts of chlorate. The FSA has worked with industry who promote best practice and guidance for use of sanitisers.

Drinking water

In national legislation throughout the UK, it is already a requirement to keep disinfection by-products as low as possible. This is usually achieved through management of disinfectant dosing and storage.

Microbiological safety of food

The HSE is working with the Advisory Committee on the Microbiological Safety of Food to understand how changes to pesticide MRLs affect biocide use, microbiological food safety, and any change to the overall risk to consumers to allow for both chemical and microbiological safety.

Dietary intakes

Since 2018 the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) has been considering chlorate as part of its on-going work looking at the chemicals in the diet of infants and young children (up to 5 years). The [European Food Safety Authority's 2015 opinion on chlorate](#) establishes appropriate health-based guidance values for chlorate exposure to protect against acute and chronic risks to health.

Fosetyl-Al (sum)

The full residue definition is “fosetyl-Al (sum of fosetyl, phosphonic acid and their salts, expressed as fosetyl)”. Throughout this report that definition is reflected as fosetyl (sum) All the residues reported as fosetyl (sum) in this report were detected as phosphonic acid.

Fosetyl-Al breaks down to phosphonic acid, but phosphoric acid can also be a residue left by use of pesticides containing disodium phosphonate or potassium phosphonates. Additionally, products sold as fertilizers also can contain or break down to phosphonic acid. And finally, phosphonic acid also occurs naturally in the environment. The presence of phosphonic acid does not necessarily mean that a pesticide was used. Those producing food need to be aware that the use of products that contain phosphonic acid or break down to phosphonic acid may lead to produce which breaches the MRL.

This pesticide can only be detected using a single residue method technique.

Dichlorodiphenyltrichloroethane (DDT)The use of DDT is banned or heavily restricted in many countries. It is not allowed for use on food crops anymore, but it is still used in some countries outside the EU as a public health insecticide. Residues of DDT take a long time

to break down in the environment and can accumulate in fatty tissue which is a major reason that it has been banned in the EU and many other countries.

Due to the bans and restrictions on use the levels in food have decreased substantially since the 1960s and 1970s. Even so, because it takes a long time to breakdown we do expect, and do see, occasional DDT residues in our monitoring results. Overall, the incidence and the size of residues have fallen steadily over time, which is what we would expect. In recent years none of our findings were unusual, unexpected or of concern. We can tell from the chemical form that we detect whether the residues we have found are from historic use (which is what we usually find). Historic use is indicated by the detection of DDE which is a break down product of DDT. We explain this every time we publish DDT results to try to make it as clear as we can that the results show food producers are not using DDT today. However, there are occasional media stories about DDT and various links and associations, which do not make this distinction.

The residues we find nowadays are at levels that would not be expected to have any effect on health, either in the short term or in the long term, when checked against today's understanding of the effect of DDT on health. As a committee, we take care to ensure we look thoroughly at this, and the FSA also actively involved in our considerations.

Processing factors

As the surveillance programme monitors residues in all types of food, from raw commodities (for example potatoes) to processed (for example wine), dried (for example dried fruit) and composite foods (for example fruit bread), consumer risk assessments are specifically tailored to address processed and mixed food products. MRLs are generally set for raw commodities, although when MRLs are established the assessment of dietary intakes allow for the potential for residues to remain in processed foods produced from the raw agricultural commodities. MRLs have been set for processed infant foods, and in future may be extended to other processed food products.

MRLs apply to all traded foods, including foods used as ingredients. The law specifies the level to apply to foods as they are traded. For almost all foods that means their raw, unprocessed form. But MRLs also apply to prepared and processed foods in which case the effect of processing needs to be allowed for.

In nearly all cases the MRL is set for the food in its raw, unprocessed form (the form of each food to which MRLs apply is listed in Annex I of Regulation 396/2005). These MRLs can be applied to processed foods using appropriate processing factors. Processing factors take account of the effect of processing on the food as traded. Different forms of processing may remove, concentrate, or dilute residues, and the effect may vary depending on the food and the pesticide concerned. Multiplying the processing factor by the original MRL gives a calculated MRL that can indicate the food was made with an ingredient or ingredients which had residues over the original MRL.

