

## **SURVEY TO INVESTIGATE THE VARIETAL LABELLING OF POTATOES – Part 1**

*This survey was conducted as part of the Agency's food authenticity programme, which aims to gather information about the description of food in the UK.*

### **Summary**

- The Food Standards Agency carried out a survey to investigate whether potatoes on sale in the UK are accompanied with an indication of their variety as required by the Food Labelling Regulations 1996, and whether this indication is accurate.
- In order to obtain a representative picture of the seasonal potato market, sampling took place during February, April and June 2003. This information sheet refers only to those samples collected in February and April. A further update for the June sampling results will be published shortly.
- A total of 294 samples were collected during February (163) and April (131) from a range of retail outlets, and wholesale and catering suppliers.
- 96 (33%) of the potatoes collected were labelled incorrectly, of which 47 (16%) were not labelled with sufficient varietal information as required by law, while the remaining 49 (17%) were not found to be the variety they were labelled as.
- The majority of the 33% of samples that were either mislabelled or not labelled with sufficient varietal information were collected from independent/small chain retail outlets (23%), fruit and vegetable shops (33%), wholesale markets (20%) and market stalls (23%).
- The major problem encountered during the survey has been at wholesale markets where the variety Ambo is being mislabelled and sold as King Edward. Of the 37

potato samples collected that were labelled King Edward, 16 were found to be a variety other than King Edward and of these 12 were Ambo. Of the 16 mislabelled King Edwards 13 were collected from wholesalers or market stalls.

- The results show that potatoes are at times sold without an indication of their variety, and in some cases where a varietal declaration has been made, this has proved to be inaccurate. All results have been passed on to local authorities who are currently following up on results with sample owners.

## **Background**

Despite a fall in retail sales of potatoes in recent years, they are still a traditional part of the UK diet (Mintel report 2003<sup>1</sup>). In 2002 UK retail sales of potatoes had a value of £1,450 million, and accounted for 17% of total fruit and vegetables sales. Although there is an enormous range of different varieties of potatoes, only around 30 to 40 are grown commercially. Supermarkets and other fruit and vegetable outlets are increasingly using the varietal name of potatoes as a marketing tool, and are selling particular varieties of potatoes as premium priced products (e.g. Charlotte and Nicola salad potatoes). Consumers may purchase a particular variety of potatoes for a number of reasons such as their taste and texture (waxy/floury), cooking properties (e.g. suitable for boiling/chipping/baking), or simply recognition of a familiar/traditional name.

Potatoes are a staple part of the UK diet, and may form part of a healthy balanced diet. Plain boiled potatoes are low in fat and provide 72 kcal/100g. Potatoes are also an important source of nutrients such as vitamin C, potassium, folate and vitamin B6.

This survey has been conducted on a range of different varieties of potatoes on sale in the UK to determine to what extent they are accompanied by an accurate indication of their variety, as well as to provide consumers with information on the products they are purchasing.

## **Legislation**

In the UK, giving misleading information about food to consumers and selling food that is not of the nature, substance or quality demanded by the consumer is covered by the general provisions of the *Food Safety Act 1990*<sup>2</sup>. More specific legislation covering the labelling of food is given by the *Food Labelling Regulations 1996 (as amended)*<sup>3</sup> Regulation no. 6 (2) and Schedule 1, which state that: The name used for potatoes sold as such must include or be accompanied by an indication of their variety.

## **Methodology**

### **(a) Sampling**

Thirty Local Authorities and DEFRA's Horticultural Marketing Inspectorate participated in the collection of samples for this survey. A list of participating local authorities is included in Annex A. Sampling was carried out during the first weeks of February and April. Collecting officers were provided with a written sampling protocol, and sample plan detailing the type of samples to be collected, and the product information to be recorded. Samples were collected across the UK from a range of retail outlets including fruit and vegetable shops, supermarkets, independent retailers and wholesale markets. A total of 294 samples were collected, comprising 163 samples from February and a further 131 from April.

### **(b) Analytical approach**

The Agency funded research to develop methodology and a database for microsatellite-based DNA profiling of potato varieties, as reported in the scientific literature (Corbett *et al.*, 2001<sup>4</sup>). Samples collected in this survey were analysed using this method by The Molecular Genotyping Group, National Institute of Agricultural Botany (NIAB) following an open tendering exercise.

