REPORT OF THE INVESTIGATION BY THE FOOD STANDARDS AGENCY INTO INCIDENTS OF ADULTERATION OF COMMINUTED BEEF PRODUCTS WITH HORSE MEAT AND DNA

Introduction

1. On 16 January the Prime Minister asked the Food Standards Agency to launch an urgent investigation into the contamination of beef products with horse and pig DNA. The FSA has conducted this investigation under the provisions in section 6 of the Food Standards Act 1999, which places a duty on the FSA to comply, as far as is reasonably practicable, with any request from a Minister of the Crown. Although the criminal investigations are still ongoing, this paper reports on progress to date.

Management of food monitoring and incidents

2. UK local authorities carry out a wide range of checks at over 600,000 food businesses and also sea ports and airports, to ensure that food on sale or in the food chain, and imported in to the UK, meets food safety requirements, and that consumers are protected from fraud. The Food Standards Agency (FSA), as the central competent authority for food and animal feed law enforcement in the UK, supports the sampling work carried out by local authorities, and provides grant funding and national coordination for surveillance and surveys on priority issues.

3. Where investigations identify a problem with a food premises or an individual food, or ingredient, the food business and the local authority are obliged under the provisions of EU General Food Law to notify these to the FSA through our incident notification procedure. These systems are in place to ensure that incidents are dealt with quickly and effectively to protect public health through product withdrawals. Rapid alert messages are sent to the Commission to enable wider notification and action by other member states or countries outside the EU. Information is published on our website to inform consumers about individual products that have been withdrawn from the UK market.

Examples of Dangerous foods stopped entering the UK through surveillance at ports:

. Aflatoxins in roasted peanuts from China (May 2013)[1]
. Salmonella in paan leaves from Bangladesh (March 2013)[2]
. Unauthorised substance dichlorvos in brown beans from Nigeria (April 2013)[3]

4. Following the Machinery of Government changes with regard to England in 2010, the FSA has retained responsibility for the investigation of incidents with potential food safety implications – both in England and in the devolved nations of the UK. In discharging these responsibilities, the FSA works closely with other UK Government departments (in particular Department of Health and Defra) and with the devolved administrations.

This incident

5. The Food Safety Authority of Ireland (FSAI) issued a press release on 15 January 2013 reporting that analyses carried out over several months on a number of meat products revealed that some contained horse and pig DNA. FSAI had notified the Food Standards Agency on 14 January that they had conducted such a survey, although with no details.

6. Of the 27 beef burger products analysed by FSAI, ten products tested positive for horse DNA. In all but one of the beef burger samples, horse DNA was found at very low levels. These burgers had been produced by three companies one of which, Dalepak (Hambleton), was located in the UK. In one sample, a Tesco Everyday Value product, the level of horse DNA indicated that horse meat was present and accounted for approximately 29% of the total meat content of the burger. This product line was manufactured at Silvercrest in the Republic of Ireland and was sold at Tesco stores in the UK.

7. The Food Standards Agency responded rapidly to the above report and, as requested by the Prime Minister on 16 January, launched an urgent investigation. Also on 16 January, the FSA set out a four-point plan for its investigation, which has been implemented in conjunction with other Government departments, local authorities and the food industry:

    i. To continue the urgent review of the traceability of the food products identified in FSAI's survey.

[1] 143 mycotoxin notifications from UK since Jan 2012. Aflatoxins are chemicals produced by certain fungi that grow on foods such as nuts, cereals and spices. They are considered to be genotoxic carcinogens. Limits are set for these toxins in certain foods by the European Commission.
[2] The FSA has asked local authorities at UK ports and airports to sample and test all consignments of paan leaves (also known as betel leaves) presented for import. The results show high levels of contamination, which could be a risk to health given that paan leaves are consumed raw. Paan is often chewed raw as a palate cleanser or to aid digestion.
[3] 216 pesticide notifications from UK since Jan 2012. Dichlorvos is an unauthorised pesticide.

ii. To explore further, in conjunction with the FSAI, the methodology used for the survey to understand more clearly the factors that may have led to the low level cases of cross-contamination.

iii. To consider, with relevant enforcement authorities and the FSAI, whether any legal action is appropriate following the investigation.

iv. To work with Defra, the devolved rural affairs departments and local authorities on a UK-wide study of food authenticity in processed meat products.

