Local Authority Food Sampling in Scotland

1 July 2013 to 30 June 2014

A Report by the Scottish Food Enforcement Liaison Committee's Sampling and Surveillance Working Group

Food Surveillance System

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INTRODUCTION

Since 2007, the Scottish Food Enforcement Liaison Committee's (SFELC's) Sampling and Surveillance Working Group (SSWG; previously the Research Working Group (RWG)) has published an annual report on the food sampling data inputted onto the UK Food Surveillance System (UK FSS) database. These reports are intended for use by the Scottish enforcement community to assist Local Authorities (LAs) and SFELC in targeting future sampling resources and enforcement activities.

This is the first report presenting the food sampling data collated on UKFSS by Scottish LAs covering the 12 month period of 1 July 2013 – 30 June 2014, rather than previous calendar year reports. The change to the reporting period was made to enable LA's to be fully informed of the recommendations so they could be taken into consideration prior to the design of local, regional and national sampling strategies for the subsequent financial year. This reporting allows the SSWG to conduct the necessary analyses of UKFSS data and other emerging trends in food safety and standards in time for circulation in January of each year. Sampling activities undertaken to address the recommendations made in this report will be reviewed by SSWG and progress reported to SFELC throughout the year.

The data presented in this report is based only on reported samples, not collected samples, during the above time frame. Where samples are found to be unsatisfactory, local authorities undertake follow-up action as deemed appropriate.

OVERALL DATA TRENDS

Between 1 July 2013 and 30 June 2014, the results of microbiological examination and chemical analysis conducted on a total of 8438 samples were submitted to the UK FSS database.

A breakdown of the number of samples taken for microbiological and chemical purposes, and those giving an overall satisfactory result is presented in Table 1. It should be highlighted that unsatisfactory chemical results include samples which failed due to labelling issues in addition to those which failed due chemical analyses.

Table 1. Breakdown of UKFSS sampling statistics for 1 July 2013 - 30 June 2014

	Number of samples	Number of samples giving an overall satisfactory result	% of Satisfactory Samples
Microbiological	5071	3918	**77**
Chemical	3367	2840	**84**
Total	**8438**	**6758**	**80**

Sampling reported between 1 July 2013 and 30 June 2014 is broken down in Table 2 according to the premises type that the samples were taken from.

Table 2. Breakdown of sampling activity according to premises type

Premises Type	Number of samples	Number of samples giving an unsatisfactory result	% of Unsatisfactory samples
Distributors/Transporters	53	10	**19**
Importers/Exporters	160	25	**16**
Manufacturers selling mainly by retail	223	76	**34**
Manufacturers/Processors	1814	317	**17**
Packers	48	7	**15**
Primary producers	109	16	**15**
Restaurants/Caterers	2253	454	**20**
Retailers	3752	769	**20**
Slaughterhouses	25	5	**20**
Materials/Articles Manufacture	1	1	**100**
Total	**8438**	**1680**	**20**

The highest proportion of samples was taken at manufacturers/processors, restaurants/caterers and retailers (93% of all samples). A further breakdown of sampling

undertaken at retailers is provided in Table 3, to indicate the numbers of samples taken at larger retail outlets compared with smaller retailers, and the failure rates at each of these different premises types.

Table 3. Breakdown of sampling activity in major supermarkets versus other retailer types.

Retailer Type	Number of Samples Taken	Number of Unsatisfactory Results	% Unsatisfactory
Major Supermarket*	1149	137	12
Others	2601	631	24

* Samples taken at the 9 UK retailers with the largest market share

The results presented in Table 3 indicate higher levels of sampling and higher failure rates in smaller retail outlets compared with the 9 major UK retailers. This finding demonstrates that sampling programmes in Scotland are largely targeted to local issues.

In order to compare differences in failure rates for imported products compared with those which are UK produced sampling data was broken down according to country of origin. This is presented in Table 4.

