

**Report on  
Food Sampling Data  
Held on the  
UK Food Surveillance  
System 2012-2013**

## Executive Summary

The report summarises the results of enforcement authorities'<sup>1</sup> (EAs') food sampling. The data include survey sampling and sampling carried out as part of enforcement investigations.

In total across those EAs using UKFSS 31,829 samples were submitted for analysis (chemical samples) or examination (microbiological samples). This comprised 12,071 microbiological samples and 19,758 chemical samples. The overall rates of compliance were 75.6% and 87.3 % for microbiological and chemical sampling respectively. The microbiological sampling includes hygiene indicators (as opposed to pathogen tests) and swab testing of surfaces. These are the main cause of microbiological non-compliance and indicate the need for better cleaning regimes in the businesses inspected. Similarly for chemical samples the main cause of non-compliance is non-food safety food labelling and composition issues.

The samples are targeted enforcement samples and it is not possible to extrapolate how this affects the supply chain as a whole where levels of compliance will be higher.

Meat and meat products including fresh and processed meats were the most frequently sampled food type. The second most frequently sampled food type was prepared food which includes ready meals and restaurant and catering meals. The report breaks down the sampling across the different premises types with microbiological sampling being most carried out at catering level and the majority of chemical sampling being carried out at retail.

Details of presence of pathogens in foods show very high rates of compliance – with rates for the main pathogens being 98% and over. Where non-compliance is found then EAs follow-up with immediate enforcement action to make sure that the business is compliant in future and the FSA is notified.

Chemical non-compliance is split between enforcement and survey type samples. The main area of non-compliance for enforcement samples were additives in drinks, salt levels in meat products and meat substitution in meat dishes at catering.

For survey samples the main causes of non-compliance were drinks failing for alcohol adulteration, the presence of undeclared allergens in prepared dishes and dairy products failing for the expected levels of fat.

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<sup>1</sup> Wherever enforcement authorities (EAs) are mentioned in this report they include Local Authorities, Port Health Authorities and groups of Local Authorities.

The top failure rates for chemical samples overall, identified issues with the presence of undeclared peanut and almond allergens in takeaway meals, levels of pesticide in Nigerian beans above the required levels and presence of heavy metals in edible clays. In all cases action was taken to investigate and ensure future compliance.

The report shows that local authority sampling is broad, varied and comprehensive, and significant local authority resource is put towards protecting the consumer. Issues raised through the report will inform recommendations for future sampling by EAs. The results can be used by industry to inform their routine checks of food. The data will also be used by UK government to help develop food and enforcement policy.

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## 1.0 Introduction

The UK Food Surveillance System (UKFSS) is a Food Standards Agency database for central storage of analytical results from food samples taken by EAs<sup>2</sup> as part of their official controls. EAs are required under the statutory Food Law Code of Practice to carry out food sampling. Samples submitted to laboratories may be subjected to a broad range of analytical tests; the type of tests applied will depend on factors such as the product type and associated risks.

Since 2007, the information held on the UKFSS database has helped identify possible trends and issues for potential investigation. The database is rapidly expanding in use by enforcement officers across the United Kingdom, which has further increased the evidence base to inform policy and enforcement on food safety and standards.

This is the first report of food data submitted to UKFSS from all countries within the UK. Previous reports on UKFSS food sampling results have been published separately for [Scotland](#) and [Northern Ireland](#).

During the reporting period (1 April 2012 to 31 March 2013) the numbers of EAs using UKFSS for chemical sample upload were: all 26 in Northern Ireland, 29 of the 32 in Scotland, 17 of the 22 in Wales, and 109 of the 152 EAs in England that carry out food standards work (food standards samples were sent for chemical analysis and labelling checks rather than microbiological examination).

This report underrepresents sampling undertaken within the UK. It does not include results of samples taken by EAs not using UKFSS, and the picture may be incomplete where EAs using UKFSS chose not to record all their samples on the system. Also, the Public Health Laboratories in England and Wales were only just starting to use UKFSS over the reporting period, and so most of the microbiological sampling reported here was from Scotland and Northern Ireland only.

A separate report on the National Co-ordinated Risk-based Food and Feed Sampling Programme for 2012-13 is available via the following link: <http://www.food.gov.uk/sites/default/files/NCSP-Food-Feed-Report2.pdf>. The National Co-ordinated Risk-based Sampling Programme provides financial support in the form of grant funding to support and coordinate EAs' sampling and surveillance across the UK. The objective of the sampling programme is

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<sup>2</sup> Wherever enforcement authorities (EAs) are mentioned in this report they include Local Authorities, Port Health Authorities and groups of Local Authorities.

to raise the importance of enforcement authority sampling, surveillance and controls for particular imported food/feed both at the port of entry and 'inland'.

### **Enforcement and Sampling**

The samples included in this report were taken by EAs as part of their official controls. Most of the samples were targeted at products and premises that were known to be a high risk and so do not represent a cross-section of foods on the market. Appropriate follow-up action is taken by authorities where non-compliance is found, in line with the 'hierarchy of enforcement'<sup>3</sup> set out in the Food Law Code of Practice.

Where contamination of food represents a safety risk, the FSA is notified and the issue dealt with as an 'incident' (see the [FSA policy on Incident handling](#)). In these instances, direct action is taken by EAs, overseen by the FSA, to minimise any risk to consumers. These actions may include: withdrawals or recalls of food from sale; possible seizing and destruction of foods; issuing alerts to industry, enforcement and regulators of issues with particular products.

**The data within this report are for those samples whose results were entered onto UKFSS within the reporting period (1 April 2012 – 31 March 2013). Therefore, the data may exclude samples taken but not analysed in that time.**

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<sup>3</sup> *The 'hierarchy of enforcement' means that local authorities start by offering non-compliant businesses advice and support, but depending on the nature of the contravention, and how responsive the food or feed business is, enforcement will escalate in level with the final step being prosecution.*

## 2.0 Overall Food Data and Key Findings

Between 1 April 2012 and 31 March 2013, data from microbiological examination and chemical analysis conducted on a total of 31,829 food samples were submitted to the UKFSS database. A breakdown of the number of food samples taken across England, Northern Ireland, Scotland and Wales is presented in Table 1.

**Table 1 Breakdown of food samples according to country**

	England	Northern Ireland	Scotland	Wales	UK
Microbiological	399	6,243	5,411	18	12,071
Chemical	11,978	2,124	4,070	1,586	19,758
<b>Grand Total</b>	<b>12,377</b>	<b>8,367</b>	<b>9,481</b>	<b>1,604</b>	<b>31,829</b>

The UKFSS had not been fully implemented in all the Public Health Laboratories in England and Wales during the reporting period. Therefore the number of microbiological samples does not reflect the total UK sample figures. FSA monitoring of the EAs' samples show that the levels of microbiological samples are greater than that for chemical sampling (see [Annual Report on UK Local Authority food Law Enforcement 1 April 2012 to 31 March 2013](#)).

A breakdown of the number of food samples taken for microbiological and chemical purposes in the United Kingdom and the proportion giving an overall satisfactory result is presented in Table 2.

**Table 2 Breakdown of UKFSS Sampling statistics for 2012-13**

	Number of samples	Number of samples giving an overall satisfactory results	% Compliance
Microbiological	12,071	9,127	75.6
Chemical	19,758	17,249	87.3
<b>Total</b>	<b>31,829</b>	<b>26,376</b>	<b>82.9</b>

Overall, 82.9% of all food samples taken during the year 2012-13 were satisfactory. The percentage of unsatisfactory results recorded for chemical analysis and microbiological examination were 12.7% and 24.4% respectively. It should however be noted that for microbiological samples, the inclusion of hygiene indicator testing (including swabs) and the inclusion of "borderline"

microbiological results as “unsatisfactory” raises the overall percentage of non-compliance/unsatisfactory results. See Section 3 for details of the microbiological results.

Many of the chemical non-compliances were a result of labelling errors and not breaches such as contamination which might have public health consequences. Further breakdowns for the reasons of failure are given later in the report.