8. Subsequently, investigations by authorities across here in the UK and Europe have identified multiple instances of the adulteration of comminuted beef products across Europe. Whilst our own investigations with the police and other enforcement authorities continue in relation to implicated products and premises in the UK, the initial response phase of this incident is now drawing to a close.

9. This report draws together the results of investigations conducted by the Food Standards Agency to date in four areas:

- gross adulteration (at or above 1% threshold)
- trace contamination (below 1% threshold)
- enforcement action
- national co-ordinated sampling and surveillance

Gross adulteration (at or above 1% threshold)

Background

10. Investigations have to date identified 27 comminuted beef products where there has been gross adulteration with horse meat (see Table 1). These have been identified through several routes:

- routine testing undertaken by the food industry and reported to the FSA;
- the co-ordinated local authority survey of processed beef products; and
- ad hoc local authority sampling and analysis.

11. The threshold used to define gross adulteration is that horse DNA is present at a level which is equivalent to 1% or more of the meat content of the food product being horsemeat. This reporting threshold is pragmatic, set to distinguish trace from deliberate adulteration. It was agreed, based on the robustness of routinely available analytical methods, and the existing knowledge and experience of regulators, enforcement and industry on a level that would clearly indicate gross

adulteration rather than carry-over of meat species in situations compatible with good practice. In many of these implicated products, horse has been identified to be present at several tens of percent of the total meat content. Such levels of gross adulteration can only have arisen as a result of deliberate substitution, gross negligence or very poor cleaning at some stage in the supply chain leading to these products.

12. Results positive for horse DNA above the 1% threshold, whether detected by the food industry or by local authorities, have in the majority of cases been reported immediately to the FSA and relevant product and other consumer-facing information has been published on the FSA website.

Table 1: UK processed beef products identified as containing 1% or more undeclared horse (as a proportion of the total meat content)

Company	Date notified to FSA	Products that tested positive for horse DNA	Action taken[4]
Aldi	15 February 2013	Today's special frozen beef lasagne	Product Recall
		Today's special frozen spaghetti Bolognese	Product Recall
	13 June 2013[5]	Aldi Oakhurst Frozen Meatloaf in Gravy	Product Withdrawal
		Aldi Oakhurst Frozen Meatloaf in Tomato sauce	Product Withdrawal
Asda[6]	6 March 2013	Chilled Beef Bolognese Sauce	Product Withdrawal
		Lean Beef Mince, 454g (frozen)	Product Withdrawal
		Smart Price Corned Beef 340g	Product Recall[7]

[4] **Withdrawal** is the process by which a product is removed from the supply chain, with the exception of product that is in the possession of consumers. **Recall** means the process by which a product is removed from the supply chain and where **consumers are advised to take appropriate action, for example to return or destroy food.**

[5] The positive results for the two Aldi products were from testing conducted by a local authority outside the scope of the formal sampling programme started by the FSA. Although these were removed from sale at the time, the FSA did not enter these on its table of products confirmed at above 1% horsemeat as full quantification tests had not been carried out. Through the new set of test returns, both products have been confirmed at above 1% and the FSA website has been updated accordingly.