Table 4. Sampling broken down according to country of origin

Origin	Number of samples	Number of samples giving an unsatisfactory result	% of Unsatisfactory samples
UK	7542	1533	20
EU	396	67	17
Third country	369	64	17
Product of more than one third country	83	13	16
Not specified/not available	48	3	6
Total	**8438**	**1680**	**20**

The results shown in Table 4 show that when comparing results from samples taken from products with UK origin and products imported from the EU and Third Countries, there is a greater percentage of unsatisfactory samples from EU imports. Table 5 highlights the types of failures identified in each category.

Table 5. Sample failures in imported foods

Origin (n)	Number of unsatisfactory samples (n)	Sample Failure Details (n)	Country of Origin
EU(67)	**Microbiological (49)**	Borderline/Unsatisfactory TVC's in meat products (28) and cheese (1)	Belgium, France, Italy, Netherlands, Republic of Ireland, Poland
		Detection of *Listeria Monocytogenes* (20)	Belgium, Italy, Poland
	Labelling (2)	Potato Crisps (Misleading)	Italy
	Meat substitution (16)	Meat (Beef/Pork)	Poland, Germany, Lithuania
Third country(64)	**Microbiological (30)**	Detection of *Listeria Monocytogenes in fruit* (1)	Not Specified Non-EU
		Unsatisfactory/Borderline TVC's (27)	Argentina, Brazil, India, China
		Detection of Salmonella in Herbs (1)	Brazil
		Detection of Bacillus Cereus in Cumin(1)	Argentina
	Labelling/Chemical (34)	Soft Drinks and Confectionary Present/Non-permitted Colours (11)	Canada, US
		Undesirable Substances (13)	China, Dominican Republic, India
		Constituent (10)	Indonesia, Israel, China
Product of more than one country(13)	**Microbiological (5)**	TVC's in Cooked Meat (5)	N/A
	Labelling (2)	Labelling of Honey (2)	N/A
	Unspecified (6)	N/A	N/A

The results presented in Table 5 suggest that microbiological failures in imported foods are primarily due to unsatisfactory hygiene indication tests such as TVC's. Of the Microbiological samples failing in the EU, 70% of the Borderline/Unsatisfactory TVC's and almost 50% of the *Listeria Monocytogenes* samples were from meat products from Poland. When looking at the results from samples of Third Country imports the highest numbers of unsatisfactory results

were in chemical sampling in particular undesirable substances e.g aflatoxins, heavy metals and antibiotics and non-permitted colours in soft drinks and confectionary imported from the US and Canada.

BREAKDOWN OF MICROBIOLOGICAL SAMPLING DATA

Microbiological samples are examined in a suite of tests, including the detection and enumeration of pathogens and/or levels of hygiene indicators and aerobic colony counts (ACCs). The results of these tests are interpreted against food hygiene legislation (as defined under Regulation EC No 2073/2005 on the Microbiological Criteria for Foodstuffs) and/or the Health Protection Agency (HPA) Guidelines for Assessing the Microbiological Safety of Ready-to-Eat Foods Placed on the Market, and are 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. For the purposes of this report, samples which were reported as satisfactory were reported as such and samples classified as unsatisfactory and borderline were reported as unsatisfactory.

Detection of pathogens in food samples

A total of 4576 of all microbiological samples (90%) were tested for the presence of at least one of the following key foodborne pathogens: Salmonella, Campylobacter, *Escherichia coli* O157, *Listeria monocytogenes*, *Clostridium perfringens*, *Staphylococcus aureus* and *Bacillus cereus.* The results indicate similar trends in microbiological failures to those observed in previous years. The highest numbers of samples tested were for *L. monocytogenes*, *C. perfringens*, and *S. aureus* (Table 6). Pathogenic bacteria were detected in a range of ready to eat products, albeit in a relatively low number of samples, with only 111 unsatisfactory results out of the 4576 samples tested (2.4%). The highest failure rate (1.8%) was observed in samples tested for the presence of *S.aureus*. These unsatisfactory samples were taken during an incident at a single premise so is not reflective of a general increase in samples failing analysis for the presence of *S.aureus*

Similar to previous years, the data indicates that relatively few samples are tested for the presence of Campylobacter, which is the most commonly, reported cause of bacterial foodborne disease in Scotland. Although Campylobacter is most frequently associated with raw fresh chicken, illness can occur following the consumption of undercooked chicken liver and chicken liver pates and parfaits. In the last report of UKFSS data, it was recommended that Scottish LAs should sample such products from catering establishments in order to

assess the risks to consumers. Enhanced surveillance of these products was initiated following publication of the last report.