## 2.1 Testing of Foods of Imported, EU and UK Origin

Approximately three-quarters (78%) of all samples submitted for microbiological and chemical analysis were reported to be products of UK origin. However, this may have been an over-estimate caused by the way data were entered. When detail of the place of origin of the sample is not known, it defaults to UK. The UKFSS sample registration screen has since been amended so that it no longer occurs, no default is applied in UKFSS and the country of origin detail **must** be selected from the drop down list.

The non-compliance rates were highest in UK products (18.5%) followed by products of other EU Member States (13.6%) and non-EU countries (11.6%). Table 3 represents the breakdown of sampling activities according to the products’ country of origin.

A total of 5,233 samples were taken across 105 non-EU countries. Overall, products of non-EU countries constituted 16.4% of the total samples. The most frequently sampled foods from non-EU countries were herbs & spices, fish & shellfish products, nuts, fruits, cereal and sauces. The most frequently sampled foods from within the EU (but not of UK origin) were vodka, meat products, and olive oil. It should be noted that the sampling rates presented for each food category were significantly influenced by targeted sampling/surveillance activities undertaken during the year.

Of the 24,950 samples of UK origin, 81.5% were satisfactory.

**Table 3 Breakdown of sampling activities according to country of origin**

Sample Result	UK	Other EU Member States	Non EU Countries	Unspecified
Satisfactory	20,328	1,421	4,626	1
Unsatisfactory	4,622	224	607	0
<b>Total</b>	<b>24,950</b>	<b>1,645</b>	<b>5,233</b>	<b>1</b>



Table 4 shows the top three non-EU countries whose products were most often sampled. 18% of samples originated from China, 15% from India and 8% from the United States. Of these, the highest rate of non-compliance was found in products from the United States where 92 samples were found to be unsatisfactory. However, much of this was targeted sampling of a known issue with carbonated drinks from the United States failing for excess levels of benzoic acid. These failures made up 48 out of the 92 non-compliances.

**Table 4 Top three non-EU countries sampled**

Country	Number of Samples (number of unsatisfactory samples in bracket)	% of Samples from non EU countries
China	935 (53)	18%
India	773 (56)	15%
United States	406 (92)	8%

## 2.2 Most Frequently Sampled Foods – Microbiological and Chemical Testing

The most frequently sampled food categories (shown in Tables 5 and 6) were meat and meat products, game and poultry, which made up 28.7% and 29.0% of the microbiological and chemical testing respectively. The next most frequent was prepared dishes at 22.5% and 13.0% for microbiological and chemical testing respectively.

Table 5 shows the microbiological sampling results by food category. These are overall analysis figures. They include aerobic colony count, hygiene indicator and pathogen testing. The testing profile would vary depending on the specific product type that is within the category. The tests applied would not be standard across all the samples.

Non-compliance in microbiological testing included swabs of food contact surfaces and tests for indicators of general hygiene and poor handling practice. Therefore, non-compliances are not always indicative of a potential risk to human health. In fact, less than 1% of samples tested for the presence of pathogens were found to contain levels which would be considered as being harmful to health (see section 3.2).

The highest rates of non-compliance for microbiological issues were found in cakes and confectionery (34.2%), meat and meat products, game and poultry (31.7%) and prepared dishes (25.8%).

**Table 5 Microbiological sampling results by Food Category**

<b>Microbiological Sampling by Food Category*</b>	<b>Number of Samples Taken</b>	<b>Non-Compliant</b>	<b>% Non-compliance</b>
Meat and Meat Products, Game and Poultry	3,469	1,098	31.7
Prepared Dishes	2,722	701	25.8
Fruit and Vegetables	1,825	300	16.4
Others** (including swabs)	853	184	21.6
Dairy Products	703	138	19.6
Ice Cream and Desserts	514	96	18.7
Fish and Shellfish	505	98	19.4
Bakery and Cereal Products	365	76	20.8
Soups, Broths and Sauces	323	68	21.1
Cakes and Confectionery	281	96	34.2
Egg and Egg Products	237	61	25.7
Drinks	147	18	12.2
Herbs and Spices	52	9	17.3
Nuts and Nut Products, Snacks	29	0	0.0
Additives	23	0	0.0
Foods for Particular Nutritional Uses	8	0	0.0
Materials and Articles in Contact with Food	8	1	12.5
Beverages	7	0	0.0
<b>Grand Total</b>	<b>12,071</b>	<b>2,944</b>	<b>24.4</b>

\*Test suite applied will be relevant to the product types

\*\*Other Food Categories include: 'Additives', 'Bakery and Cereal Products', 'Beverages', 'Cakes and Confectionery', 'Drinks', 'Egg and Egg Products', 'Foods for Particular Nutritional Uses', 'Herbs and Spices', 'Ice Cream and Desserts', 'Materials and Articles in Contact with Food', 'Nuts and Nut Products, Snacks', 'Soups, Broths and Sauces', and 'Others'.

Table 6 shows the chemical analysis results by food category. The highest rates of chemical non-compliance, excluding categories with low sample numbers were drinks (18.4%), dairy products (15.9%) and prepared dishes (16%).

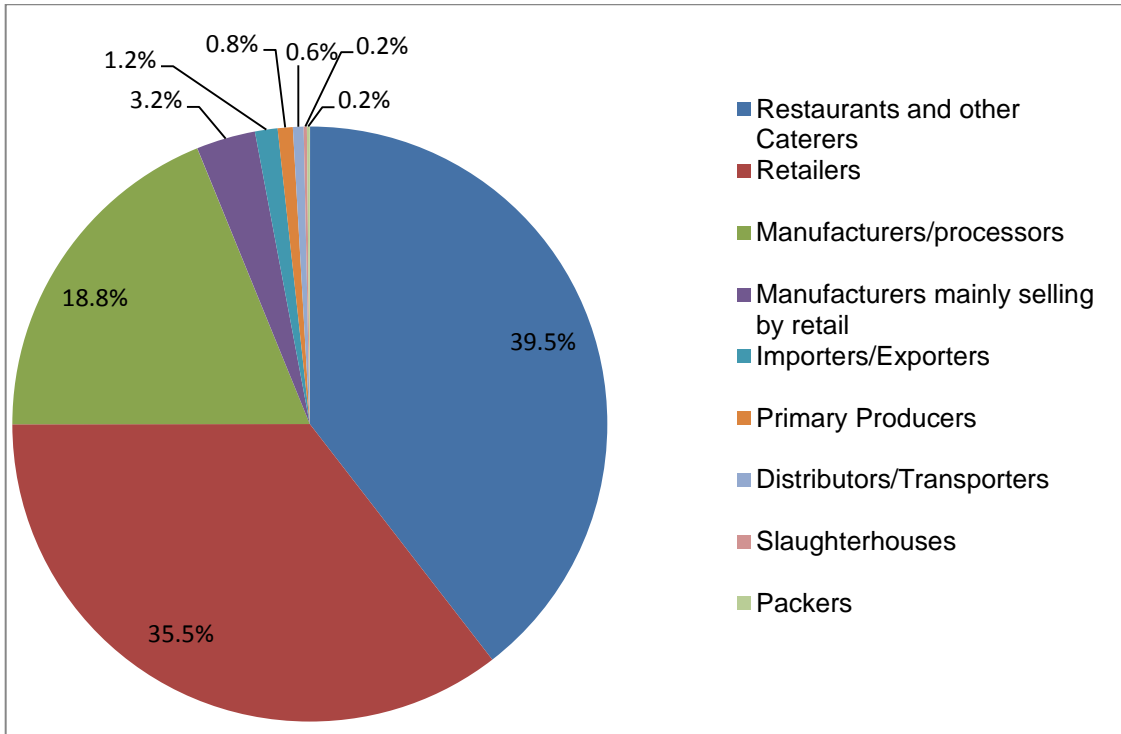
**Table 6 Chemical Sampling results by Food Category**

