

## **SURVEY ON THE MEAT CONTENT OF CERTAIN MEAT PRODUCTS.**

*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**

- Meat products, whether prepacked or sold loose, are required to declare how much meat they contain by species i.e. % beef, % pork etc. The purpose of this survey was to check whether meat product manufacturers are calculating and declaring meat content correctly in response to changes in labelling legislation requirements. The survey also evaluated the suitability of the Agency's recommended approach to calculating meat content.
- Twenty six local authorities collected recipes, samples of raw materials and final products at the point of manufacture on 191 meat products covering sausages, burgers, pies and kebabs from 146 different manufacturers.
- The meat ingredients were analysed for fat, total nitrogen and hydroxyproline by a consortium of five public analysts to determine their fat, protein and connective tissue content. A full compositional analysis was carried out on final products, where these had been collected.
- The meat content was calculated using three separate methods. Two were recipe based calculations: the FSA method is based on the manufacturer's visual lean (VL) estimation of meat ingredients by eye and reference to typical values of fat and connective tissue; whereas the CLITRAVI (Liaison Centre for the Meat Processing Industry in Europe) method is based on analytical values of fat and connective tissue in the meat ingredients. The third method (Stubbs and More calculation), which is limited to single species products, is based on analysing the meat product for nitrogen and fat and using agreed nitrogen factors to calculate the meat content.

- Despite a requirement for a meat content declaration since 1984, six (3%) out of the 191 product descriptions examined did not give a quantitative meat declaration. A further four products (2%) quantified the meat content, but did not declare it in the correct format.
- Overall the survey indicates that the manufacturers sampled are declaring their meat contents accurately. This was confirmed by comparing the manufacturer's meat declaration to the meat content determined by the CLITRAVI and Stubbs and More calculations, taking into account the analytical tolerances. Declaring more meat than is actually present misleads consumers, but only 3% (using the CLITRAVI calculation) of the samples and 4% (using the Stubbs & More calculation) overdeclared the amount of meat. If the tolerance is increased to 10%, then only two (1%) products declared more meat than calculated using the CLITRAVI method. In 41% (CLITRAVI) or 40% (Stubbs and More) of the products, the manufacturer's meat contents were underdeclared compared to the two respective calculations, which could be to the disadvantage to the manufacturer.
- The results also showed that the FSA calculation of meat content accords reasonably well with the CLITRAVI calculation, which is the EU recommended method. Nearly 70% of the samples, the FSA calculations were within 5% of the CLITRAVI calculations, and only one sample had a higher meat content by the FSA calculation than by the CLITRAVI calculation. 30% of the samples had a lower meat content by the FSA calculation than the CLITRAVI method, which can be attributed almost totally to underestimating the VL of the meat ingredients.
- The Stubbs and More calculation, which is used by UK enforcement laboratories (public analysts), also agreed reasonably well with the CLITRAVI calculation. If a meat product is found to have a lower meat content using the Stubbs and More calculation than that declared by the manufacturer, then this could be regarded by public analysts as an adverse result. In three cases in this survey, the meat content declarations are lower by 10% or more using the Stubbs and More calculation, when this was not the case for the CLITRAVI method. If possible, meat content determination by the CLITRAVI method in-factory is therefore useful if adverse results have been based on the Stubbs and More calculation

- In 57% of the products, the VL of the meat ingredients estimated by the manufacturer was at least 10% lower than the VL determined by fat analysis. The accuracy of the FSA calculation could therefore be improved if VL determination by manufacturers also improved. The Agency should investigate ways of helping small businesses achieve this.
- Participating local authorities and the manufacturers have been provided with the results of this survey. Cases where there was no declaration or the meat content was overdeclared have been followed up by subsequent visits. The overdeclared meat contents have been subsequently revised. Many manufacturers were already aware that they were underdeclaring the meat content, and preferred to build in a margin of error given the variability of the meat ingredients. In general, the survey has shown that most manufacturers including small businesses are well aware of the change in labelling rules and are able to calculate meat contents in response to these changes.

## **Background**

1. The Food Authenticity Programme supports the Agency's objectives of promoting consumer choice through honest and informative labelling and reducing food fraud. As part of this work, the Agency undertakes surveys in partnership with local authorities to investigate problems of misdescription, fraud, and compliance with food standards legislation.