Each sample consists of a batch of a minimum of 20 potato tubers from which six tubers were chosen at random. Three of these tubers were taken for DNA analysis using an analytical protocol approved by the Agency's Working Party on Food Authenticity. The remaining three tubers were stored at  $-20\text{ }^{\circ}\text{C}$  for use in any further testing that may be required.

DNA was extracted from the sample and an authenticated reference and the resulting extracts subjected to PCR (Polymerase Chain Reaction) to amplify target DNA sequences. A list of primer pairs for these linkage groups is included in Annex B. The PCR products were separated using capillary electrophoresis and the resulting patterns analysed.

### **Quality Assurance**

Each sample was given a unique identifying code and sent directly to the laboratory by the relevant collection officer.

The genotype of samples was compared both directly and indirectly with the genotype of stated and control varieties. Direct comparison was made with an authenticated tuber of

the stated variety. Indirect comparison was made by reference to NIAB's stored database of potato variety genotypes (Annex C provides a list of potato varieties currently in this database). A key element of the quality assurance is agreement between the reference tuber and the database.

If the genotype of a submitted sample differed from that of the reference samples of the stated variety, or if there was no varietal information supplied at the point of sale, the variety the sample most closely resembled was determined by reference to the database.

## **Results**

The results of the analyses are shown in Table 1. Of the 294 samples collected 96 (33%) did not have appropriate varietal labelling; 47 samples (16%) were not labelled with a variety, while a further 49 (17%) samples were labelled with an incorrect variety (Table 2).

Over the course of the February and April sampling periods, 37 potatoes labelled as King Edward were collected (Table 3). Of these potatoes, 16 (43%) samples were wrongly labelled and were found to be varieties other than King Edward (Figure 1). 12 (75%) of the incorrectly labelled samples were of the variety Ambo, and 13 (88%) were collected from either market stalls or wholesale markets.

## **Interpretation**

While this survey has found that 67% of potato sampled were labelled correctly with the appropriate variety as required by the Food Labelling Regulations 1996, a significant number of samples were either not adequately labelled or the variety was misdescribed.

The breakdown of outlets which potatoes were sampled from is shown in Figure 2. 17% of samples were purchased from major supermarkets, which are responsible for 80% of the volume of retail sales of potatoes. The results found one (2%) of these 51 samples collected to be mislabelled (Figure 3). Supermarkets generally operate with a direct supply chain, and in recent years have put in place testing regimes to ensure they are buying and selling the correct variety of potatoes in line with Food Labelling Regulations.

The sampling protocol was designed to focus on samples of potatoes destined for sale by smaller retailers and catering suppliers, where the extended supply chain includes wholesale markets. The majority of samples that were either mislabelled or not labelled were collected from Independent/small chain retail outlets, fruit and vegetable shops, wholesale markets and market stalls (Figure 4). While a similar number of mislabelled and unlabelled samples were collected from most of the outlets, it is notable that of the 19

adverse results from wholesale markets, 16 were labelled with the wrong variety (Figure 5).

With some of the smaller retailers there was poor awareness of the Food Labelling Regulations requirement that potatoes on sale must be accompanied with an indication of their variety. Potatoes were often described and sold as 'salad', 'whites', 'reds', 'Cyprus' etc. This survey has usefully helped to educate some retailers and raise awareness of their labelling responsibilities. Some smaller retailers have reported that bulk stock is arriving from suppliers with incorrect or no varietal labelling. This may be a wider problem.

In certain cases where the potato variety has been misdescribed there is some evidence that supplies of potatoes are correctly labelled by the growers/packers and mislabelling is occurring in the small retail outlets. These outlets may describe and sell potatoes with a varietal name the public recognises or demands (i.e. those varieties made popular by supermarkets). It is important to note that many of these cases are due to poor practice with no financial advantage afforded to the traders by the mislabelling. The price paid for potatoes is generally dependent on their grade/quality, and only a few potatoes receive a higher price in the market place due to their variety (e.g. King Edward, Maris Piper, Desiree).

The major problem encountered during the survey appears to be concentrated within the wholesale market trade where the variety Ambo is being mislabelled and sold as King Edward (Figure 1). Of the 37 potato samples collected that were labelled King Edward, 16 were found to be a variety other than King Edward and of these 12 were actually Ambo. Of the 16 mislabelled King Edwards, 13 were collected from wholesale or market stalls.