Table 6. Test results for pathogens.

Pathogen	Unsatisfactory/borderline food stuffs	No. of unsatisfactory samples	No. of borderline samples	Sample origin	No. of samples tested	% satisfactory (no. of satisfactory samples)*
Salmonella	**Total**	**2**	0	**N/A**	**1254**	**99.8 (1252)**
	Ham joint	**1**	0	**UK**		
	Dried Herbs	**1**	0	**I**		
Campylobacter	Total	0	0	**N/A**	**201**	**100 (201)**
***E. coli* O157**	NA	0	NA	**N/A**	**136**	**100 (136)**
***Listeria monocytogenes* (enumeration)**	**Total**	**8**	**2**	**N/A**	**3096**	**99.7 (3086)**
	Cheese (unpasteurised)	**2**	**0**	**UK**		
	Hygiene swab	**4**	0	**UK**		
	Sandwiches	**1**	1	**UK**		
	Take Away Meals	1	**0**	**UK**		
***Listeria monocytogenes* (detection)**	**Total**	**19**	NA	**N/A**	**1449**	**98.7 (1430)**
	Cooked meat	**8**	NA	**EU**		
	Cheese (unpasteurised)	**4**	NA	**UK**		
	Fresh fruit	**1**	NA	**I**		
	Prepared Meals	**6**	N/A	**UK**		
Clostridium perfringens	**Total**	**0**	6	**N/A**	**2405**	**99.7 (2399)**
	Meat Products	**0**	2	**EU+UK**		
	Dried Herbs	**0**	4	**UK**		
Bacillus cereus	**Total**	**0**	**3**	**N/A**	**230**	**99.0 (201)**
	Lettuce	**0**	1	**UK**		
	Chicken Sandwich	0	**1**	**UK**		
	Dried Herbs	0	**1**	**I**		
Staphylococcus aureus	**Total**	**25**	**46**	**N/A**	**4112**	**98.2 (4041)**
	Cheese (unpasteurised)	**17**	**9**	**UK+EU**		
	Cooked meat products	**1**	**13**	**UK**		
	Ice cream	**0**	**2**	**UK**		
	Fish products	**0**	2	**EU**		
	Sandwiches/ salads	2	**16**	**UK**		
	Hygiene swab	5	**4**	**UK**		

Detection of hygiene indicators (including aerobic colony counts) in foodstuffs

Hygiene indicators such as Enterobacteriaceae, non-pathogenic *E. coli* and *Listeria* species (not *L. monocytogenes)* and aerobic colony counts are used to assess issues relating to process control such as the quality of raw materials, undercooking and cross-contamination.

These indicators allow food enforcement officers to focus on potential areas for concern in the production and handling of food. There were unsatisfactory levels of hygiene indicators reported in the following categories of food:

- Pre-packed and Non-Pre-packed Sandwiches
- Pre-packed and Non-Pre-packed Cooked meat and poultry
- Pre-packed and Non-Pre-packed Fish products including smoked fish and pates
- Ice-creams
- Pre-packed and Non-Pre-packed Take-away meals

These results are indicative that hygiene issues are occurring during the preparation of these types of products, and highlight the potential for contamination with pathogenic bacteria. LAs should therefore continue to focus on cross contamination and personal hygiene controls in the types of premises which produce these foods. Sampling should be undertaken to verify these controls and to use as an aid to educate FBOs on the importance of implementing good cross-contamination and personal hygiene controls.