Calculating the MRLs for processed goods is dependent on the information available. HSE will contact the supplier if residues exceed the calculated MRL to give them an opportunity to provide relevant information to support the calculation.

Processing factors for apple juice, barley, bread (ordinary), oats and wine were taken from a published compilation of factors. Unless indicated otherwise.

HSE uses the general principle that if no specific processing factor is available, a default factor of 1 may be applied. Further information can be found at the links below.

In this report, we have applied processing factors mostly from the European database of processing factors for pesticide residues in food [European database of processing factors for pesticides residues in food version 5 May 2025](#)

Table 8a: Processing factors and MRLs used for Apple Juice (GB)

Food type	Pesticide	Processing factor	MRL for unprocessed apple (mg per kg)	Apple juice MRL (mg per kg)
Apple juice	Acetamiprid	0.47	0.4	0.188
Apple juice	Boscalid	0.07	2	0.14
Apple juice	Captan	0.63	10	6.3
Apple juice	Pyrimethanil	0.51	15	7.65

Table 8b: Processing factors and MRLs used for barley (GB and NI were relevant)

Food type	Pesticide	Processing factor	MRL for unprocessed grain (mg per kg)	Pearl barley MRL (mg per kg)
Pearl barley	Chlormequat	0.38	7	2.66
Pearl barley	Fluxapyroxad	0.15	2	0.3
Pearl barley	Mepiquat	0.81	4	3.24
Pearl barley	Tebuconazole	0.38	2	0.76

Table 8c: Processing factors and MRLs used for bread (ordinary) (GB and NI were relevant)

Food type	Pesticide	Processing factor	MRL for unprocessed grain (mg per kg)	Wheat MRL (mg per kg)
Bread (ordinary): other	Chlormequat	0.3	7	2.1
Bread (ordinary): wholemeal	Chlormequat	1.1	7	7.7
Bread (ordinary): white	Flonicamid	0.67	2	1.34
Bread (ordinary): wholemeal	Deltamethrin	0.86	1	0.86
Bread (ordinary): white	Deltamethrin	0.27	1	0.27
Bread (ordinary): other	Glyphosate	0.12	10	1.2
Bread (ordinary): wholemeal	Glyphosate	1.2	10	12
Bread (ordinary): other	Mepiquat	0.16	3	0.48

Table 8d: Processing factors and MRLs used for oats (GB and NI were relevant)

Food type	Pesticide	Processing factor	MRL for unprocessed grain (mg per kg)	Oat MRL (mg per kg)
Oats	Chlormequat	0.87	15	13.05
Oats	Glyphosate	0.17	20	3.4

Table 8e: Processing factors and MRLs used for wine (NI)

Food type	Pesticide	Processing factor	MRL for unprocessed grain (mg per kg)	Oat MRL (mg per kg)
Wine (white)	Dimethomorph	0.63	3	1.89
Wine (red)	Dimethomorph	0.37	3	1.11
Wine (red)	Fluopicolide	0.31	2	0.62
Wine (red)	Fluopyram	0.2	1.5	0.3
Wine (red)	Fosetyl	1.3	150	195
Wine (red)	Metalaxyl	0.67	1.5	1.005
Wine (red)	Methoxyfenozone	0.33	1	0.33

Follow-up from previous reports

HSE enforcement investigation has been completed for the possible unauthorised uses from last quarter in the following sample:

- one UK pre-packed salad sample that contained etofenprox. Enforcement conclusion that the residue is most likely to be a result of the authorised use of etofenprox on rocket grown in Germany.