[6] Asda Chosen By You corned beef has been removed from this table. The FSA was advised that the product contained horse DNA after the company carried out its own tests. Asda later confirmed that the level of horse DNA was below the 1% reporting threshold

Company	Date notified to FSA	Products that tested positive for horse DNA	Action taken[4]
Bird's eye	22 February 2013	Traditional Spaghetti Bolognese Beef lasagne	Product Withdrawal Product Withdrawal
Brakes	19 February 2013	Brakes spicy minced beef skewer	Product Withdrawal
The Burger Manufacturing Company[8]	19 February 2013	Burger	Product Withdrawal
The Co-operative[9]	4 February 2013	Frozen: 4 Beef Quarter Pounder Burgers	Product Withdrawal
Findus	4 February 2013	Findus Beef Lasagne, 320g, 360g, 500g	Product Recall
Hungarian Food Ltd	20 March 2013	Kockázott Marhaús, 1.010kg (frozen diced beef)	Product Withdrawal
King Fry Meat Products Ltd	28 February 2013	Beef burger	Product Withdrawal
Makro	14 February 2013	Frozen MQ 100% Aberdeen Angus Beef Burgers 12 6oz	Product Withdrawal
Oak Farm Foods	8 March 2013	Oak Farm Cottage Pie	Product Withdrawal
Rangeland	13 February 2013	Range of burger products	Product Withdrawal
Sodexo	21 February 2013	Beef burgers Minced beef	Product Withdrawal Product Withdrawal

7 Product was recalled after bute was detected at very low levels (4ppb). The recalls undertaken for Aldi and Findus product were undertaken because results of bute testing were not known at the time they tested positive for horse DNA. In both cases the results subsequently came back negative.

[8]The Burger Manufacturing Company was previously removed from this list after results on a first product were confirmed at less than 1%. However, they have been added back to the list after separate tests on a different sample were confirmed as positive for horse DNA above the reporting threshold.

[9] Ikea Frozen Swedish Food Market Meatballs has been removed from this table. The Agency was advised that initial tests showed the product contained horse DNA. Further testing has confirmed that the level of horse DNA was below the 1% reporting threshold.

Company	Date notified to FSA	Products that tested positive for horse DNA	Action taken[4]
		Halal minced beef	Product Withdrawal
Taco Bell	22 February 2013	Ground beef	Product Withdrawal
Tesco	15 January 2013	Everyday Value Frozen Burgers	Product Withdrawal
	11 February 2013	Everyday Value Spaghetti Bolognaise	Product Withdrawal
	12 March 2013	Tesco Simply Roast Meatloaf, 600g	Product Withdrawal
Whitbread Group PLC	15 February 2013	Lasagne product Beef burger product	Product Withdrawal Product Withdrawal

13. All products testing positive for the presence of horse have subsequently been tested for the presence of phenybutazone ("bute"), a drug widely used in horses but banned for use on horses destined for the food chain. In all but one case UK products have tested negative for "bute".

14. On 9 April 2013, ASDA reported to the FSA a positive test for the presence of "bute" at four parts per billion (a very low level, close to the limit of detection) in its 340g tins of Smart Price Corned Beef. The product had already been withdrawn from ASDA shelves the following day due to horsemeat adulteration, and following the detection of "bute" a full product recall was instigated by the supermarket and the FSA issued advice to consumers.

Trace contamination (below 1% threshold)

Background

15. The increasing sensitivity achievable by DNA tests means that it is possible to detect extremely low levels of DNA from an undeclared species, even when processors are adhering to good hygiene and manufacturing practices. Even where equipment has been thoroughly and properly cleaned, a few individual molecules of DNA might remain and, in theory, could be detected as a very low 'trace' positive result by sensitive DNA tests.

16. Some examples where such 'trace' carry-over might occur are:
    - carry-over of small amounts of material from one species to another by drops of blood or airborne particles, in abattoirs where different species of meat are stored and slaughtered in the same plant;
    - carry-over of small amounts of different species of meats, in establishments processing different species one after the other on the same production line or through shared equipment, such as mincers;
    - small traces of meat remaining on a cutting machine, board, knife or mincer used subsequently for another species, in a butcher's shop, or in the home.