BREAKDOWN OF CHEMICAL SAMPLING DATA

Data categorised as chemical sampling covers a wide range of analysis types including the presence of contaminants, nutritional constituents, additives, and substitution. The majority of samples submitted for chemical analysis are also assessed for compliance with The Food Labelling Regulations 1996 and other relevant legislation which includes labelling requirements. As each sample is tested for a range of labelling and chemical testing issues, each category of analyses is associated with a number of different results. Therefore this data is broken down according to the numbers of results allocated with each category of test, as shown in Table 7. It should be noted that unsatisfactory results are defined as those which fail to comply with guideline values as well as those which are found to be in breach of legislative standards, therefore appropriate follow-up will not involve enforcement in all cases.

Table 7. Chemical analyses conducted on food samples and the numbers of satisfactory and unsatisfactory results obtained for each.

Type of analysis (No. Samples)	Total no. of results	No. unsatisfactory results	% unsatisfactory results	Types of failure (number of unsatisfactory results)
Constituent (1374)	8290	90	1.1	Acidity above or below limit/declaration (1) Alcohol above or below limit/guideline (6) Fat above or below limit/declaration (20) Gluten above declaration (2) Meat content below declaration (21) Milk fat below declaration (6) Other constituent (32) Egg present/not permitted (2)
Additives* (702)	2770	71	2. 6	Colouring Matter above limit/present but not permitted (54) Preservatives above limit or present (15) Flavour enhancers above guideline limit (2)
Nutritional Component* (334)	737	44	6.0	Energy above or below limit/declaration (22) Vitamins above or below limit/declaration (2) Fatty Acids above or below limit declaration (1) Nutrient Metals above limit/declaration (7) Sugar above or below limit declaration (5) Fibre above or below limit declaration (7)
Undesirable Substances (656)	3126	40	1.3	Heavy Metals above limit/declaration (17) Antibiotic present not permitted (1) Aflatoxins above limit/present (6) PCB's and Pesticides above limit. (16)
Substitution (770)	1618	82	5.1	Meat identification (42) Fish identification (6) Meat Identification in prepared meals (34)

*Note that each sample may be subjected to a range of tests within each type of analysis e.g. a single meat products sample tested for 3 different constituent types - e.g. 'Meat content', 'Fat', and 'Gluten'.

With the exception of labelling/nutritional component declaration, the highest percentage of failures observed in chemical samples was detected in 'Substitution'. Given that the previous report covered a period involving investigations resulting from the horsemeat incident this is not unexpected as there is still a high focus on sampling for authenticity testing. The results of sampling for substitution, presence of undesirable substances and the use of additives in foods are detailed in the sections below.

Meat/Fish Substitution and Speciation

A total of 770 samples were tested for substitution using two distinct types of test during the period. One test (ELISA) gives a simple qualitative indication of the presence of a meat species in a sample. The other test (PCR) gives a semi quantitative estimation of the relative percentages DNA of species tested in a sample. The semi-quantitative estimation serves to provide an indication as to whether the sample likely contains trace amounts which may be

due to cross-contamination/carry-over, or whether it contains substantial amounts which is unlikely to arise from this source. Samples recorded as fails using this method are those with a semi-quantitative value greater than1% of species other than that declared/expected.

A total of 1618 substitution tests were carried out on the 770 samples analysed for this parameter. The results of these analyses indicated that a total of 82 samples (207 tests) failed due to substitution. A full breakdown of the substitution issues identified during this sampling period is shown in Table 8.

Table 8. Summary of results for substitution tests.

Foodstuff tested	No. of unsatisfactory samples	Species detected (no. of samples)
Beef puddings	1	Presence of lamb
Frozen beef	1	Frozen casserole beef found to contain lamb
Frozen lamb	1	Substitution of lamb for beef
Fresh Lamb	1	Lamb product containing poultry
Frozen Meat - Other	2	Beef mince containing lamb (2)
Burgers	2	Presence of beef and pig (1) Presence of pork in Chicken Burger (1)
Fresh and frozen fish products	6	Haddock substituted with whiting (6)
Cooked Meat	3	No Details
Fresh Pre-packed Minced Meat	1	Presence of pork (1)
Frozen Pre-packed Minced Meat	1	Presence of pork (1)
Fresh Non-Pre-packed Minced Meat	10	Presence of lamb (10)
Meat Products - Other	10	No Details
Pies (beef)	1	No Details
Sausages	15	Presence of beef (9) Presence of lamb (6)
Take-away meals	23	Donner kebabs found to contain beef and poultry (2) Donner kebabs found to contain Cow, Pig and Sheep (2) Lamb curry substituted with beef (19)