In our Quarter 4 2025 report

Samples collected in Great Britain

In quarter 4 of 2025 we will look at results from samples collected in Great Britain for:

- apples
- barley
- beans with pods
- bread (gluten free)
- bread (ordinary)
- cabbage
- celery
- fish (tinned)
- grapes
- lettuce
- mango
- milk
- oats
- peaches and nectarines
- plant-based chocolate
- pork
- potatoes
- pre-packed salad
- spinach
- strawberries
- tomatoes
- wine

Samples collected in Northern Ireland

In quarter 4 of 2025 we will look at results from samples collected in Northern Ireland for:

- apples
- beans with pods
- bread (gluten free)
- bread (ordinary)
- cabbage (head)
- cheese (hard)
- figs
- fish (tinned)
- grapes
- lettuce
- mango
- milk
- peaches and nectarines
- plums
- pork
- potatoes
- salad and baby leaf bags
- spinach
- strawberries
- tomatoes

Glossary

This is a 'standard' glossary which defines the key terms used in the Expert Committee on Pesticide Residues in Food (PRiF) reports. Not all the terms listed here are used in every report.

97.5th percentile consumer

See [High level consumer in this report](#).

Acceptable daily intake (ADI)

This is the amount of a chemical which can be consumed every day for a lifetime in the practical certainty, based on all known facts, that no harm will result. It is expressed in milligrams of the chemical per kilogram of body weight of the consumer. The starting point for the derivation of the ADI is usually the 'no observed adverse effect level' (NOAEL) that has been observed in animal studies for toxicity. This is then divided by an uncertainty factor (most often 100) to allow for the possibility that animals may be less sensitive than humans and to account for possible variation in sensitivity between individuals. The studies from which NOAELs and hence ADIs are derived to allow for any impurities in the pesticide active substance as manufactured, and any toxic breakdown products of the pesticide.

Acetylcholine

Acetylcholine is a neurotransmitter, a chemical that carries signals through the nervous system. See [cholinergic in this report](#).

Acetylcholinesterase

This is an enzyme which degrades acetylcholine and is involved in the regulation of nerve impulses. Inhibition of this enzyme can interfere with this nerve transmission function. This is a short-term effect of concern with organophosphate and carbamate pesticides at levels above the Acute Reference Dose (ARfD).

Acute reference dose (ARfD)

The definition of the ARfD is similar to that of the ADI, but it relates to the amount of a chemical that can be taken in at one meal or on one day without appreciable health risk to the consumer. It is normally derived by applying an appropriate uncertainty factor to the lowest NOAEL in studies that assess acute toxicity or developmental toxicity.

As a matter of policy, the EU does not use NOAELs from tests that involve deliberate administration of pesticides to humans to determine ADIs and ARfDs. However, where such data have been ethically and scientifically derived some authorities, for example, the World Health Organization, do consider such data. Where human data are used there is

usually less uncertainty in the resulting reference value compared to extrapolating from animal tests to humans, and a lower uncertainty factor (most often 10) is used to account for the variation in sensitivity between individuals.

The initial risk assessments in PRiF reports use the agreed EU reference values. However, where intakes are above the EU value and a reference value based on acceptable human data is available a refined assessment, which is a more appropriate indicator of the risk, is also reported.

Analyte

This is the name for the substance that the PRiF surveys look for and measure if present; it could be a pesticide itself or a product from a pesticide when it is degraded, or metabolised.

BMDL₁₀

A benchmark dose level for the dose predicted to cause a 10% increase in tumour formation in experimental animals. This is used in a margin of exposure approach, which is endorsed internationally and considers that where exposures are at least 10,000 x lower than the BMDL₁₀ they are unlikely to be of concern.

Cocktail effect

See [multiple residues](#) in this report.

Codex

The Codex Committee on Pesticide Residues (CCPR) is responsible for establishing Codex maximum residue levels (MRLs) for pesticide residues in specific food items or in groups of food. These Codex MRL (CXLs) are internationally agreed food standards.

