Retail Surveillance Sampling Programme during Covid-19 pandemic - Discussion

Project Overview

Of the 1010 samples analysed, 829 were compliant with regard to the analyses undertaken. The overall project compliance rate was 82.1%.

The types of non-compliances detected include:

- meat and fish samples tested for speciation were non-compliant if they contained DNA from a non-stated species. For meat products the threshold used was >1% and in some cases multiple species were detected.
- meat samples tested for composition were non-compliant if they did not have a qualitative meat declaration, had a low meat content, excess fat or other labelling irregularities.
- herbs and spices tested for adulteration were reported as unsatisfactory if they contained extraneous material such as damaged or unwanted plant parts, dirt or foreign substances.
- Basmati rice samples were reported as unsatisfactory if non-basmati rice varieties were detected or if the marked variety was not at least 97% of the product.
- any milk proteins detected in dairy free products were reported as unsatisfactory.

The sampling for this project took place during national and local lockdowns and sampling plans were adjusted to include more focus on web sales and deliveries as well as shop purchases.

- 15% of samples were purchased from large FBOs
- 75% from smaller FBOs
- 10% as online purchases

Table 8: Compliance by Retail Outlet Type

Retail Outlet Type	Number of Compliant samples	Number of Non- Compliant samples	% of Compliant samples	% of Non-Compliant samples
Internet	67	35	65.7%	34.3%
Retail - independent	419	108	79.5%	20.5%
Retail - large	272	21	92.8%	7.2%
Takeaway	43	10	81.1%	18.9%
Wholesale	27	4	87.1%	12.9%
Grand Total	828	178	82.3%	17.7%

Samples purchased via the internet had the highest rate of non-compliance with around one third of the 102 samples ordered online not meeting all the legislative requirements. Approximately one fifth of samples bought from independent retailers including takeaways were deemed by Public Analysts to be non-compliant. Samples bought from large retailers had the lowest level of non-compliance although around one in eight samples were still reported as unsatisfactory.

The maps for geographical distribution show that there was a wide spread of samples for sub projects P1 to P5. The locations of non-compliant samples in each sub project were reviewed for

local or regional hotspots. No geographical distribution patterns were identified.

Sampling for P6 was undertaken during national lockdown and the products identified for this sub project were all available from large FBOs and were purchased from outlets local to the OLs in order to comply with Covid-19 restrictions.

P1 Mince and Processed Meat Composition and Speciation

Of the 300 meat samples analysed for both compositional/labelling compliance and meat species, 179 were compliant with regards to all of the analyses.

No horsemeat was detected in any of the 300 samples which were all analysed for the presence of seven meat species (cow, pig, sheep, chicken, turkey, horse and goat). Table 9 summarises the compliance status by product type. The overall compliance rate for the 300 meat samples analysed was 59.7%.

Table 9: Compliance by Product Type (composition and speciation)

Product	Number of Compliant samples	Number of non-compliant samples	Total
Beef Burger	21	9	30
Beef Mince	21	8	29
Beef Pie	22	12	34
Beef Ready Meal	24	6	30
Goat	2	8	10
Lamb Curry / Kebab	24	13	37
Lamb Mince	10	24	34
Lamb Ready Meal	20	10	30
Pork Mince	16	19	35
Pork Sausages	19	12	31
Total	179	121	300

Meat Speciation

Speciation non-compliance was found in 62 samples with either additional or alternative meat species to those on the label being detected.

Table 10 shows the number of samples adulterated with other meat species by product type. The compliance rates by meat types for speciation across the products tested are as follows: Beef 95.1%, Pork 72.7%, Lamb 69.3% and Goat 30%.

Table 10: Meat Speciation Non-Compliance by Product Type

Product	Total number of samples	Non-compliant species	% of species
Beef Burger	30	0	0.0%
Beef Mince	29	4	13.8%
Beef Pie	34	2	5.9%
Beef Ready Meal	30	0	0.0%
Goat Meat / Products	10	7	70.0%
Lamb Curry / Kebab	37	9	24.3%
Lamb Mince	34	20	58.8%
Lamb Ready Meal	30	2	6.7%
Pork Mince	35	15	42.9%

Pork Sausages	31	3	9.7%
Total	300	62	20.7%

Beef Speciation

Speciation non-compliance was found in 6 out of 123 beef products. All the beefburgers and all the beef ready meals only contained beef. Non-compliant minced beef samples consisted mainly of bovine (beef) DNA but small amounts of sheep and turkey, pork, sheep and pork, and sheep and chicken were also detected in the four samples respectively. The two non-compliant beef pie samples were both found to contain bovine and porcine (pig) DNA, one of which was 30% pork and 70% beef. The compliance rate for beef products for speciation was 95.1%.