<b>Chemical Sampling by Food Category</b>	<b>Number of Samples Taken</b>	<b>Non-Compliant</b>	<b>% Non-compliance</b>
Meat and Meat Products, Game and Poultry	5,724	833	14.6
Prepared Dishes	2,568	412	16.0
Drinks	1,638	301	18.4
Bakery and Cereal Products	1,486	153	10.3
Fish and Shellfish	1,325	103	7.8
Others*	1,056	145	13.7
Fruit and Vegetables	1,047	90	8.6
Cakes and Confectionery	997	90	9.0
Herbs and Spices	954	51	5.3
Nuts and Nut Products, Snacks	715	89	12.4
Dairy Products	700	111	15.9
Soups, Broths and Sauces	538	47	8.7
Materials and Articles in Contact with Food	305	16	5.2
Foods for Particular Nutritional Uses	238	28	11.8
Beverages	213	10	4.7
Ice Cream and Desserts	149	19	12.8
Additives	80	6	7.5
Egg and Egg Products	25	5	20.0
<b>Grand Total</b>	<b>19,758</b>	<b>2509</b>	<b>12.7</b>

\*Other Food Categories include: 'Additives', 'Bakery and Cereal Products', 'Beverages', 'Cakes and Confectionery', 'Drinks', 'Egg and Egg Products', 'Foods for Particular Nutritional Uses', 'Herbs and Spices', 'Ice Cream and Desserts', 'Materials and Articles in Contact with Food', 'Nuts and Nut Products, Snacks', 'Soups, Broths and Sauces', and 'Others'.

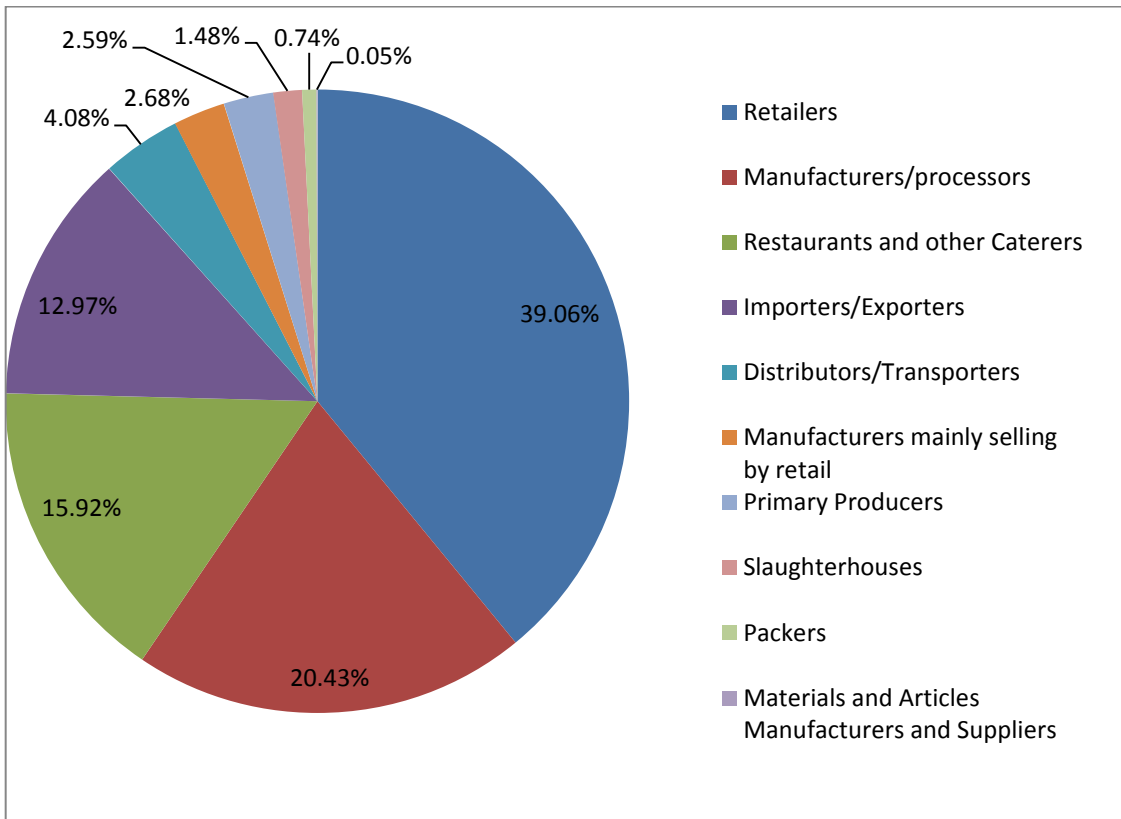
## 2.3 Premises Types

The most frequently sampled premises types (that is the most targeted by Local Authorities) for microbiological sampling were restaurants and other caterers (39.5%), retailers (35.5%) and manufacturers/processors (18.8%) (Figure1). The most frequently sampled premises types for chemical sampling were retailers (39.1%), manufacturers/processors (20.4%) and restaurants and other caterers (15.9%), (figure2).



Total = 12,071 samples

**Figure 1 Microbiological Sampling by premises types**



Total = 19,758

**Figure 2 Chemical Sampling by premises types**

## 2.4 Premises Types Compliance Levels

The rates of non-compliance for each of the premises types sampled for microbiological and chemical analysis are presented in Table 7 and Table 8. The rates of non-compliance for microbiological sampling include hygiene indicator testing and swabbing of surfaces to test the quality of hygiene controls in a premises. Therefore, the rates of non-compliance are not indicative of the pathogen contamination of foods.

The top premises type that was non-compliant for microbiological examination was importer/exporter (44.2%) and was mainly a result of sultanas and seedless raisins from Turkey that failed due to the presence of yeasts and moulds (See table 7).

**Table 7 Non-compliance for microbiological sampling results by premises types**

Type of premises sampled for microbiological analysis	Number of samples taken in these premises	Non-compliant	% Non-compliance
Importers/Exporters	147	65	44.2
Packers	19	6	31.6
Manufacturers mainly selling by retail	389	103	26.5
Restaurants and other Caterers	4,768	1,249	26.2
Retailers	4,285	1,037	24.2
Manufacturers/processors	2,273	467	20.5
Distributors/Transporters	70	11	15.7
Slaughterhouses	21	2	9.5
Primary Producers	99	4	4
<b>Grand Total</b>	<b>12,071</b>	<b>2,944</b>	<b>24.4</b>

The top premises type that was non-compliant for chemical analysis was manufacturers mainly selling by retail (19.5%) (See table 8). This was largely the result of foods within the meat and meat products, game and poultry category, of which 11% failed due to salt levels (58 samples were above the voluntary limit of industry salt reduction for food manufacturing). Although these results reflect failure for salt content, it is important to note that these are based on comparison with guideline values and do not constitute a breach of legislative limit.

**Table 8 Non-compliance for chemical sampling results by premises types**

Type of premises sampled for chemical analysis	Number of samples taken in these premises	Non-compliant	% Non-compliance
Manufacturers mainly selling by retail	529	103	19.5
Restaurants and other Caterers	3,145	467	14.8
Manufacturers/processors	4,037	560	13.9
Packers	147	19	12.9
Retailers	7,718	948	12.3
Distributors/Transporters	807	99	12.3
Primary Producers	512	59	11.5
Slaughterhouses	292	32	11
Importers/Exporters	2,562	222	8.7
Materials and Articles Manufacturers and Suppliers	9	0	0
<b>Grand Total</b>	<b>19,758</b>	<b>2509</b>	<b>12.7</b>

### 3.0 Microbiological Sampling

#### 3.1 Details of Microbiological Sampling

Microbiological samples were examined by accredited laboratories using accredited methods, including the detection and enumeration of pathogens and/or levels of hygiene indicators and Aerobic Colony Counts (ACCs). According to the Health Protection Agency (HPA)<sup>4</sup> guidance, the ACC, also known as Total Viable Count or Standard Plate Count, is an indicator of quality, not safety, and cannot directly contribute towards a safety assessment of ready-to-eat food.