COLEACP (Europe-Africa-Caribbean-Pacific Liaison Committee)

It aims to promote the competitive export of fresh fruit, vegetables, flowers and ornamental plants from the ACP. Its specialised information and advisory services are open to all ACP companies in the horticultural export sector and are financed by the European Commission. It has 2 overriding objectives to enable ACP companies to comply with European food safety and traceability requirements and to consolidate the position of small-scale producers in the ACP horticultural export sector.

Cholinergic

In relation to the animal nervous system, processes and structures are cholinergic if they release or use acetylcholine.

Cryogenic milling

Processing of commodities at very low temperatures can be achieved by milling or grinding pre-frozen samples in the presence of dry ice, a procedure known as 'cryogenic milling'.

Extensions of authorisations for minor use (EAMUs)

Users and authorisation holders of agricultural Plant Protection Products (PPP) may apply to have the authorisation of specific PPP's extended to cover uses additional to those authorised and shown on the manufacturer's product label. For many reasons, label recommendations of authorised pesticides do not cover the control of every problem which may arise. This is particularly true for crops that are grown on a comparatively small scale in the UK as well as for pests and diseases that occur less often, or which are new to the UK. As part of the process evidence on residues that would arise from the use is required, and consumer safety is evaluated and if necessary, a specific MRL set. EAMU is pronounced "emu" these types of authorisations are also informally called "off labels".

EFSA Pesticides Peer review Co-Ordination (EPCO)

EU meetings involving EFSA and member state experts.

Genotoxicity

Genotoxicity is the effect of substances (called genotoxins) which can alter or damage the genetic material (DNA, RNA, or chromosomes) within a cell. Cells have the capacity to protect themselves from genotoxic effects by many repair processes and therefore many genotoxic events do not become evident as mutations. Where mutations occur, this can lead to cancer or effects that can be passed to unborn children (for example, birth defects, inherited diseases).

Good agricultural practice in the use of pesticides (GAP)

The nationally authorised safe uses of pesticides under conditions necessary for effective and reliable pest control (the way products should be used according to the statutory conditions of authorisation which are stated on the label). GAP encompasses a range of pesticide applications up to the highest authorised rates of use, applied in a manner which leaves a residue which is the smallest practicable. Authorised safe uses are determined at the national level and include nationally registered recommended uses, which allow for public and occupational health and environmental safety considerations. Actual conditions include any stage in the production, storage, transport, distribution and processing of food commodities and animal feed.

High-level consumer

A term used in UK risk assessment calculations to describe the amount of food consumed by a person. In line with internationally agreed approaches, the PRiF uses the 97.5th

percentile value, which is generally about 3 times the average amount consumed. This takes account of different eating patterns that may occur throughout the population.

Human data

See [Acute reference dose](#) in this report.

In vitro

A test performed in vitro “in the glass” means that it is performed outside of a living organism and usually involves isolated tissues, organs or cells.

In vivo

Live animal studies.

Import tolerance

An MRL set for imported products where the use of the active substance in a plant protection product on a commodity is not authorised in the European Community (EC), or an existing EC MRL is not sufficient to meet the needs of international trade. All import tolerances are assessed for consumer safety.

Imported

The tables in the reports record whether the sample was of UK origin or imported. This can mean different things depending on the commodity. See also [Origin](#) in this report. The PRiF report the country from where the produce has been imported only if this is clear from the packaging or labelling.

INFOSAN (International Food Safety Authority network)

Since the end of the EU transition period, in Great Britain, notifications are submitted via FAO/WHO’s International Food Safety Authority network INFOSAN of which UK is a member. Non compliances that do not present a food safety risk are not communicated by Great Britain to other countries and there is an expectation that non-compliance notifications will be communicated by the importer or exporter or both in liaison with the LA.

NI continues to be part of the EU Rapid Alert System for Food and Feed (RASFF) (see [RASFF](#) in this report) network under the terms of the Windsor Framework so where appropriate will email notifications via the RASFF network, including for non-compliances under Administrative Assistance and Cooperation Network (AAC) procedures.

JMPR

Joint FAO and WHO Meeting on Pesticide Residues, which conducts scientific evaluations of pesticide residues in food.