Goat Speciation

Of the 10 goat meat samples analysed, four had no goat DNA detected and another three also contained significant amounts of other meats as shown in Table 11.

Table 11: Species Non-Compliances by Goat Product Type

Product	DNA detected in Goat	DNA detected in Sheep	DNA detected in Cow	DNA detected in Pig
Curry	Not Detected	>99%	-	-
Goat Meat	Not Detected	>99%	<1%	-
Mince	Not Detected	>90%	<1%	-
Burger	Not Detected	>80%	11%	-
Mince	>50%	-	5-10%	<1%
Burger	>50%	5-10%	1-5%	1-5%
Mince	>50%	10-50%	-	<1%

The main substitute ingredient for goat was lamb but beef and pork were also found in a number of the samples. The compliance rate for goat products for speciation was 30%.

Lamb Speciation

Out of 101 lamb products sampled for speciation, 31 were non-compliant with 9 out of 37 kebabs detecting undeclared meat DNA. Beef was detected in 8 of the samples ranging from 2% to 73% and chicken DNA was identified in 7 of the kebabs
ranging from trace amounts to 64%.

Out of a total of 34 minced lamb samples, 20 were found to contain DNA from other species ranging from trace amounts to > 50%. Beef was present in 18 samples and pork was found in 11 of the kebabs. Low levels of chicken DNA were also detected in two kebabs. The 2 lamb ready meals reported as unsatisfactory both contained 98% sheep DNA but one also had 2% beef and the other had 2% pork. The overall compliance rate for lamb products for speciation was 69.3%.

Pork Speciation

A total of 18 samples out of 66 pork products tested for speciation were non-compliant. 15 out of 35 pork minces had other meat DNA detected as well as pork. Beef DNA was detected in 13 minces ranging from 1% to 50% and 10 had sheep DNA detected ranging from <1% to 30%.

Three of the 31 pork sausages had pork as the main meat component but also contained beef and lamb, one of which had 30 – 60% beef. The overall compliance rate for pork products for

speciation was 72.7%

Meat Composition and Labelling

Of the samples tested for composition and/or labelling, 69 were found to be non-compliant. Table 12 shows the number of unsatisfactory reports by product type.

Table 12: Meat Composition Non-Compliance by Product Type

Product	Total Number of Samples	Composition Non-Compliant	% of samples
Beef Burger	30	9	30.0%
Beef Mince	29	5	17.2%
Beef Pie	34	11	32.4%
Beef Ready Meal	30	6	20.0%
Goat Meat / Products	10	3	30.0%
Lamb Curry / Kebab	37	5	13.5%
Lamb Mince	34	6	17.6%
Lamb Ready Meal	30	8	26.7%
Pork Mince	35	4	11.4%
Pork Sausages	31	12	38.7%
Total	300	69	23.0%

The two main reasons for samples being reported as unsatisfactory was the absence of a quantitative ingredient declaration or QUID (which informs the customer the percentage of ingredients in the product) and low meat content where samples did not contain the amount of meat declared or required for the type of product (e.g. pork sausages are required to contain at least 42% pork). 23 of the samples fell into each of these failure categories.

Excess fat was also identified in 13 products, 12 of which were minces (6 lamb, 3 pork, 2 beef and 1 goat). The other product with excess fat was a lamb kebab.

Incorrect labelling was the reason for 9 of the unsatisfactory reports and these labels either did not include the required information or did not provide it in the correct format. One lamb ready meal was found to contain a piece of string (55 mm by 3 mm). Table 13 shows the composition failure reasons by product type.

Table 13: Meat composition failure reasons by product type

Product	No Quantitative Ingredient Declaration	Composition Failure Reasons: Low Meat Content	Excess Fat	Labelling	Foreign material
Beef Burger	5	2	-	2	-
Beef Mince	-	-	2	3	-
Beef Pie	7	3	-	1	-
Beef Ready Meal	2	4	-	-	-
Goat Meat / Products	2	-	1	-	-
Lamb Curry / Kebab	2	2	1	-	-
Lamb Mince	-	-	6	-	-
Lamb Ready Meal	1	6	-	-	-
Pork Mince	-	1	3	-	-
Pork Sausages	4	5	-	3	-

Product	No Quantitative Ingredient Declaration	Composition Failure Reasons: Low Meat Content	Excess Fat	Labelling	Foreign material
Total	23	23	13	9	1

The compliance rates by meat for composition and labelling across the product types tested are as follows: Lamb 81.2%, Pork 75.8%, Beef 74.8% and Goat 70%.