Presence of Undesirable substances

A total of 656 samples were tested for the presence of Undesirable substances such as pesticides, herbicides, heavy metals, antibiotics and aflatoxins. 'Undesirable substances' usually includes suites of tests for more than one parameter e.g. a single sample may be tested for a range of different heavy metals or mycotoxins. 3126 analyses were carried out in total on these samples of which 40 were deemed unsatisfactory. Table 9 details the unsatisfactory results within this category.

Table 9. Food samples containing undesirable substances.

Undesirable Substance	Food Description (n)	Result Category
Heavy Metals	Cold mussel meat (5) Cold water prawns (4) Shredded crab meat (6) Jelly fish tips (2)	Above Limit/declaration
Pestidices and PCB's	Banana Chips (1) Herbs and Spices (10) Tea (5)	Above limit/Present
Antibiotics	Whole cow's milk (1)	Present not permitted
Aflatoxins	Herbs and Spices (6)	Above limit/Present

Use of additives in food

A total of 71 samples failed due to additives, the majority of which involved the mis-use of colouring matter (54 samples) and preservatives/flavour enhancers (17 samples).

The types and levels of additives in food are regulated by The Food Additives (Scotland) Regulations 2009. These Regulations stipulate:

- permitted colours and preservatives in foods,
- maximum levels for permitted colours and preservatives in certain foods, and
- foods which may not contain added colour or preservatives.

Details of these unsatisfactory results are detailed in Table 10.

Table 10. Food samples containing colour above the regulatory limit

Reason for failure	Food Description	Colours
Colour detected above regulatory limit	Mushroom Pakora (5) Pilau Rice (8) Onion Rings (1)	Tartrazine (E102)
	Confectionary (31)	Combined colours
***Presence of a Southampton 6 colour**	Pilau rice (5)	Sunset yellow (E110), tartrazine (E102) and allura red (E129)
	Chicken Chow Mein (2)	Tartrazine (E102) and ponceau 4R (E124)
	Chicken pakora (12)	Tartrazine (E102), sunset yellow (E110), allura red (E129), carmoisine (E122) and ponceau 4R (E124)
	Lamb Chasni (2) Lamb Rogan Josh(2) Lamb Tikka Chasni (3)	Tartrazine (E102), sunset yellow (E110), allura red (E129)

*It should be noted that not all samples found to contain colours will constitute a failure due to non-compliance with legislative requirements. Some samples are given an unsatisfactory result because they go against FSA recommendations on the use of the Southampton 6 colours.

PROGRESS WITH SAMPLING UNDERTAKEN TO ADDRESS RECOMMENDATIONS MADE FOR NATIONAL FOOD SURVEILLANCE IN FY 2014/15

The previous report (covering sampling activity undertaken between 1 January and 30 June 2013) made a number of recommendations detailed below for food sampling activities to be undertaken during Financial Year 2014/15.

1. Campylobacter in chicken liver products sampled at catering premises.
2. Analyses of UK produced ready to eat products for microbiological contamination, with a focus on *Listeria monocytogenes*.
    - Pre-packed at end of shelf life
    - Non Pre-packed
3. Substitution and mis-use of colours in take-away meals.
    - Substitution
    - Presence/Levels Colourings in take-away meals.
4. Substitution and labelling in meat products imported from EU countries.
5. Labelling and use of colours in confectionary and soft drinks produced in the US and Canada

Sampling for these priorities is ongoing and will be discussed in the next report.