Limit of determination (LOD) and LOD MRLs

The LOD is the lowest concentration of a pesticide residue or contaminant that can be routinely identified and quantitatively measured in a specified food, agricultural commodity or animal feed with an acceptable degree of certainty by the method of analysis. Note, exceptionally we test at levels lower than the LOD MRL to determine incidence of certain pesticides of specific interest.

LOD MRL (maximum residue levels set at the LOD)

These are marked by an asterisk (*). For some pesticides and commodities insufficient trials data are available on which to set a MRL or there may be no use of the pesticide on that crop. In these cases, the MRL may be set at a default level for example, at the LOD where analytical methods can reasonably detect the presence of the pesticide. These MRLs are not based on GAP. Also, see under [Reporting limit](#) in this report.

Lowest observed adverse effect level (LOAEL)

The lowest concentration or amount of a substance, found by experiment or observation, which causes detectable adverse alteration of morphology, functional capacity, growth, development or life span of the target organism under defined conditions of exposure.

Off label

See [Extensions of authorisations for minor use \(EAMUs\)](#) in this report.

Maximum residue level (MRL)

A MRL is the maximum concentration of a pesticide residue expressed in mg per kg in or on food or feed of plant and animal origin that is legally tolerated when a plant protection product (PPP) is applied correctly (following good agricultural practice).

MRLs apply to most food commodities, although they are not currently applied to fish and produce grown exclusively for animal feed. They are not set specifically for processed commodities. Instead, the MRLs for the raw agricultural commodities apply, with processing factors applied to determine the compliance of processed goods.

An import tolerance is an MRL set on imported food or feed to meet the needs of international trade.

MRLs are intended primarily as a check that GAP is being followed and to assist international trade in produce treated with pesticides. MRLs are not in themselves 'safety

limits', and exposure to residues greater than the MRL does not automatically imply a hazard to health.

MRLs reflect levels of pesticides that could occur in produce, which has been treated in accordance with good agricultural practice. Where pesticides do not give rise to readily detectable residues, or are not authorised for use on commodities, MRLs are set at the lowest level which can be identified in routine laboratory analysis. Thus, they provide a mechanism for statutory controls on pesticides in produce which is put into circulation and for monitoring correct use of these chemicals.

If no use of a pesticide on a crop is identified when MRLs are set the tolerance for that pesticide and crop combination is set at the limit of determination (effectively zero). Limit of determination MRL are marked by a '*'.

MRLs are regulated in Northern Ireland under Regulation 396/2005.

MRLs are regulated in Great Britain under Retained Regulation (EC) No 396/2005.

Maximum residue levels set at the LOD (LOD MRL)

See [LOD MRL](#) in this report. For some pesticides and commodities, insufficient trials data are available on which to set a maximum residue level, or there may be no use of the pesticide on that crop. In these cases, the MRL may be set at a default level, for example, at the LOD where analytical methods can reasonably detect the presence of the pesticide. These MRLs are not based on GAP.

MRL exceedances

When a residue is found at a level higher than that set for the MRL.

MRL exceedances and relationship with the acceptable daily intake (ADI)

Before permitting any use of a pesticide, a detailed assessment is made to ensure that residues in foods derived from commodities comply with MRLs and will not give rise to unacceptable risks to consumers. MRLs do take account of consumer safety aspects and, in effect, are set at levels below safety limits. However, MRLs must not be confused with safety limits, which are expressed in terms of the ADI of a particular pesticide residue from all sources. The ADI (expressed as mg per kg bw per day) is the amount of chemical that can be consumed every day of an individual's entire lifetime in the practical certainty, based on all known facts, that no harm will result. See [Acceptable daily intake \(ADI\)](#) in this report for further information.

Whenever unexpectedly high or unusual residues occur during monitoring, the risk to consumers, from exposure to residues at the highest levels found, is assessed by comparison of predicted intakes with the ADI or ARfD as appropriate.