Beef Composition

The compliance rate for beef products for composition / labelling was 74.8%. Of those samples that were non-compliant for composition the majority, 14 out of 31 (45.2%), were missing a quantitative ingredient declaration. There were 2 beef samples, a mince and a pie, that were non-compliant for both composition and speciation.

Goat Composition

The compliance rate for goat products for composition / labelling was 70%. Of the ten goat samples, two were missing a quantitative ingredient declaration and a minced goat sample contained excess fat. There were 2 goat samples, a mince and a burger, that were non-compliant for both composition and species.

Lamb Composition

The compliance rate for lamb products for composition / labelling was 81.2%. Of the 19 non-compliant samples listed in Table 5.2, low meat content in lamb ready meals and excess fat in lamb mince were the most frequently reported issues. The foreign material found was a piece of string in a lamb ready meal. There were 3 lamb samples, 2 minces and a kebab, that were non-compliant for both composition and species.

Pork Composition

The compliance rate for pork products for composition / labelling was 75.8% with 5 pork sausage samples having a low meat content and another 4 pork sausages missing a quantitative ingredient declaration. There were 3 pork samples, all sausages, that were non-compliant for both composition and species.

Retail Type

Table 14 shows the overall breakdown of compliance, for both speciation and composition, by retail type. Large retailers and takeaways had the greatest rate of compliance for meat and meat products (73.7% and 72.7% respectively), when compared to other retail outlets.

Table 14: Meat Compliance by Retail Type Samples

Retail Outlet Type	Number of compliant samples	Number of non-compliant samples	Total
Internet	29	26	55
Retail - independent	86	70	156
Retail - large	42	15	57
Takeaway	16	6	22
Wholesale	6	4	10

Retail Outlet Type	Number of compliant samples	Number of non-compliant samples	Total
Total	179	121	300

P2 Fish and Fish Product Speciation

The compliance rate for P2 Fish speciation was 96%.

Tables 15 and 16 summarise compliance by product type and retail type respectively. There were four non-compliant samples, and these were all foods sold as haddock. Two haddock fillets bought from takeaways and one haddock fillet from a fish seller were all identified as being cod. No haddock was detected in a smoked haddock and bacon gratin which was labelled as containing 10% haddock and 4% coley, all the fish was identified as coley. It was noted that this sample had a duplicate sample tested which did contain haddock which indicates that uneven distribution of fish in the product preparation may be the reason for this sample failure rather than substitution.

Table 15: Fish Speciation Compliance by Product Type

Product	Number of compliant samples	Number of non-compliant	Total
Cod fillets	20	-	20
Cod or Haddock fish fingers	12	-	12
Cod or Haddock fishcakes	11	-	11
Haddock fillets	17	3	20
Named species fish products	25	1	26
Plaice fillets	11	-	11
Total	96	4	100

Table 16: Fish Speciation Compliance by Retail Type

Retail Outlet Type	Number of Compliant samples	Number of non-Compliant samples	Total
Internet	1	-	1
Retail – Independent	32	2	34
Retail – Large	39	-	39
Takeaway	20	2	22
Wholesale	4	-	4
Total	96	4	100

P3 Spice and Herb Authenticity and Contamination

A total of 375 Spices and Herbs were examined for authenticity with a compliance rate of 89.6%.

A total of 150 black pepper, ginger and turmeric samples were tested for heavy metals and all were compliant. Of the 50 spice mixes tested for aflatoxins, one sample contained a level of aflatoxin B1 that exceeded the maximum limit. Table 17 summarises the compliance status by Product type.

Table 17: Spice and Herb Compliance by Product Type

Product	Number of Compliant Products	Number of Inconclusive products	Number of non-compliant products	Total
Black Pepper	50	-	-	50
Ginger	50	-	-	50
Mixed Herbs	42	-	8	50
Oregano	37	1	11	49
Sage	19	-	6	25
Spice Mix	48	-	3	51
Thyme	39	-	11	50
Turmeric	50	-	-	50
Total	335	1	39	375

There were 39 non-compliant samples and 1 inconclusive sample, giving an overall failure rate of 10.4%. Of the non-compliant samples 92% were herbs and only 8% (3 samples) were spices. The 35 non-compliant herbs samples all failed on microscopy. 25 of the samples were deemed to be not of the quality demanded due to the high proportion of extraneous plant matter present and 7 samples contained foreign matter (plastic, stones, snail shell). A further 2 samples, 1 x sage and 1 x oregano, were reported as not having plant material consistent with the named herb.