King Edward potatoes are a well-known traditional variety of potatoes, with part-red tuber skin colour and creamy coloured flesh. Ambo, however, is a cross between the red variety Desiree and the white variety Cara. Ambo potatoes are both early maturing and high yielding, and require less use of pesticides than King Edwards. Although the tubers of these two varieties look very similar, King Edward potatoes have different growing and cooking properties and can generally command a higher price, both at wholesale and retail outlets. During the first week of April King Edward potatoes were selling at wholesale for £70-£100/tonne, and the difference in price between King Edward and Ambo potatoes at this point in the supply chain is around £30-£40/tonne (3-4p/Kg). This differential increases further at retail outlets. Over the course of the sampling for this survey the

average price paid for King Edward potatoes in retail outlets was 58p/Kg, compared with 39p/Kg for a generic white potato such as Ambo.

### **Follow up Action**

Trading Standards departments and relevant Home Authorities have been informed of the results of this survey to enable them to take any follow up action they consider appropriate. The Agency is encouraging Enforcement Authorities to follow up cases where varietal information is lacking and to remind retailers that it is their responsibility to follow this up with their suppliers to ensure they have the correct information to display on products on sale.

The Agency will also be seeking information from Local Authorities on the outcome of their follow-up investigations and considering whether any further action is required. Of the forty Local Authorities and Home Authorities who received notification of adverse results, to date seventeen have taken follow-up action. Advance results of the survey were also sent to all the companies from which samples collected/originated were found not to be appropriately labelled with the variety, or where the variety labelled was found to be inaccurate. These companies were given the opportunity to comment on the results of the analysis. Comments received from companies are reproduced in Annex D. The results of the final sampling exercise carried out in June will serve as a useful indicator to see if labelling problems continue and also whether any of the summer potato crop are prone to misdescription problems.

### **Conclusions**

The survey has served to highlight the lack of awareness by many retailers of the need to include a varietal name when selling potatoes. Clearly in many cases where varietal labelling has been omitted there may be no real intent to defraud and our survey has served as a useful reminder to those involved of the need to meet the requirements of the Food Labelling Regulations. In the main the findings have highlighted a problem with substitution of King Edwards with the Ambo variety. The Agency is encouraging Local Authorities to follow up the results to make sure the legislation is observed.

### **References**

1. Mintel report May 2003. Fresh Fruits and Vegetables.
2. Food Safety Act 1990. [1990] Ch. 16
3. Food Labelling Regulations 1996. SI 1996 No 1499

4. Corbett G, Lee D, Dononi P and Cooke RJ (2001) Identification of potato varieties by DNA profiling. *Acta Horticulturae* 546 387-390)

#### **Further Information**

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**Table 1. Sample details and results of analyses.**

**See excel spreadsheet**

**Table 2. Summary of results**

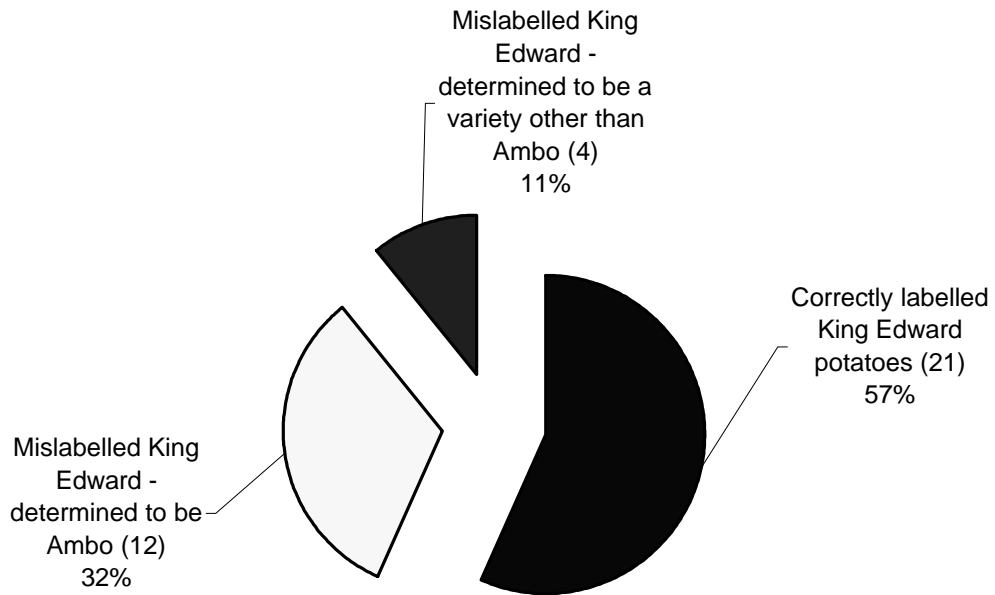
	samples	%
Total samples correctly labelled	196	67%
Total samples with incorrect labelling	96	33%
Not labelled with sufficient varietal information	(47)	(16%)
Potato variety mislabelled	(49)	(17%)
Varietal labelling could not be confirmed*	2	<1%
<b>Total samples collected</b>	<b>294</b>	<b>100%</b>