The results of these tests were interpreted against food hygiene legislation, as appropriate and defined under [Regulation EC No 2073/2005 on the Microbiological Criteria for Foodstuffs](#) and/or the HPA [Guidelines for Assessing the Microbiological Safety of Ready-to-Eat \(RTE\) Foods placed on the Market](#). The food examination results were classified as satisfactory, borderline or unsatisfactory. Samples are given an overall satisfactory result only when the results of all tests within the suite are satisfactory.

<sup>4</sup> HPA is now known as Public Health England (PHE)

For the purpose of this report, samples which were classified as borderline were classified as unsatisfactory. Details of borderline samples for pathogen contamination are also provided.

### 3.2 Detection of Pathogens in Food Samples

Table 9 shows the results for detection of pathogens in food. The number of samples failing for the presence of pathogens in food is less than 1% compared to the overall microbiological fail rates. This is because the non-compliance in microbiological testing included swab and hygiene indicator testing which do not necessarily reflect a risk to health.

Information on the [FSA's foodborne disease strategy](#) shows that there are strategic goals in place to reduce the level of *Campylobacter* and *Listeria monocytogenes* in particular foods. Further information on the FSA's work on foodborne diseases in the UK can also be found in the [Chief Scientist Annual Report](#).

All samples tested for *Campylobacter* and *E coli* O157 were satisfactory. For *Listeria monocytogenes*, 98.8% of samples tested for these bacteria were satisfactory. It is important to note that the results are based on **targeted sampling** as part of the Local Authority official control and therefore are not representative of the whole food chain.

The EA sampling helps provide evidence on which foods need to be prioritised for interventions or advice to vulnerable sectors of the community. If levels breach microbiological criteria or HPA guidelines on RTE foods, then the local authorities investigate the source of contamination and products are withdrawn from sale.

A total of 10,156 samples were tested for at least one of the following key foodborne pathogens: *Campylobacter*, *Escherichia coli* O157, *Clostridium perfringens*, *Listeria monocytogenes*, *Salmonella*, *Staphylococcus aureus* and *Bacillus cereus*.

**Table 9 Tests for Pathogens**

Pathogen	Unsatisfactory foodstuffs	No. of unsatisfactory samples	No. of borderline samples	No. of samples tested	% Satisfactory (no. of satisfactory samples)
Campylobacter	N/A	0	0	634	100 (634)
E.coli O157	N/A	0	0	591	100 (591)
<b>Clostridia</b>		3	18	8123	99.7 (8,102)
	Sauces – other (curry sauce)	1			
	Vegetables – fresh (carrots)	1			
	Take-Away Meals- oriental style chicken chop suey	1			
<b>Listeria monocytogenes</b>		23	17	3378	98.8 (3338)
	Cows Cheese - made from raw milk	12			
	Chicken - cooked	3			
	Cream - Other (chicken salad BAP)	1			
	Ham - cooked	4			
	Pork - cooked	1			
	Poultry - cooked, Other	1			
	Rice - cooked	1			
<b>Salmonella</b>		8	0	7698	99.9 (7690)
	Chicken - cooked	2			
	Egg - Pasteurised, liquid (raw egg white)	1			
	Egg - products, Other (pasteurised liquid egg white)	1			
	Chicken Pieces - frozen	1			
	Miscellaneous - Other(sundried madora-macimbi)	1			
	Vegetables - fresh	1			
	Egg - products, other (raw egg white)	1			
	<b>Staphylococcus aureus</b>				
Beef - Fresh		1			
Cows Cheese - made from raw milk		12			
Ice Cream - milk ice		1			
Kebabs		1			
Pork - cooked		1			
Poultry - cooked, other		1			
Poultry Pate		1			
Sandwiches without salad		3			
Shellfish Frozen – peeled (cooked peeled king prawn)		1			
Take-Away Meals - British/American style		1			
Vegetables - salads, prepared		1			
<b>Bacillus cereus</b>			10	131	5735
	Gravy - prepared	1			
	Miscellaneous - other (rose bean curd)	2			
	Poultry - cooked, other	1			
	Restaurant meals	1			
	Salami	1			
	Sandwiches with salad	1			
	Sausage roll	2			
	Take-Away Meals - Indian style	1			



***Campylobacter*** was not detected in any of the 634 samples tested for the presence of this pathogen during the reporting period. Samples tested included fresh vegetables, cooked and fresh poultry, poultry pate, liver and meat pate. *Campylobacter* infection is most frequently associated with raw or undercooked chicken, chicken livers, and chicken liver pate. Local authorities carry out risk based sampling and therefore for microbiological sampling will target ready-to-eat (RTE) products that are likely to be consumed without cooking and therefore present the highest risk to health. *Campylobacter* is found in raw chicken and is widespread. As such EAs would not be expected to carry out routine sampling of raw chicken as there are currently no legislative standards. The FSA carries out its own retail surveys of raw chicken to determine prevalence and to monitor progress in achieving strategic targets. EAs sample RTE cooked sliced meats which could be subject to cross contamination from raw meat, and chicken liver and chicken liver pate, which are known risk factors for *Campylobacter* when undercooked. These products are served to consumers without requiring further cooking. It is encouraging that there is no non-compliance in this area.

***E.coli O157*** was not detected in any of the 591 samples tested for the presence of this pathogen during the reporting period. Samples tested included fresh vegetables, meat and meat products.

***Clostridium perfringens*** was detected in 3 out of 8,123 samples tested for the presence of this pathogen. The levels detected in 1 sample of curry sauce (out of a total of 135 sauces sampled), 1 sample of carrots (out of a total of 289 fresh vegetables sampled) and 1 sample of oriental style chicken chop suey (out of a total of 268 oriental take away meals sampled) were unsatisfactory according to HPA guidelines for RTE foods. RTE foods are usually tested for the presence of *C.Perfringens* to identify poor process controls, particularly during the cooling of cooked foods, the use of left-over foods, stocks and gravies. The low prevalence suggests that it may be appropriate to reduce the number of samples examined for this organism and redirect testing to other pathogens which have a more significant impact on public health.

***Listeria monocytogenes***: two tests are applied to food samples to determine potential risks from *L. monocytogenes*. These are an enumeration test and the presence/absence test. The enumeration test is used to determine the levels of *L. monocytogenes* in foods sampled during their shelf life. According to Regulation EC No 2073/2005 on the microbiological criteria for foodstuffs, levels exceeding 100cfu/g constitute a failure. The detection of any *L. monocytogenes* in RTE foods sampled during shelf-life, particularly at borderline levels (10-100 cfu/g) should prompt further investigation.

There were 17 borderline samples and 23 unsatisfactory samples as defined by HPA guidelines. Of the samples that were unsatisfactory, there were:

- 12 out of 97 of cheese made from cow's milk
- 3 out of 58 of cooked chicken
- 1 out of 2 of other cream
- 4 out of 216 of cooked ham
- 1 out of 101 of cooked pork
- 1 out of 36 of other cooked poultry and
- 1 out of 23 of cooked rice.

The information in Table 9 indicates that the highest number of unsatisfactory results was obtained from the testing of unpasteurised cheese made from cow's milk for *L. monocytogenes*. It should be noted that these results were attributed to samples taken at a single cheese producer as part of an incident investigation.

***Salmonella*** was detected in 8 samples out of the 7,698 samples tested for the presence of this pathogen. These included a range of meat and poultry products and vegetables.

***Staphylococcus aureus*** was found at unsatisfactory levels in 24 of the 10,156 samples tested. Tests results are assessed using the HPA [Guidelines for Assessing the Microbiological Safety of Ready-to-Eat \(RTE\) Foods placed on the Market](#). Half of the unsatisfactory samples were obtained from the testing of unpasteurised cheese samples taken at a single cheese producer as part of the incident investigation mentioned in the *L. monocytogenes* section above. 12 out of 107 cow's milk cheese samples were unsatisfactory and 3 out of 672 samples of sandwiches without salad were unsatisfactory. It should be noted that the detection of unsatisfactory and borderline results for *S.aureus* will not always result in a risk to human health, since only toxin producing strains are capable of causing food poisoning. Nonetheless, the results are indicative of hygiene failures in processing and handling, and suggest that enforcement activities relating to the production of these foods should pay particular attention to personal hygiene.