Upon evaluation by microscopy, two of the spice mixes were found to be unsatisfactory. A sample labelled as basil was found to contain only thyme and another sample was found to contain additional ingredients not declared on the label.

The inconclusive sample related to an oregano sample which showed noticeable macroscopical differences with the other oregano samples looked at. This sample coincidentally had a duplicate, which was reported as being non- compliant (not consistent with oregano). Table 18 shows that the greatest number of non-compliant samples were purchased from independent retailers.

Table 18: Spice and Herb Compliance by Retail Type

Retail Outlet Type	Number of Compliant products	Number of Inconclusive products	Number of non-compliant	Total
Internet	20	-	8	28
Retail - independent	223	1	27	251
Retail - Large	77	-	4	81
Wholesale	15	-	-	15
Total	335	1	39	375

P4 Basmati Rice and Durum Wheat Authenticity

The compliance rate for P4 Rice/Pasta was 77.5%. Of the 40 basmati rice samples, 31 contained basmati varieties and were reported as compliant and 3 cooked rice samples were reported as inconclusive as they were unsuitable for analysis due to degraded DNA, as shown in Table 19.

Table 19: Rice Compliance by Product Type

Product	Number of Compliant samples	Number of Non-Compliant samples	Number of Inconclusive samples	Total
Cooked Basmati	15	2	3	20

Product	Number of Compliantsamples	Number of Non-Compliant samples	Number of Inconclusive samples	Total
Prepacked Basmati	16	4	-	20
Total	31	6	3	40

Non-basmati rice varieties were detected in 3 out of 40 samples with the levels of adulteration ranging from 9% to 29%.

A further 3 samples were labelled with a specific variety of basmati rice and although they contained >95% of approved basmati rice varieties there is also a requirement to contain at least 97% of the marked variety and they did not comply with this requirement. As shown in Table 20, 5 out of the 6 non-compliant samples were obtained from independent retailers or takeaways.

Table 20: Rice Compliance by Retail Type

Retail Outlet Type	Number of Compliant samples	Number of Non-Compliant samples	Number of Inconclusive samples	Total
Internet	1	-	-	1
Retail - Independent	11	-	3	14
Retail - Large	11	1	3	15
Takeaway	7	2	-	9
Wholesale	1	-	-	1
Total	31	6	3	40

All 25 durum wheat pasta samples tested for authenticity were satisfactory.

Table 21: Pasta Compliance by Product Type

Product	Number of Compliant samples	Total
Cooked Pasta	10	10
Prepacked Pasta	15	15
Total	25	25

The samples were purchased from a range of retailers as shown in Table 22.

Table 22: Pasta Compliance by Retail Type

Retail Outlet Type	Number of Compliant samples	Total
Internet	1	1
Retail - Independent	12	12
Retail - Large	12	12
Total	25	25

P5 Undeclared Milk

A total of 140 samples were analysed for the presence of milk and 132 were deemed to be compliant. Table 23 summarises the compliance status by product type. The compliance rate for

P5 Milk was 94.3%.

Table 23: Undeclared Milk Compliance by Product Type

Product	Number of Compliant samples	Number of Non-Compliant samples	Total
Dairy Alternatives: Butter	10	-	10
Dairy Alternatives: Cheese	15	-	15
Dairy Alternatives: Ice cream	10	-	10
Dairy Alternatives: Milk	15	-	15
Dairy Alternatives: Yoghurt	10	-	10
Dark Chocolate	33	6	39
Free from - Chocolate products	20	1	21
Free from - Flour Confectionery	19	1	20
Total	132	8	140

No milk proteins were detected in any of the ‘free from’ dairy alternative products. Undeclared milk was detected in 6 samples, milk, and in 1 case other allergens, may be present due to accidental cross-contact during production. The other 6 non-compliant samples either did not declare the presence of milk or milk derived ingredients or had a clear statement that the product was dairy free. 15% of the dark chocolate samples were reported as unsatisfactory with 6 out of 39 having milk protein present. A dairy free vegan truffle and a popcorn were also reported as non-compliant. Table 24 provides a breakdown of compliance by retail type.