\* no appropriate reference material

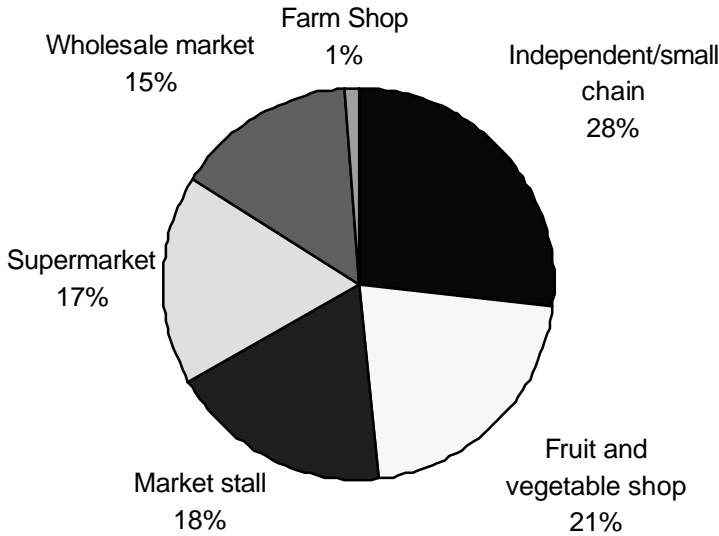
**Table 3. Range of potato varieties sampled**

<b>Variety</b>	<b>Potatoes labelled as variety</b>	<b>Potatoes determined to be variety</b>
King Edward	37	21
Estima	31	32
Nicola	20	34
Maris Piper	18	19
Maris Peer	16	13
Charlotte	15	15
Wilja	15	10
Marfona	10	11
Nadine	10	19
Cara	8	10
Kerr's Pinks	8	7
Romano	6	6
Esquisa	5	6
Maris Bard	5	5
Elvira	4	4
International Kidney	4	4
Sante	4	4
Amandine	3	3
Desiree	3	2
Pentland Dell	3	5
Dunbar Standard	2	1
Golden Wonder	2	2
Juliette	2	2
Lady Crystl	2	2
Navan	2	7
Agata	1	4
Claret	1	2
Osprey	1	1
Pentland Squire	1	1
Pink Fir Apple	1	1
Rooster	1	2
Saxon	1	4
Vivaldi	1	2
Accord	-	1
Ambo	-	12
Arran Comet	-	1
Barna	-	1
Bintje	-	1
Caeser	-	1
Colmo	-	1
Fambo	-	1
Inova	-	1
Premiere	-	1
Rocket	-	1
Shannon	-	1
Swift	-	1