Towards a better definition of trace contamination

17. While the 1% threshold has been supported in the UK, across the EU, and internationally as a pragmatic reporting level above which gross adulteration is likely to have occurred, there is a need for an evidence based assessment of how best to define and control trace contamination.

18. FSA and Defra are funding three strands of work to address this question, through the Laboratory of the Government Chemist, and supported by key industry stakeholders:

    i. Robust, experimental testing in controlled and factory settings to get a clearer understanding of the levels of carry-over achievable through good practice in meat processing, and a level which constitutes unavoidable 'trace' contamination.

    ii. Development and validation of robust analytical methods for detection and quantification of horse in meat products

    iii. Deliberative research with consumers to understand their views on what levels and controls for trace carry-over will be acceptable to the general public.

19. This work will inform discussion at UK and EU level and with industry on the action levels and controls which should be adopted by both industry and regulators in the longer-term for assuring the integrity of meat products.

Faith Communities

20. Our deliberative research with consumers may identify a level of trace carry-over of undeclared meat species that, provided appropriate controls are applied, would be acceptable to the general public. However, we understand that for some faith communities the presence of even trace levels of some undeclared meat species

is unacceptable. Throughout this incident, there have been isolated instances of food products labelled as Halal containing traces of pork DNA. Each of these has subsequently been removed from sale.

21. FSA, Defra and the Department for Communities and Local Government are in a dialogue with faith communities. Technical discussions were held on 14 March with the Halal and Kosher certifying bodies to provide information on the Government's testing programme and to outline the further research being undertaken so that they could consider the implications for certification. Certification is a matter for private industry and the faith communities. There are no specific regulations governing the sale and labelling of Halal or Kosher meat. However as with all food information, labels should not mislead the consumer.

Enforcement action

Background

22. There have been two areas for investigation and enforcement action. The first area has been gross adulteration with undeclared animal species of processed beef products that have been on sale in the UK including, for example, the Tesco Everyday Value beef burger identified in the original FSAI survey on 15 January, and the Findus beef lasagne reported to us on 7 February. We have in each case worked closely with the relevant UK local authorities. The second area has been activity at points of the food supply chain in the UK which may have led to gross adulteration. This has centred on investigations jointly with the police at five primary locations across the UK.

23. These investigations continue and whilst we cannot yet draw any firm conclusions, we can describe the enforcement approaches we are taking.

Gross adulteration of processed beef products on sale in the UK

24. Regardless of its size, a business operating across council boundaries can form a primary authority partnership with a single local authority in relation to food safety. Once legally nominated, partnerships are automatically recognised by all local regulators. The Primary Authority provides information and advice to the company and to other local authorities in liaison with the FSA and actively assesses the controls in place at the time of an incident and how these may be improved to meet legal requirements. If a problem arises, the Primary Authority can coordinate enforcement action to ensure that the business is treated consistently and that responses are proportionate to the issue.

25. FSA has met with the local authority that has Primary Authority (PA) responsibility for Tesco. The FSA was able to explain the emerging issues and set the investigation in a national context, explaining the requirement for specific information from the company and ensuring that the local authorities were proactive in the investigation phase of the incident.

26. The FSA met with Tesco and interviewed their key personnel in order to fully understand the extent of the issues relating to gross adulteration of their branded products and any action they had taken before, during and after the adulteration of their products had been identified. Consequently, the FSA received assurances from Tesco that they had reviewed their controls and put measures in place to improve them. These included extensive testing regimes aimed at ensuring product authenticity. Subsequent audits by Primary Authorities and other local authorities have confirmed that the controls have improved as a result of these interventions. In addition, Youngs, as the UK representatives of Findus Group, were interviewed regarding the company's response to finding contamination, and similar discussions were held regarding the prevention of future incidents and assurances gained.

Points of the food supply chain across the UK which may have led to gross adulteration

27. Following the identification of Findus beef lasagne as a second, separate food supply chain leading to a retail UK product which has been adulterated with horsemeat, the FSA checked traceability of products from the UK abattoirs approved for the slaughter of horses for human consumption. This was to provide assurance regarding the onward food supply chain for UK-originated horsemeat.