No MRL

For certain pesticides an MRL may not have been set.

Metabolite

A degradation or conversion product from a pesticide when it is metabolised.

Multiple residues

In this report this term is used to describe when more than one pesticide is found in an individual food sample. It may have arisen because the crop was treated at different times with pesticides applied singularly, or when pesticides are applied as mixtures (several pesticides mixed in the spray tank at the same time) or the marketed pesticide product contains more than one pesticide or any combination of these 3 situations. Mixtures may be used in response to specific pest pressures and also as part of strategies to minimise pesticide resistance building up on pest populations. We consider the possible implications to health of more than one pesticide being found in samples (sometimes called the 'cocktail effect'). Refer to 'Multiple residues' under [HSE risk assessment methodology](#) for further details.

National estimate of daily intake (NEDI)

An estimate of intake of pesticide in the diet over the long-term to compare to the ADI. The NEDI is based on median or mean residue levels and a high-level consumption (97.5th percentile value) for the daily amounts of the food item consumed over the long-term. For further details on the calculation of NEDIs, refer to the [Consumer Exposure section of the Data Requirements Handbook on the HSE Pesticide website](#). Here you will find information and further links.

National estimate of short-term intake (NESTI)

An estimate of peak intake of pesticide in the diet to compare to the ARfD. The NESTI is based on the highest residue found multiplied by a [variability factor](#) and a high level consumption (97.5th percentile value) for the amount of the food item consumed over a single day. See [variability factors](#) in this report. For further details on the calculation of NESTIs, refer to the [Consumer Exposure section of the Data Requirements Handbook on the HSE Pesticide website](#). Here you will find information and further links.

Neurotoxicity

Neurotoxicity is the effect of substances (called neurotoxins) which alter the normal working of an animal's nervous systems and can damage the nervous tissue.

No observed adverse effect level (NOAEL)

The greatest concentration or amount of a substance, found by experiment or observation, which causes no detectable adverse alteration of morphology, functional capacity, growth, development or life span of the target organism under defined conditions of exposure.

Off label

See [Extensions of authorisations for minor use \(EAMUs\)](#) in this report.

Origin

The brand name annex reports the origins of the samples tested. This can mean different things depending on the commodity. For example, butter is often labelled as 'UK origin'; however, many of it comes in bulk from New Zealand and is split into smaller blocks and packaged in the UK. Lettuce is a fresh produce and 'UK origin' usually means that it has been grown and packaged in the UK. Processed commodities such as cereal bars often contain multiple raw ingredients, each of which may come from a different source or origin. Therefore, the origin of the produce usually reflects the place where it was manufactured. The PRiF report the origin as stated on the packaging or labelling of the commodity concerned, unless other more accurate information is available to indicate that the origin is from elsewhere. Some products are listed as 'unknown origin' because the labelling does not give this information.

Parent

The chemical form of a pesticide as applied to plants, as opposed to metabolites and breakdown products.

Percentile

A percentile is a value that divides a sample of measurements at a specific point when they are listed in ascending order of magnitude. For example, the 97.5th percentile from a food consumption survey is a value that is equal to or more than 97.5% of the measurements and equal to or less than 2.5% of the measurements. So, in a sample of 40 daily food consumption values, the 97.5th percentile is equal to or more than 39 of the measurements. Such high percentile estimates of food consumption are used in risk assessments as they are more protective than using average consumption levels.

Permitted level (PL)

The permitted levels (expressed as mg per kg), in specific commodities, of some substances which can be classified as pesticides but are controlled under the Miscellaneous Food Additives Regulations 1995 (S.I. 1995 No. 3187).

Pesticide

A pesticide is any substance, preparation or organism prepared or used for destroying any pest. Most pesticides sought by the PRiF in its monitoring are those used to control pests in agricultural crops, although non-agricultural products may be included where there is a specific reason for doing so, for example, where there are implications in terms of possible intakes of residues.