***Bacillus cereus*** was detected in 10 out of 5,735 samples tested. The majority of the food that was tested was cooked meat, vegetables, sandwiches, rice and ready to eat meals. The top categories for borderline samples were prepared dishes (36 samples), soup, broths and sauces (32 samples), meat & meat products (24 samples) and fruits & vegetables (10 samples).

## 4.0 Chemical Sampling

### 4.1 Details of Chemical Sampling

Food samples submitted to Public Analysts were subjected to chemical analysis. The labelling details of pre-packed food were also examined for the purpose of ensuring that the food and all its components were safe to eat and that they contain accurate and appropriate labelling details to enable consumers to make informed choices about the food they purchase. The available scope of accredited tests is much wider than that used for microbiological examination. The tests selected may fall into one or more of the following categories, depending on the sample type, specific requests made or the discretion of the Public Analyst.

- Additives – the use of food additives is highly regulated, on the basis of the precautionary principle, and in the interest of food safety. Monitoring the levels and types of additives being used in food is an essential public health measure.
- Authenticity – chemical tests may be used to determine if food or drink is authentic i.e. to check if it is of the true nature, substance and quality demanded by the consumer, also if the geographic origin or production method is as described on the food label.
- Composition (also includes ingredients) – certain food must meet compositional standards set in either community or UK law.
- Contaminant – these may be of natural origin (e.g. mycotoxins), environmental origin (e.g. lead, arsenic), man-made environmental contaminants (e.g. dioxins, PCBs), process contaminants (3-MCPD, acrylamide) or residues of crop treatment agents (pesticides). Monitoring the levels of contaminants present in our food, many of which could have health consequences, is also an essential public health measure.
- Labelling information – these are detailed legislative requirements for information which must be given on food labels.
- Genetically Modified (GM) food – only certain GM foods may be sold within the EU, and there are detailed labelling requirements.
- Nutrition parameter – consumers are encouraged to make healthier food choices and the information given on food labels which inform their decision must be checked to ensure that it is accurate.

Table 10 shows the levels of compliance for chemical testing carried out across the 19,758 samples submitted for analysis. Note that each sample may be subjected to a range of tests; therefore the numbers of analyses carried out are in excess of the total number of samples. For example, a single meat

sample may be subjected to a range of composition tests, such as fat content, protein, meat speciation, added water, collagen content.

The category of 'Undesirable Substances' often includes 'multi-analysis' test suites for groups of chemicals like pesticides, dioxins, PCBs or mycotoxins and these will elevate further the analytical test totals. This category also includes analyses for heavy metals, process contaminants, contact material contaminants, illegal additives and illegal genetically modified organisms (GMOs). Radioactivity analysis of food is mostly directed at non-permitted use of irradiation in food processing.

The highest percentage of failures was detected for nutritional composition, where 19.1% (167 samples) were non-compliant. The majority of the samples were in the categories: meat and meat products, game and poultry (84 samples), dairy products (22 samples) and prepared dishes (17 samples).

In the 'additives' category 6.3% of tests (303 samples) were non-compliant of which the most frequently assessed were 'sulphur dioxide' (67 tests), 'benzoic acid' (49 tests), 'sorbic acid' (47 tests), 'sunset yellow FCF' (47 tests) and 'tartrazine' (43 tests). The majority of the samples that failed for additives were in the food categories meat and meat products, game and poultry (87 samples), drinks (67 samples) and prepared dishes (51 samples).

**Table 10 Chemical analyses conducted on food samples and the number of unsatisfactory results obtained for each.**

Type of Analysis	No. of tests	Non-compliant	% Non-compliance
Undesirable Substances	61,173	1,370	2.2
Constituent	38,271	1,525	4.0
Additives	18,193	1,151	6.3
Nutritional Component	15,440	595	3.9
Substitution	11,313	678	6.0
Composition	6,260	1,198	19.1
Contamination	2,816	98	3.5
Radioactivity	243	13	5.3
Quality	10	0	0.0

## 4.2 Chemical Analysis in Different Types of Food - Enforcement

Chemical sampling activities were carried out for either enforcement/investigative reasons or surveillance/monitoring reasons, as entered onto UKFSS. The enforcement/investigative samples<sup>5</sup> were taken as part of EA official controls or enforcement activities where non-compliance was suspected. The surveillance/monitoring samples<sup>6</sup> would have been part of EA surveys or sampling programmes (see Section 4.3).

The types of analyses conducted on food samples and the key areas where unsatisfactory results were obtained are presented in Table 11 for samples taken for Enforcement/Investigative reasons.

The category of meat and meat products, game and poultry made up 24% of samples taken for enforcement/investigative reasons; the next highest was fish and shellfish products at 11% of samples, and then drinks at 10%.

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<sup>5</sup> Enforcement/investigation sample is taken by enforcement officers as part of their normal duties enforcing the requirement of Food Safety Act and subordinate legislations. They include samples taken as part of an inspection of a food premises and also those collected from retail outlets.

<sup>6</sup> Surveillance/monitoring sample is taken either as part of a formalised survey programme or for monitoring purposes so as to provide background information in support of enforcement work.

**Table 11 Chemical sampling carried out for enforcement/investigative reasons by Food Category**

<b>Food Category</b>	<b>No. of samples</b>	<b>Non-compliant</b>	<b>% Non-compliance</b>
Egg and Egg Products	4	2	50.0
Drinks	434	113	26.0
Meat and Meat Products, Game and Poultry	1,047	262	25.0
Prepared Dishes*	200	44	22.0
Dairy Products	144	31	21.5
Foods for Particular Nutritional Uses	32	5	15.6
Bakery and Cereal Products	326	46	14.1
Others**	172	24	14.0
Nuts and Nut Products, Snacks	325	36	11.1
Fruit and Vegetables	220	23	10.5
Cakes and Confectionery	180	15	8.3
Beverages	78	6	7.7
Ice Cream and Desserts	39	3	7.7
Fish and Shellfish	474	35	7.4
Additives	30	2	6.7
Materials and Articles in Contact with Food	101	5	5.0
Herbs and Spices	393	14	3.6
Soups, Broths and Sauces	154	5	3.2
<b>Grand Total</b>	<b>4,353</b>	<b>671</b>	<b>15.4</b>

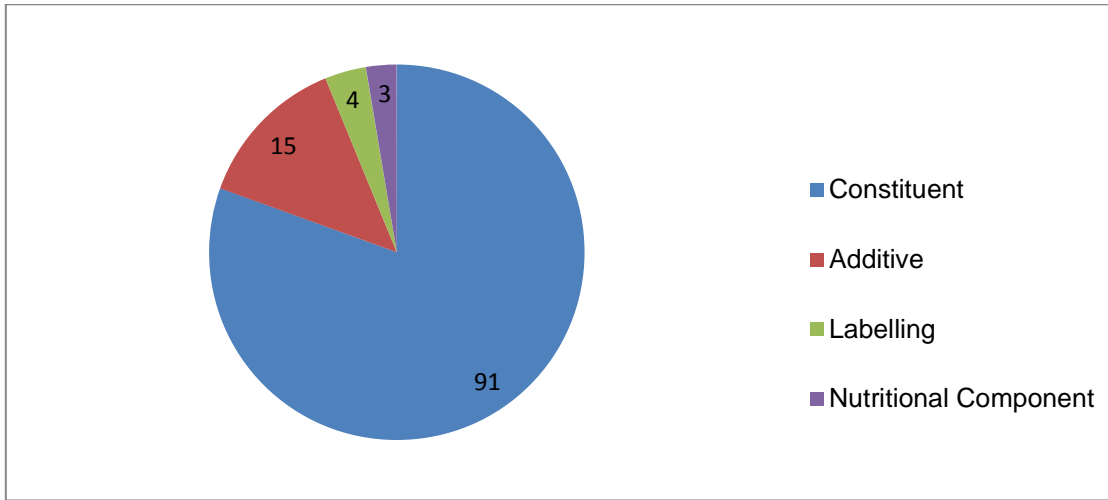
\*Prepared dishes include: restaurant and take away meals.