RECOMMENDATIONS FOR NATIONAL FOOD SURVEILLANCE IN FY 2015/16

The food sampling data presented in this report was reviewed by the SSWG at their meeting on 19 November 2014. The findings were considered in conjunction with information collected from FSA's emerging risks programme, and local intelligence provided by SSWG members to develop a series of recommendations for food sampling and surveillance activities in 2015/16.

The following recommendations are made by the SSWG for food sampling and surveillance activities in Scotland between 1 April 2015 and 31 March 2016:

General sampling focus

The results of sampling during the period reinforce the importance of effective sampling plans as important components of each local authority's food safety enforcement toolkit.

Local authorities should continue to operate sampling plans which mirror the profile of their premises and which support authorised officers during their routine food safety and food standards inspections.

It is important that sample failures continue to be followed up by local authorities and that those contraventions are pursued in terms of each council's enforcement policy.

Specific sampling priorities

As part of their sampling plans local authorities are encouraged to prioritise the undernoted topics. FSA has recommended an appropriate sample number to be collected nationally for each topic, which will allow trends to be assessed. It is suggested that these are divided amongst the local food liaison groups who can then allocate and monitor sampling within their areas.

1. Histamine levels in cheese.

Following incidents of high levels of histamine found in cheese samples in Scotland, coupled with the lack of legislation in this area, surveillance is recommended in order to gain further knowledge on baseline levels. This work will inform an appropriate standard which can be

applied for enforcement purposes. Suggested sampling – 100 samples of hard cheeses (eg cheddar)

2. Microbiological quality of imported foods

This year's data indicates that the percentage of unsatisfactory samples is no higher for imported foods than UK sourced foods. However, *Listeria monocytogenes* was identified in a number of samples of food from a variety of countries. Focussed sampling of ready to eat imported (EU and Third Country) foods, including Listeria examination, would allow any trends to be investigated. Suggested sampling - 200 samples

3. Microbiological quality of herbs and spices used by caterers

Examination of data on UKFSS shows a continuing issue with the microbiological quality of some samples of herbs and spices, however there is limited data available for these types of products. Sampling would be targeted at catering premises. The intention would be to collate information on the quality of herbs and spices intended for addition to ready to eat food. Suggested sampling - 200 samples

4. Meat substitution and use of additives by caterers

Meat substitution and the use of colours are current sampling priorities for 2014/15 sampling plans. It is apparent that failures continue to be identified and targeting should continue. It is also apparent that sampling for monosodium glutamate has reduced in recent years and increased sampling would allow compliance, and any need for further engagement with the trade, to be assessed. Suggested sampling – 200 Samples. These samples should be primarily focused on meat substitution but to utilise sampling, analysis for colours and MSG should be carried out where possible.

Emerging and local issues

SSWG discussed a number of topics which were considered to be emerging or to affect limited, or localised, groups of premises, In each case there is no, or very limited, sampling data on UKFSS.

FLGs and local authorities are asked to consider whether the food business profile in their area would merit sampling of the following products. As the uptake of these practices vary throughout Scotland no sampling targets are recommended by SSWG.

1. Campylobacter in rare duck and other game birds

Campylobacter is a known risk in raw and undercooked poultry however evidence is lacking on the risks associated with duck and other game birds. Intelligence gathered at local level has indicated that it is increasingly fashionable for restaurateurs to offer these products rare or “pink”. Sampling of raw and cooked birds would provide useful data.

2. Microbiological quality of rare burgers

Evidence for the increasing market for rare burgers, coupled with reported cases of foodborne illness that have been linked to undercooked burgers have suggested that this could be an emerging area of food safety risk in Scotland.

3. Microbiological quality of sous-vide food

Recent years have seen an increase in the number of sous-vide foods being cooked at low temperatures (e.g. 42°C to 70°C). There is a lack of information for pathogen growth and thermal death models in the range of about 40 to 60°C. This makes it difficult to assess the safety of these new sous-vide foods that are cooked in a water-bath at around 50 to 70 °C.

4. Fat content of minced meat

The EU Food Information for Consumer Regulations introduces standards for fat and collagen content, as well as labelling of minced meat. The Scottish regulations take advantage of a derogation relating to the labelling of minced meat.