28. These checks identified the sale of horsemeat from Peter Boddy's, an abattoir in West Yorkshire, to Farmbox Foods Ltd, a cutting plant in Wales. Routine visits were then arranged to both premises for 12 February 2013. Concerns identified at those premises led to subsequent police involvement and the arrest of three men, now on police bail.

29. On 14 February 2013, further investigatory visits were undertaken at three premises in London and Hull with paperwork and computers being seized.

30. The identification of this second, separate food chain leading to an adulterated UK retail product – and the potential, subsequently realised, for more widespread adulteration – triggered more general discussions between FSA and police authorities. Initial contact between FSA and the Metropolitan Police took place on 7 February, with initial contact between FSA and Europol on 8 February. Following discussion with the UK Serious Organised Crime Agency (SOCA), the

FSA started supplying information regarding live investigations to Europol on 13 February – the first EU Member State food agency to do so.

31. Initial contact between FSA and the City of London Police Economic Crime Directorate, which specialises in investigation of large scale fraud, took place on 15 February. The City of London Police subsequently became the lead police force for UK investigations on 11 March 2013.

32. The current position is that City of London Police are the overall strategic lead on investigations, including intelligence assessment, with local police forces responsible for the investigations in their area. A co-ordinating Police Gold Group is in place chaired City of London Police with the Metropolitan Police, Heddlu Dyfed-Powys Police, Humberside Police, City of London Crown Prosecution Service (CPS) and FSA in attendance. A Strategic Group led by FSA is also in place to provide over-arching strategic direction to the horsemeat enquiries which includes the Police, FSA, Defra, Home Office, CPS and SOCA.

33. The FSA has also worked closely and proactively with local authorities across the UK to share information about products that were under investigation and to initiate follow up action where necessary. This has included visits to food business operators for audits and for seizure of material.

National co-ordinated sampling and surveillance

Background

34. The report to the Food Standards Agency of the gross adulteration of Findus beef lasagne products on 7 February identified a food supply chain completely separate from that implicated in the FSAI report of gross contamination of a Tesco Everyday Value Beefburger. As a result, the FSA that day announced it was requiring the food industry to test each line of comminuted beef products available through retail and catering outlets in the UK. On 9 February, at a meeting chaired by the Secretary of State for Environment, Food and Rural Affairs, the food industry agreed to delivering meaningful results from its testing programme to the FSA by Friday 15 February, with initial tests focussing on the areas of most concern but with all products tested and reported. Over the following month, the industry reported to the FSA, for subsequent publication, the results of 5,430 tests of beef products.

35. The results of industry testing published to 1 March 2013 are detailed in Table 2 below. The industry testing results showed that 5,386 of the 5,430 results from industry (over 99%) were negative for the presence of horse at or above the level of 1%. The 44 positive samples represented 17 different products and industry took a range of prompt and precautionary actions to remove implicated or suspect

product lines from sale to reassure consumers and assure the integrity of the food chain.

Table 2: Results of industry testing up to 1 March 2013 for undeclared horse in beef products

Table 2 Collated test results for horse (all results to 1 March 2013)			
Sample type	**Total number of tests**	**Tests negative for horse***	**Tests positive for horse***
Beef products			
Products	4196	4152	44
Raw materials/ingredients	927	927	0
Total	*5123*	*5079*	*44*
Other (non-beef) meat products			
Products	223	223	0
Raw materials/ingredients	84	84	0
Total	*307*	*307*	*0*
All tests	**5430**	**5386**	**44**

36. Following publication of the 1 March report, the food industry continued to test for horse as part of its wider assurance measures and to share the results with the FSA, with results reported quarterly. The first quarterly report was published on 13 June, including 19,050 test results submitted since the 1 March report. The new data included three beef products that tested positive for horse at or above the 1% threshold. None tested positive for phenylbutazone. Information on these three results had been in the public domain since March when action was taken to remove the products from sale.