\*\*Other Food Categories include: 'Additives', 'Bakery and Cereal Products', 'Beverages', 'Cakes and Confectionery', 'Drinks', 'Egg and Egg Products', 'Foods for Particular Nutritional Uses', 'Herbs and Spices', 'Ice Cream and Desserts', 'Materials and Articles in Contact with Food', 'Nuts and Nut Products, Snacks', 'Soups, Broths and Sauces', and 'Others'.

A further breakdown of the food categories with the highest percentage of non-compliance is presented in Figures 3, 4, and 5 (excluding those analyses with less than 50 samples).

Of the 91 drink samples in Figure 3 that failed constituent tests<sup>7</sup> (on the inherent make-up of the product), 71.4% were non-compliant for alcohol levels; 43 samples were below and 20 samples were above expected alcohol levels. Four of the 15 samples that failed for additives content had excess levels of benzoic acid.

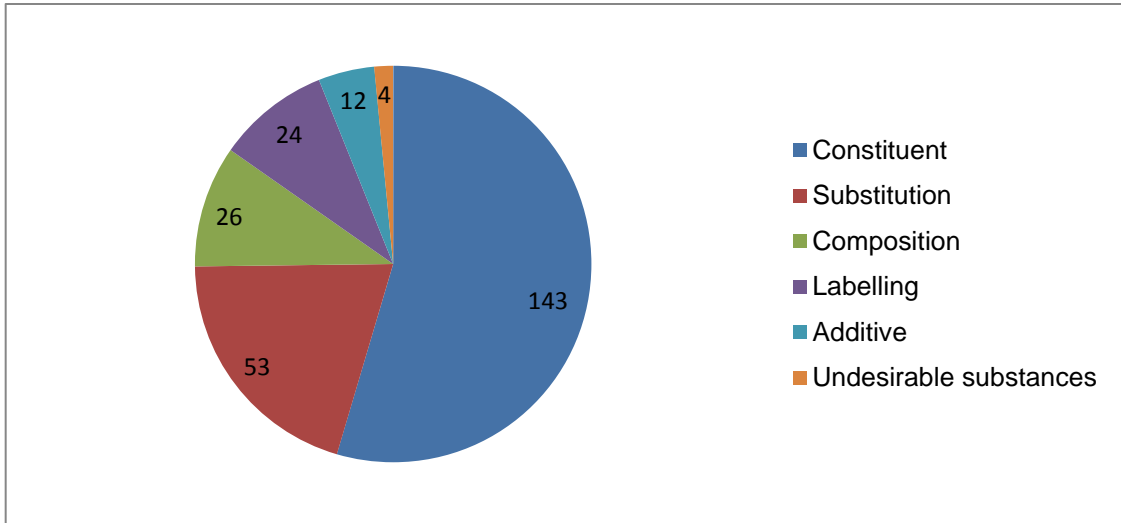
<sup>7</sup> Constituent test is the test applied to determine the main compositional ingredients of a food.



\*Total = 113

**Figure 3 Non-compliance in drinks for samples taken for enforcement/investigative purposes**

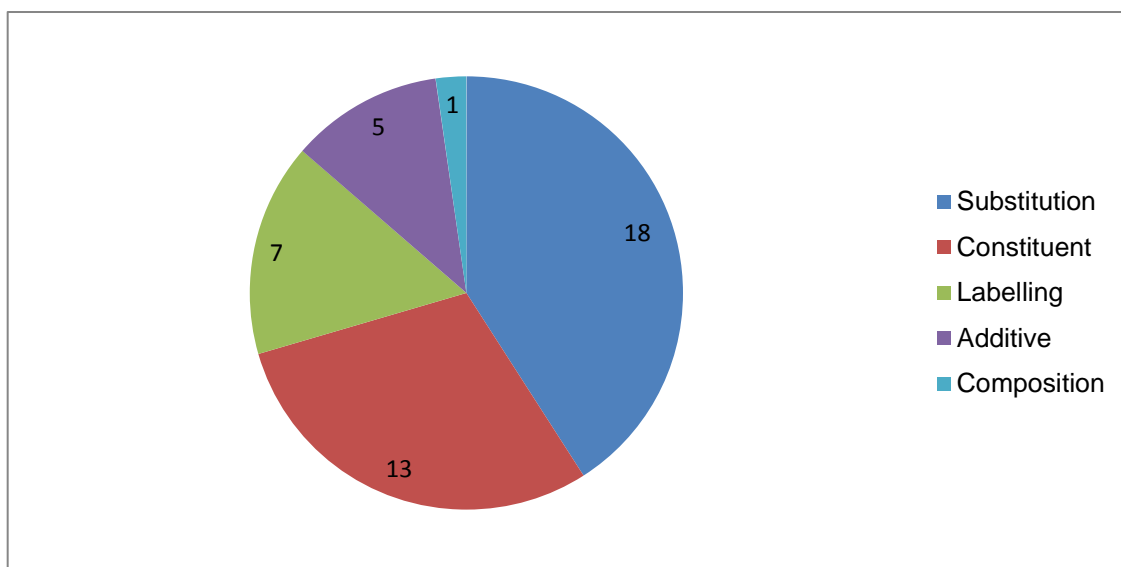
Out of the 262 samples non-compliant for meat and meat products, game and poultry, 54.6% failed for constituent reasons. 79.7% of these were non-compliant for salt levels and 17.5% were non-compliant for meat content.



\*Total = 262

**Figure 4 Non-compliance in meat and meat products, game and poultry for samples taken for enforcement/investigative purposes**

In Figure 5, out of the 44 samples that were non-compliant for prepared dishes, 40.9% failed due to substitution<sup>8</sup>. The majority of samples (11 samples) failed for the presence of unlabelled meat species.



\*Total = 44

**Figure 5 Non-compliance in Prepared Dishes for samples taken for enforcement/investigative purposes**

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<sup>8</sup> Substitution test is the test applied which identifies the nature of the major component of a food such as the type of meat or fish present.



### 4.3 Chemical Analysis in Different Types of Food – Surveillance

Table 12 shows chemical sampling activities carried out by food category for surveillance/monitoring reasons. The surveys may be on a local, regional or national level. Enforcement would have been carried out on non-compliant surveillance/monitoring samples. The highest failure rates (excluding food categories where the number of samples taken is small) were drinks (15.6%), prepared dishes (15.5%) and dairy products (14.4%).