Table 24: Undeclared Milk Compliance by Retail Type

Product	Number of Compliant samples	Number of Non-Compliant samples	Total
Internet	15	1	16
Retail - Independent	55	6	61
Retail - large	61	1	62
Wholesale	1	-	1
Total	132	8	140

All the non-compliant chocolate samples were from independent retailers (one purchased via the internet). The item from the large FBO that was non-compliant was a free from – flour confectionary product and was 1 of 3 popcorns tested.

P6 Undeclared Gluten

All 30 gluten-free flours or gluten-free flour alternatives were found to be satisfactory with respect to the presence of gluten. All the samples were purchased from Large FBOs.

Table 25: Undeclared Gluten Compliance by Product Type

Product	Number of Compliant samples	Total
Gluten Free Flour	15	15
Gluten Free Flour Alternative	15	15
Total	30	30

Duplication

Every effort was made to minimise duplication of samples however in a few cases the same product was purchased by different samplers from different locations. Sample descriptions and brand names were used to identify product duplicates in each sub project. Each sample submitted to the OLs was analysed once. Results from duplicated samples have been reviewed below. There were no duplications identified in sub projects P2 Fish, P4 Rice/Pasta or P6 Gluten.

P1 Mince and Processed Meat Composition and Speciation

Table 26: Duplicated P1 Meat Products and Compliance Status

Product	Number of distinct products	Number of Compliant samples	Number of Non-Compliant samples
Beef Ready Meal	1	2	0
Lamb Curry/Kebab	1	2	0
Lamb Mince	1	1	1
Lamb Ready Meal1	1	2	0
Total	-	7	1

Four distinct products were sampled more than once. The duplicated results for three of the products agreed. One product, a lamb mince, was reported as compliant and also non-compliant. The analytical composition of both samples was very similar and both reports identified a higher fat content than declared. The difference in compliance status is down to how the Public Analysts have undertaken labelling assessment - one considered 'typical declaration' and also compared to 'nutritional declaration' (non- compliant), the other has considered 'typical declaration' only (compliant).

One of the duplicated products was purchased from 2 different branches of a large supermarket. The other duplicate products were procured from different retailers (e.g. one from a wholesaler, the other from a large FBO).

P3 Spice and Herb Authenticity and Contamination

Table 27: Duplicated P3 Spice and Herb Products and Compliance Status

Product	Number of distinct products	Number of Compliant samples	Number of Samples Non-Compliant	Number of Inconclusive samples
Black Pepper	2	4	0	-
Ginger	3	10	0	-
Mixed Herbs	3	6	0	-
Oregano	6	10	3	1
Sage	2	3	1	-
Spice Mix	1	2	0	-
Thyme	4	8	1	-
Turmeric	9	19	0	-
Total	-	62	5	1

A total of 30 distinct products were sampled more than once as part of this sub project. This is, at least in part, a reflection of the marketplace. Even when shopping at geographically diverse independent or smaller retailers the same brands of spices/ herbs are on sale.

One oregano product that was submitted twice was reported as non-compliant against one sample and inconclusive against the other. However, both reports referred to the samples showing features not consistent with or different to other oregano samples.

Another oregano product that was submitted three times found 1 sample to be compliant but the other two were not of the quality demanded (mould spores, excessive extraneous plant material).

One thyme product was submitted three times, two samples were found to be compliant and the third to contain excessive extraneous plant material.

Whilst most sample duplications resulted in the same outcome, a number have had differing results demonstrating that quality can vary from batch to batch. Given the nature of the product and the nature of the failure (deemed to be not of the quality demanded) this is unsurprising.

P5 Undeclared Milk Allergens

Table 28: Duplicated P5 Undeclared Milk Products and Compliance Status

Product	Number of distinct products	Number of Compliant samples	Number of Non-Compliant samples
Dairy Alternatives: Butter	1	2	0
Dairy Alternatives: Cheese	2	5	0
Dairy Alternatives: ice cream	1	2	0
Dairy Alternatives: Yoghurt	1	2	0
Dark Chocolate	1	3	0
Total	-	14	0

Six distinct products were sampled more than once including a dairy alternative cheese and a dark chocolate both sampled three times. The duplicated results for all products agreed. Two of the distinct products were purchased from the same large retail outlet but from different geographical regions.

There are relatively limited choices in the marketplace for dairy alternative products as this is still quite a specialist product with a limited range of suppliers. This is likely to have been a contributing factor in the number of duplicates seen in this sub project.