37. We are exploring with the food industry how we might extend this approach to share actionable intelligence on the authenticity of food products available in the UK, with the objective of improving consumer protection.

* at 1% reporting limit

Table 3: The results of industry testing published to 13 June report.

Table 3 Collated test results for horse (all results submitted to 13 June report)			
Sample type	**Testing for horse**		
	Total number of tests	**Tests negative for horse**	**Tests positive for horse**
Beef products			
Products	7248	7201	47
Raw materials/ingredients	15568	15568	0
Total	*22816*	*22769*	*47*
Other (non-beef) meat products			
Products	790	790	0
Raw materials/ingredients	874	874	0
Total	*1664*	*1664*	*0*
All tests	**24480**	**24433**	**47**

38. Separately, and as part of the action plan announced by the FSA on 16 January, FSA worked with Defra to commission local authorities to take formal enforcement samples of comminuted beef products from across the UK. The programme was formulated to provide a representative picture of levels of adulteration with undeclared horse and pig at a 1% reporting limit, as well as enabling enforcement authorities to take formal action, where appropriate, on the basis of the findings.

39. Following investigations across the EU regarding the source of horsemeat used in beef products European Commission Recommendation 2013/99/EU was made in February 2013 and established an EU-wide co-ordinated control plan to establish the prevalence of fraudulent practices in the marketing of certain foods in processed beef products. Member States were asked to test certain foods marketed and/or labelled as containing beef for the presence of horse DNA. The local authority sampling programme was therefore extended to include 150 further products as part of this EU-wide surveillance programme.

40. A total of 514 samples have been taken and analysed over the three phases of the local authority sampling programme (see tables 4 and 5).

41. The results from the local authority testing programmes were consistent with those from industry testing. Over 99% of samples tested by local authorities were negative for horse at or above the 1% reporting level, and no horse positives were found in the second and third phases of the local authority testing programme carried out between 13 February and 8 March 2013.

Table 4: details of the three phases of sampling in the local authority programme

Phase	No. of samples taken	No. of LAs taking part	Type of beef products sampled			Premises sampled	Date of sampl-ing
1	224	28	Beef burgers, beef mince, beef sausage and similar processed beef products.	Pre-packed products	Mainly frozen products and from lower priced or 'value' or 'economy' lines	Retail, wholesale, caterers	4-18 February
2	140	28	Beef-containing ready meals	Pre-packed products	Frozen, chilled, tinned and fresh	Retail, wholesale, caterers	13-25 February
3	150	24	Beef burgers, beef mince, beef sausage and similar processed beef products. Beef-containing ready meal	Pre-packed, non pre-packed, and pre-packed products for direct sale		Retail, wholesale, caterers, cold stores	25 February – 8 March

Table 5: Summary results of horse and pig DNA detected at or above the 1% reporting limit in each of the three phases of the local authority programme

Phase	Number negative for both undeclared horse and pig DNA <1%	Number positive for horse DNA ≥ 1% (% of total)	Number positive for pig DNA ≥ 1% (% of total)	Number that did not meet sampling criteria	Total Number of samples taken
1	**218** (97.3%)	**2** (1.3%)	**2** (0.9%)	**2** (0.9%)	**224**
2	**139** (99.3%)	**0** (0%)	**1** (0.7%)	**0** (0%)	**140**
3	**150** (100%)	**0** (0%)	Not applicable	**0** (0%)	**150**
TOTAL	**507** (98.4%)	**2** (0.6%)	**3** (0.8% of 364)	**2** (0.4%)	**514**

42. Border Inspection Posts also took part in a sampling programme between 4 March and 3 May 2013. A total of 79 samples of meat and products of bovine origin from six non-EU countries were taken at ports of entry by four port health authorities. No horse or pig positive test results were found.