**Table 12 chemical sampling carried out for surveillance/monitoring reasons by food category**

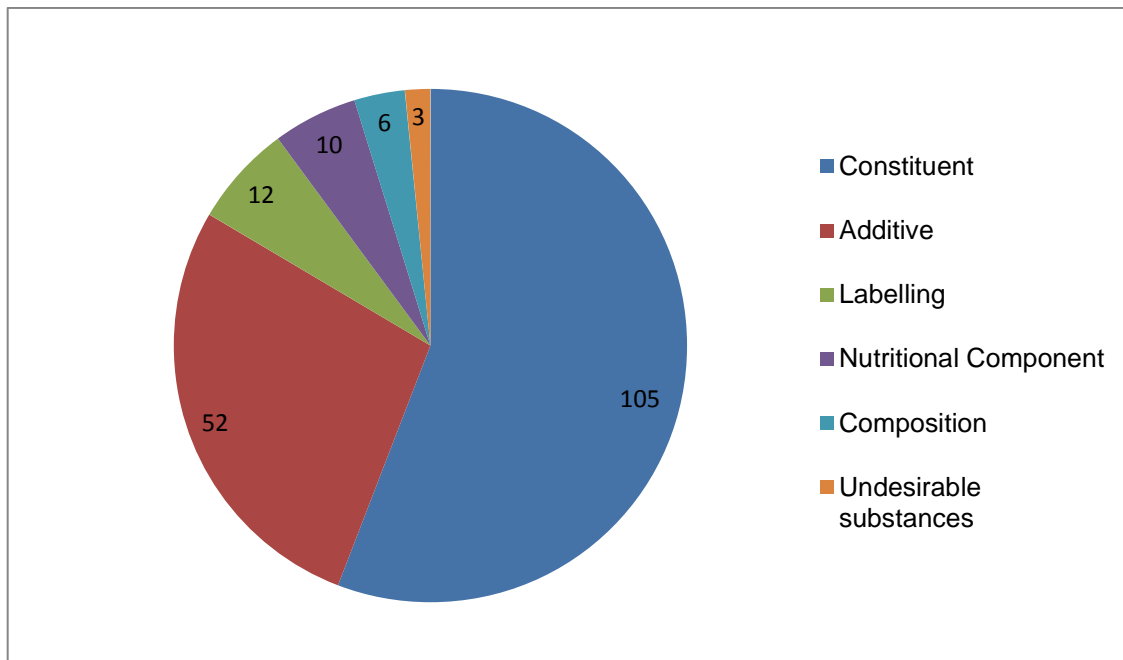
Food Category	No. of samples	Non-compliant	% Non-compliance
Meat and Meat Products, Game and Poultry	4,677	571	12.2
Prepared Dishes*	2,368	368	15.5
Drinks	1,204	188	15.6
Bakery and Cereal Products	1,160	107	9.2
Others**	884	121	13.7
Fish and Shellfish	851	68	8.0
Fruit and Vegetables	827	67	8.1
Cakes and Confectionery	817	75	9.2
Herbs and Spices	561	37	6.6
Dairy Products	556	80	14.4
Nuts and Nut Products, Snacks	390	53	13.6
Soups, Broths and Sauces	384	42	10.9
Foods for Particular Nutritional Uses	206	23	11.2
Materials and Articles in Contact with Food	204	11	5.4
Beverages	135	4	3.0
Ice Cream and Desserts	110	16	14.5
Additives	50	4	8.0
Egg and Egg Products	21	3	14.3
<b>Grand Total</b>	<b>15,405</b>	<b>1,838</b>	<b>11.9</b>

\*Prepared dishes include: restaurant and take away meals.

\*\*Other Food Categories include: 'Additives', 'Bakery and Cereal Products', 'Beverages', 'Cakes and Confectionery', 'Drinks', 'Egg and Egg Products', 'Foods for Particular Nutritional Uses', 'Herbs and Spices', 'Ice Cream and Desserts', 'Materials and Articles in Contact with Food', 'Nuts and Nut Products, Snacks', 'Soups, Broths and Sauces', and 'Others'.

A further breakdown of the food categories with the highest percentage of non-compliance is presented in Figures 6, 7, and 8 (excluding those where fewer than 50 samples were taken).

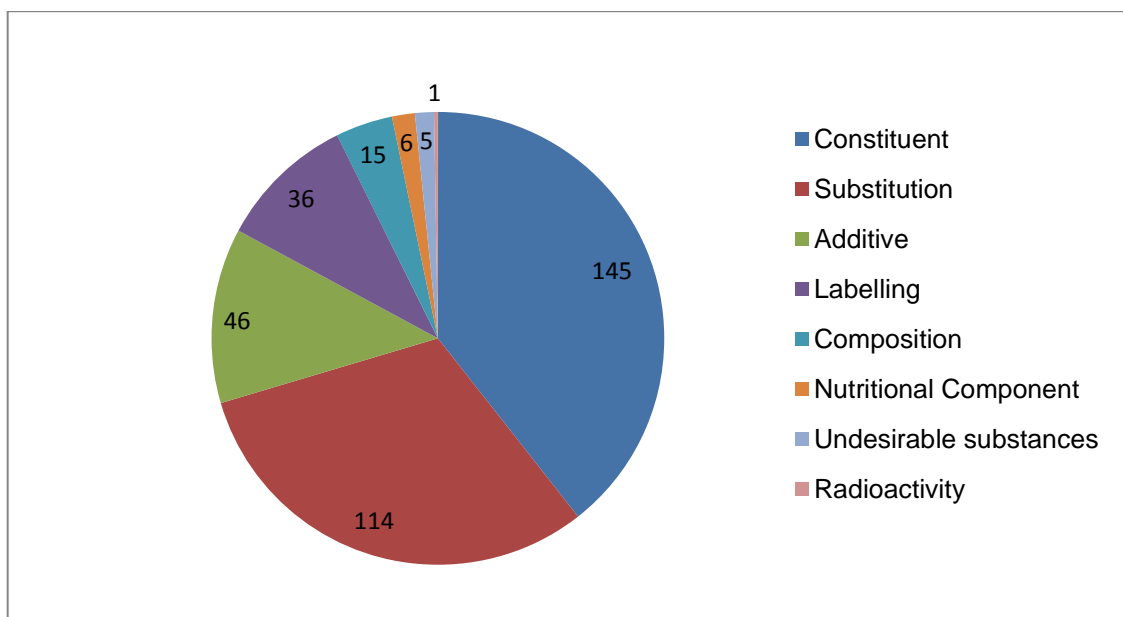
Of the 105 drink samples in Figure 6 that failed constituent tests: 79.1% were non-compliant for alcohol level; 67 samples were below and 15 samples were above expected levels.



\*Total = 188

**Figure 6 Non-compliance in drinks for samples taken for surveillance/monitoring purposes**

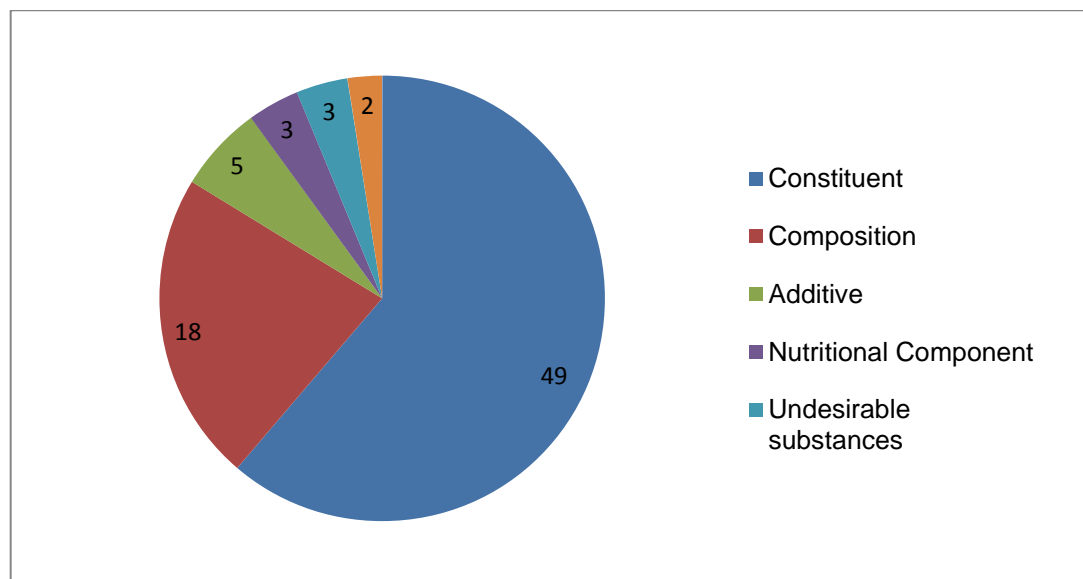
Of the 145 prepared dishes samples in Figure 7 that failed constituent tests, half failed due to unlabelled presence of nut allergens (including peanuts).



\*Total = 368

**Figure 7 Non-compliance in prepared dishes for samples taken for surveillance/monitoring purposes**

Of the 49 dairy products samples in Figure 8 that failed constituent tests; 59.2% (29 samples) failed due to levels of fat in dairy products such as milk.