Probabilistic modelling

The usual estimates of consumer exposure use single high values for both consumption amounts and residue levels. Whilst these are based on realistic UK dietary survey data and residue levels, they tend to overestimate most representative intakes. This is because they do not allow for actual variations in both amounts consumed and residue levels. Probabilistic modelling is a technique that considers all the possible different combinations of consumption and residue levels. This provides information on the probability of intakes occurring.

Rapid Alert System for Food and Feed (RASFF)

The European Commission's Rapid Alert System for Food and Feed (RASFF) allows member authorities (EU and EFTA member States) to quickly exchange information about measures taken when responding to risks detected in food or feed. This exchange of information helps authorities in countries inside the European single market to act more rapidly and in a coordinated way in response to a possible health threat caused by food or feed.

RASFFs notifications about pesticide residues are sent when a residue is over the MRL, allowing for measurement uncertainty and a potential consumer risk has been identified. For pesticide residues in food traded in the single market this means when a risk assessment has identified that risk to people eating the food cannot be ruled out.

More information is available on the European Commission website at [RASFF - Food and Feed Safety Alerts](#).

Relationship between GAP and MRLs

The MRL can be defined as the maximum concentration of a pesticide residue (expressed as mg per kg) likely to occur in or on food commodities and animal feeds, after the use of the pesticide according to the GAP.

Reporting limit

The reporting limit is the lowest level at which residues will be reported by a laboratory for a survey, as agreed in advance with the laboratory. It can be equal to or higher than the limit of quantification (sometimes also referred to as the limit of determination). The limit of quantification is the lowest concentration that has been validated to meet strict acceptance

criteria and may vary slightly from laboratory to laboratory depending on the equipment available and operating procedures used. The reporting limit should be at or below the MRL. For a small number of pesticides for example, monocrotophos, we are looking for the pesticide below the LOD MRL because we are specifically interested in prevalence in food due to the nature of the pesticide. In such cases, tests are performed in the laboratory to support the lower reporting limits by validating the method at lower limits. 'None were detected above the set RL': This term is used in the Brand Name Annex, where no residues were found above their reporting limit.

Residue

Residues may be present in vegetable and animal products following the application of pesticides. They may not only include the pesticide that was applied but other degradation or reaction products and metabolites that may be of toxicological significance. The levels or amounts of residues present are expressed in milligrams of the chemical in a kilogram of crop, food, or commodity (mg per kg), or parts per million.

Risk assessment

A risk assessment is carried out when residues are found in foods to determine whether, at the levels found, they present a concern for consumer health or not. Consumer risk assessments are routinely conducted as part of the approval process for pesticides and are based on residue trials. Approval of a pesticide is only recommended when the consumer risk is acceptable.

Safety factor

Values used in extrapolation from experimental studies in animals (usually 100) or humans (usually 10) to the population: for PRiF assessments this represents a value by which the NOAEL is divided to derive an ADI or ARfD. The value depends on the nature of the effect, the dose-response relationship, and the quality of the toxicological information available. The use of such a factor, accounts for possible differences in susceptibility between the animal species tested and humans, and for variation between different individuals in the population. The terms 'uncertainty factor' and 'assessment factor' are also sometimes used for this factor; the PRiF will use 'safety factor'.

Sample

The nature of all samples is as designated in the EC's 'sampling' Directive 2002/63/EC. For examples a sample of apples must be made up of at least 10 apples and weigh at least 1kg in total. And a sample of grapes must be made up of at least 5 bunches and weigh at least 2kg in total.

Variability factor

A value that describes the variation in residue levels between the highest unit level and the average level in samples made up of many units. Internationally this is agreed to be the

97.5th percentile unit residue level divided by the average of the sum. The variability factor multiplied by the measured residue level from a composite sample (for example, a sample made up by mixing several units before analysis) gives an estimate of the likely higher residue levels that may have occurred in individual units. These estimated higher levels are used in short-term risk assessments involving fruit and vegetables where consumers eat only a portion of a single item, for example, melon, or a small number of units for example, apples and potatoes.