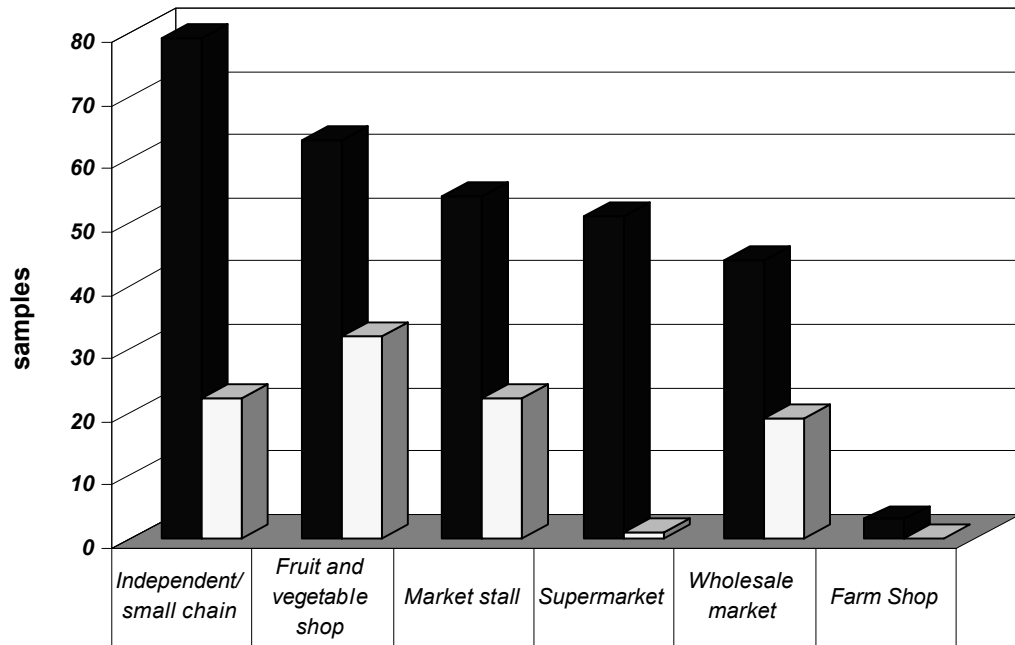
**Figure 1. Determination of variety of potatoes labelled as King Edward**



**Figure 2. Range of outlets samples were collected from**

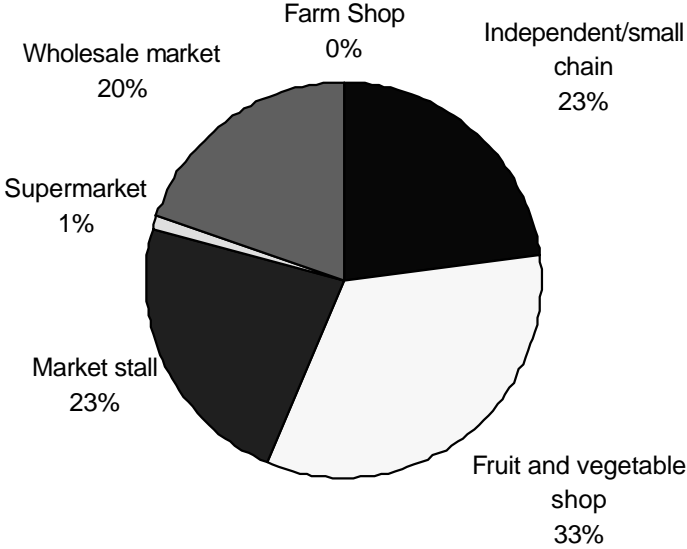


**Figure 3. Adverse samples collected from outlets visited**

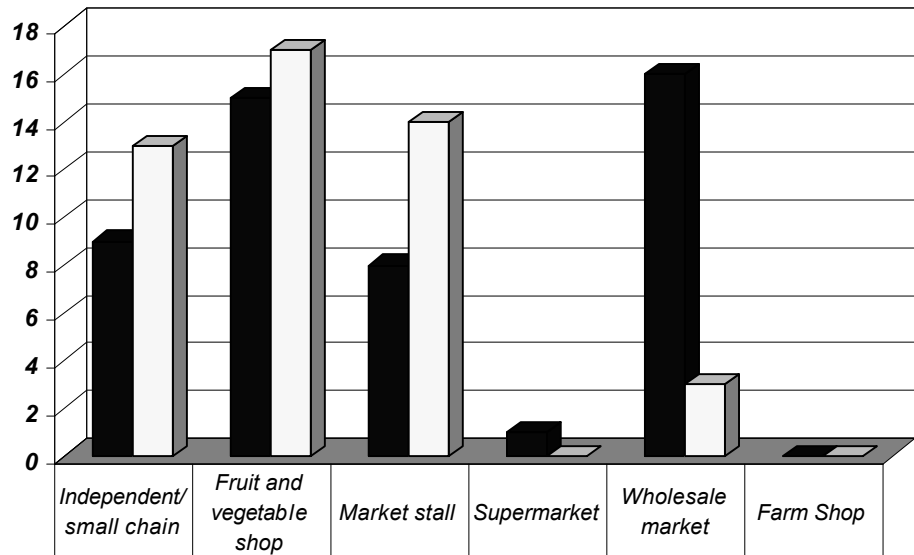


■ <i>Total samples collected</i>	79	63	54	51	44	3
□ <i>Adverse results reported</i>	22	32	22	1	19	0