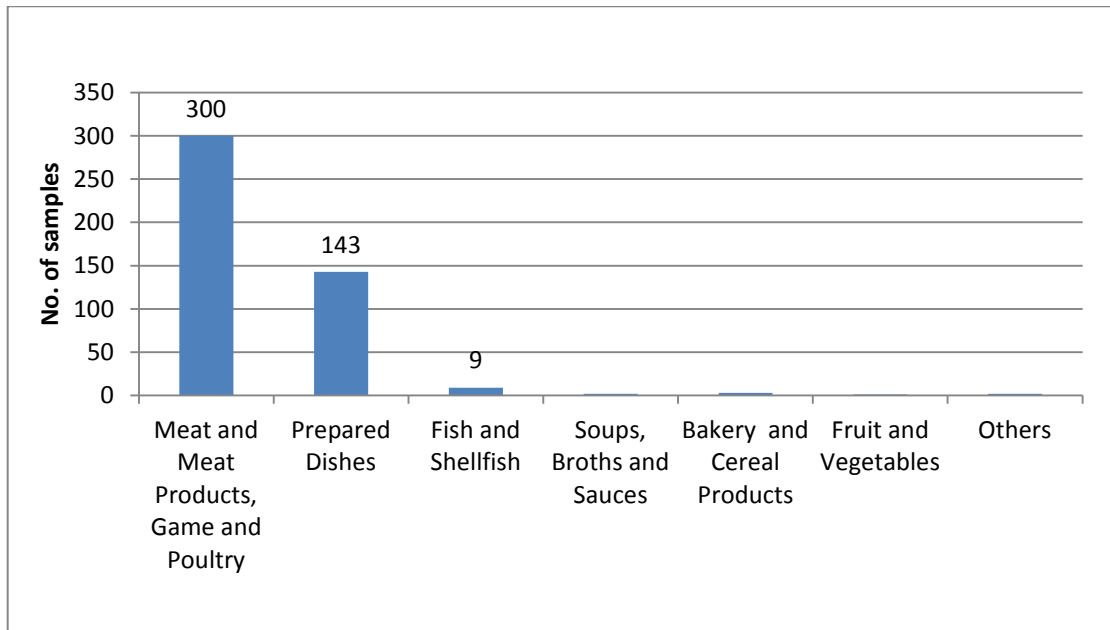


\*Total = 80

**Figure 8 Non-compliance in dairy products for samples taken for surveillance/monitoring purposes**

#### 4.4 Substitution in Food

During 2012/13, a total of 3,174 samples were tested for 'substitution' (that is, based on the label description, the replacement of an expected food with a non-declared food) of which 460 were unsatisfactory. The most frequent samples that failed were in food category 'meat and meat products' - ham pizza, minced beef, beef burger and lamb mince and 'Prepared Dishes' - lamb curry, lamb doner kebab, lamb kebab and lamb shish kebab. Figure 9 represents the number of samples failing for substitution tests by food category. Some of this testing will relate to the increased levels of testing during the horse meat incidents in the early part of 2013. They will also include the 514 survey samples taken across the 54 EAs as part of the [survey of beef products](#) in the UK to check for the presence of undeclared horse and pig DNA. Further information on the horse meat investigation is available on the [FSA website](#).



**Figure 9 Number of samples unsatisfactory for substitution test by food category**

#### 4.5 The Top Chemical Non-compliances 2012/13

Table 13 shows the top areas of chemical non-compliance for the year. This involved looking into the data where non-compliance was found to see if trends exist in relation to issues such as the food type, the country of origin, the hazard type or premises involved. Once a trend for an area of non-compliance has been established then analysing all similar testing of the identified product type allows the percentage of non-compliance to be determined.

In the constituent or adulteration categories, vodka and lamb takeaway meals have the highest failure rates with 26% of samples failing.

The vodka failures range from the wrong absolute alcohol content to fraudulent sale of goods. Presence of peanuts at takeaways in almond powders and Indian style meals continues to be investigated by the FSA and the EAs. Whenever the presence of undeclared peanut is found, this prompts the FSA to carry out a risk assessment to determine whether the levels of protein detected pose a risk to those with an allergy. Continued concern about the authenticity of lamb in take-away meals has prompted an Agency survey of EA sampling of lamb dishes from takeaway restaurants across the UK in 2014.

The presence of non-permitted pesticides in white beans imported from Africa is now the subject of discussion at EU Commission, with a view to action being taken to prevent this area of non-compliance.

The high rate of failure for presence of heavy metals in edible clays confirms the need for the existing published [FSA advice](#) in this area to those sectors of the populations where consumption of edible clays is customary.

The failure rates for mycotoxins in peanut butter and corn flour/corn products are being monitored by the FSA policy teams. These non-compliant products were prevented from being placed on sale in the UK market by EA officers.

**Table 13 Chemical non-compliance 2012/13**

Food issue/hazard	Type of food	country	Total number of samples	Number of unsatisfactory samples	% non-compliance
Constituent–peanut allergen presence	Takeaway – Indian style ; request for no nuts	UK	375	41	11%
Constituent–almond allergen presence	Takeaway – Indian style ; request for no nuts	UK	157	17	11%
Constituent–substitution, fish species identification	Retail fish products and takeaway meals	UK	374	21	6%
Constituent–substitution, presence of meat species	Kebabs and other lamb take away meals	UK	403	104	26%
Constituent–adulteration	Vodka	Sweden; UK; Germany; Italy; Russian Federation	318	84	26%
Undesirable substances–Pesticides	Fresh Beans: (white beans; honey beans; Oloyin beans) including dried beans	Nigeria	85	29	34%
Undesirable substances–Heavy metals	Edible clays; edible chalk (calabash chalk)	USA, Sierra Leone, Pakistan, Nigeria, Ghana, Uganda	31	28	90%
Undesirable substances–Mycotoxins	Peanut butter	Central Africa, India, Philippines, USA	43	6	14%
Undesirable substances–Mycotoxins	Corn flour and corn flour products	South Africa, India	72	18	25%

## 4.6 Food Labelling Checks

Most food samples submitted for analysis will have a label check carried out. This involves checking the label against UK Food Labelling law. Over the reporting period the requirements of the [UK Food Labelling Regulations 1996 \(as amended\)](#) applied. These checks are not the result of an analytical test.

Labelling checks are carried out by Public Analysts mostly on chemical samples. Out of the 19,758 samples where labelling test was performed, there were a total of 4,252 individual labelling failures representing 2,735 samples. These 14% failures were relatively minor faults. Table 14 shows the labelling failures with the labelling failure description given. The highest rates of failure were associated with 'name of the food/or address of manufacturer', 'ingredients', 'ingredient list' and 'nutritional declarations'. A proportionate level of enforcement will have been carried out in relation to these failures.

**Table 14 Labelling Faults**

Labelling Fault	No of Non-compliances
Name of the food/or address of manufacturer - not sufficiently precise/absent/misleading/incorrect format	744
Ingredients, Ingredient list - not sufficiently precise /absent/misleading/incorrect format	687
Nutritional declaration - not sufficiently precise /absent/misleading/incorrect format	675
Other statutory or compulsory declaration - not sufficiently precise/absent/misleading/incorrect format	639
QUID declaration - not sufficiently precise /absent/misleading/incorrect format	440
Durability indication - not sufficiently precise /absent/misleading/incorrect format	437
Allergen declaration - not sufficiently precise /absent/misleading/incorrect format	140
All statutory information- not sufficiently precise /absent/misleading/incorrect format	124
Medicinal or Health claim - not sufficiently precise /absent/misleading/incorrect format	118
Storage and/or usage instructions - not sufficiently precise /absent/misleading/incorrect format	92
Net quantity - not sufficiently precise /absent/misleading/incorrect format	69
Wholly or partly illegible - not sufficiently precise /absent/misleading/incorrect format	65
Place of origin - not sufficiently precise /absent/misleading/incorrect format	22
<b>Grand Total</b>	<b>4,252</b>

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