**Figure 4. Breakdown of outlets adverse results were collected from**



**Figure 5. Different types of adverse results collected from each outlet**



■ <i>samples mislabelled</i>	9	15	8	1	16	0
□ <i>sampling lacking varietal labelling</i>	13	17	14	0	3	0

## **Annex A. List of Local Authorities Participating in the Survey**

Birmingham City Council  
Bath and North East Somerset  
Cambridgeshire County Council  
Glasgow City Council  
Gloucestershire County Council  
Horticultural Marketing Inspectorate  
Herefordshire Council  
London Borough of Kensington and Chelsea  
Lincolnshire County Council  
Luton Borough Council  
London Borough of Merton  
Nottinghamshire County Council  
Northern Ireland - Food Liaison Group  
Norfolk County Council  
North Yorkshire County Council  
Oxfordshire County Council  
Plymouth City Council  
Neath-Port Talbot Borough County Council  
Somerset County Council  
Southampton City Council  
Shropshire County Council  
Stoke on Trent City Council  
City and County of Swansea Council  
London Borough of Wandsworth  
Wokingham Council  
West Lothian Council  
Worcestershire County Council  
Walsall Council  
London Borough of Westminster  
Wolverhampton City Council  
West Yorkshire Trading Standards

## Annex B. Microsatellite Primer Pairs

Linkage Group	Repeat Motif	Primer Sequences	Predicted Size (bp)	Annealing Temperature (AT)
I	(TAA) <sub>6</sub>	ccttccttaatacaataacc catggagaagtgaaaacgtctg	162	55 °C
VIII	(ACTC) <sub>6</sub>	tctcttgacacgtgactgaaac tcaccgattacagtaggcaagaga	249	60 °C
IX	(CT) <sub>4</sub> ...(CT) <sub>8</sub>	caactcaaaccagaaggcaaa gagaaatgggcacaaaaaaca	193	55 °C
XI	(CTGTTG) <sub>3</sub>	ttaagtctcagttctgcaggg gtcataacctttaccattgctggg	166	55 °C
XII	(TAC) <sub>5</sub> ...(TA) <sub>3</sub> . ..(CAT) <sub>3</sub>	tctcaccageccggaacat aagctcgggaagtgatttg	288	55 °C

## Annex C. List of Potato Varieties in Current Database

Accent	Cosmos	Lady Rossetta	Rocket
Accord	Cultra	Marfona	Romano
Admiral	Desiree	Maris Bard	Rooster
Agata	Dunrod	Maris Peer	Roseval
Ailsa	Dunbar Standard	Maris Piper	Russet Burbank
Alex	Elvira	Merlin	Sante
Alpha	Erntestolz	Midas	Saturna
Amandine	Estima	Minerva	Saxon
Ambo	Exquiza	Morene	Shannon
Anna	Fambo	Mozart	Shepody
Anya	Fianna	Nadine	Sprint
Arran Comet	Golden Wonder	Navan	Spunta
Arran Victory	Harmony	Nicola	Sunbeam
Asterix	Hermes	Olympia	Sunset
Atlantic	Home Guard	Osprey	Swift
Barna	Inova	Pentland Crown	Symfonia
Bintje	International Kidney	Pentland Dell	Tiffany
British Queen	Juliette	Pentland Javelin	Valor
Caesar	Kennebec	Pentland Squire	Verity
Cara	Kerr's Pink	Picasso	Vivaldi
Carlingford	King Edward	Pink Fir Apple	Wilja
Charlotte	Lady Balfour	Premiere	Winston
Claret	Lady Crystl	Record	Yukon Gold
Colleen	Lady Felicia	Red Duke of York	
Colmo	Lady Olympia	Remarka	

## **Annex D. Written Comments Received From Companies**

NB *The comments listed in this Annex were received by the Food Standards Agency in response to notification of their individual results from the companies concerned and reflect their views.*

**From: Somerfield Stores Ltd, Somerfield House, Whitchurch Lane, Bristol, BS14 0TJ**

### **Sample NR 191**

“I have investigated this matter with our supplier for this product and our findings are as follows:

- From the information supplied by the FSA the offending product would appear to be a 1kg Pillow Pack of Small New Potatoes packed in packhouse 2 at the supplier’s site. Unfortunately the supplier only retain physical packing records for 3 months, therefore as the sample was taken in February they do not have access to packing records to determine what may have happened.
- A packing error such as this could occur due to a number of reasons. The most likely cause of such an error is operator error during the ‘run off’ from one product to another. This is particularly a risk on vertical form fill and seal lines where the film and print information take a considerable time to set up while the hopper above the plant is being filled with potatoes. i.e. Due to time restraints a lap over of varieties could occur when a production line has not been correctly downed down prior to packing a new variety.
- We have spoken to our supplier concerning this problem, and they have agreed to write a procedure for supervisors operating vertical form fill and seal lines. As the supplier will be moving into a new factory later this year and the majority of our lines will be packed using this format, it is therefore important we ensure procedures are in place and are followed correctly.”

**From: Edwin H Davey (Limber) & Co, Cormuir, Great Limber, Grimsby, North East Lincs, DN37 8JS**

**Sample HMI 573**

“We can state with absolute certainty that neither the Scottish VTSC grower, nor the Scottish grower who multiplies our King Edward seed has ever encountered Ambo, let alone grown it. We can also verify that no land upon which we grow our King Edwards has ever grown Ambo and we can guarantee the integrity of our King Edwards until they leave our premises.”

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**From: Coven Heath Nurseries, 562 Penn Road, Penn, Wolverhampton, WV4 4HU**

**Sample WV 494**

“Thank you for your information. The potatoes you declare to be Estima were purchased from Redbridge, Wolverhampton Wholesale Market. It clearly stated Wilja on the bags and on the sales ticket.”

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**From: Redbridge Produce and Flowers Ltd, 47/51 Block B, Wholesale Fruit Market, Edge Lane, Liverpool L13 2EA**

**Sample WV 494**

“We have tried to investigate this matter and our Wolverhampton branch made contact with the retailer on 26 August 2003. We requested from the retailer, either: a true date of sale, a true indication of unit (item coding), a sales ticket.

At this point the retailer is unable to provide us with any of the above which is the key in tracing back the source of this product. We have asked that he looks back on his records at his earliest convenience so that we can take the necessary steps to investigate this matter fully.

At this stage we are unable to confirm or deny that this product was purchased from Redbridge Wolverhampton”

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**From: Lidl UK GmbH, 19 Worples Road, Wimbledon, London SW19 4JS**

**Sample ST 366**

“Lidl has an extensive food-sampling programme and issues such as this should ordinarily be highlighted during routine sampling. Our fruit and vegetables are checked in our in-house test kitchen at least once per week to ensure that our customers receive high quality produce. Naturally, Lidl impresses upon its suppliers the importance of accurate labelling. In this case, it would not have been possible for our Buyer to determine the particular variety of potato by visual inspection. Lidl can change its potato supplier on a daily basis and therefore, it would not be practical to use DNA testing to confirm the variety supplied.

Following this incident the supplier was contacted and they have assured us that the potato variety was Charlotte. The supplier carries out their own quality assurance testing and are adamant that the variety of the potato was as described. Lidl’s own quality assessment of the product did not reveal any adverse findings.

Unfortunately Lidl has not been able to sample these particular batches of salad potato due to the delay in notification. Therefore, I am unable to comment further on your results.”

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**From: TJ Allen and Son, Manor Farm, Brambleberry Lane, Bratoft,  
Lincolnshire**

**Sample NG 235**

"The potatoes in question were indeed Estima. Our sacks are all variety box printed and usually ticked in the box. All we can assume is that some were missed on this occasion"

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**From: Nisa Today’s (Holdings Ltd), PO Box 58, Scunthorpe, North  
Lincolnshire, DN15 8RG**

**Sample OX 261**

“Following your results on the above I have traced back, with our supplier of salad potatoes, to the field where the Amadine potatoes were grown in France. It appears that the 12 ha field where these potatoes were grown was a split field of 8 ha of Amadine and 4 ha of Exquisa.

It transpires that Amadine variety were ordered but the French delivered Exquisa which were grown in the same field. Our supplier states that is it impossible to distinguish between the two salad potato varieties and only DNA testing could determine the difference in variety. There is no financial advantage as the two varieties are the same cost price.”

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**From: Savages Supermarket, 45-51 Bridge Road, Woolston, Southampton,  
SO19 7GP**

**Sample SO 343**

“Our policy at the time was to take details of the product from the invoice. This would be the description and the country of origin.

The potatoes in question [were] listed as mids on the delivery note and so they [were] labelled as these. This was wrong and since [then] we have re-looked [at] our system for labelling and now only take the details from the packaging itself.”

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