2. The amount of meat in a meat product is an important piece of information for consumers in deciding which product to buy. Amendments to labelling rules have changed the way meat is declared and how the meat content is calculated. The Food Labelling Regulations 1996 as amended, define meat from different species (i.e. beef, pork etc.), and there are limits on the amount of fat and connective tissue, which has potentially complicated the calculation of the meat content. In response to these changes, the Agency developed guidance to assist businesses to understand the changes and calculate meat content. Because of the large number of meat products sold loose in UK supermarkets and butchers shops, there is also a requirement to inform consumers about the meat content of products sold loose, as well as for prepacked products.

## Objectives of survey

3. This survey was commissioned to check the accuracy of meat content declarations of a range of meat products in compliance with the *Food Labelling Regulations 1996 and Meat Products (England) Regulations 2003* and the corresponding Scotland, Wales and N. Ireland Regulations. It will examine how well manufacturers are coping with the calculations and changes in legislation, and will assist enforcement officers to identify problem areas of compliance and whether any changes are necessary in the Agency's guidance. The results will indicate whether the FSA method to calculate meat content is still appropriate and accurate.

## Legislation

4. The UK has had legislation since 1984<sup>(1)</sup> requiring manufacturers to declare meat contents in prepacked meat products and those sold loose. Changes in labelling legislation now apply a quantitative ingredient declaration<sup>(2)</sup> (QUID) in food products. In order to ensure that the meat content is consistently calculated in all EU Member States, there is a generic definition of 'meat'<sup>(3)</sup>. This definition of 'meat' as an ingredient is restricted to skeletal muscle with certain limits for fat and connective tissue for the different species. The UK previously declared meat content in terms of "minimum meat content %". Under QUID this has changed to require the declaration in the list of ingredients of how much of each species of meat (% beef, % pork, % lamb etc.) is used in the product as a percentage of the final product. The *Meat Products (England) Regulations (MPR) 2003* (and the corresponding Regulations in Scotland, Wales and N. Ireland), which replace earlier legislation, also maintain a previous requirement for meat ingredient declarations in products sold loose. These changes have potentially made the calculation of 'meat' content more complicated for some products especially those with high levels of fat and connective tissue.

5. The maximum fat and connective tissue contents permitted in meat as an ingredient are given in Table 1 below:

**Table 1 Limits on Fat and Connective Tissue in Meat<sup>(3)</sup>**

<b>Species</b>	<b>% Fat</b>	<b>% Connective tissue of the total meat protein</b>
Pork	30	25
Birds and rabbits	15	10
All other red meats and mixtures	25	25

Where a prepacked product has excess fat and/or connective tissue above the limits, this has to be declared (but not quantified) in the list of ingredients (e.g. pork fat, chicken skin).

### Sample Collection

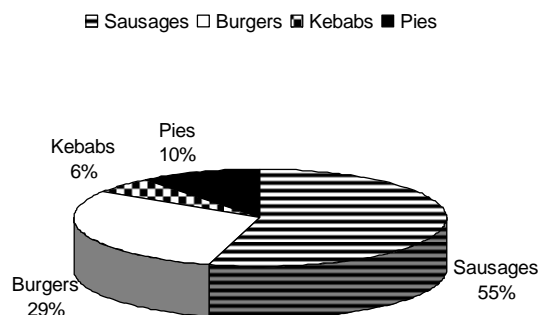
6. Twenty six local authorities (see Annex 1) from across the UK collected samples and information to a detailed sampling protocol developed by the Agency on 191 meat products from 146 different meat product manufacturers. Local authority enforcement officers were requested to take samples during their normal food standards inspections of meat product manufacturers between February and end of May 2006. The survey restricted the meat products collected to sausages, burgers, kebabs and pies, as those products are produced in both large and small businesses. Samples of the meat ingredients, finished products (when made from one species), recipes, VL contents and labelling or description information were collected. A breakdown of the products investigated is given in Table 2.

### Analytical methods

7. Ingredients and products were sent to a consortium of five public analysts (Durham, Lancashire, Leicester, Staffordshire, West Yorkshire) for analysis according to an agreed protocol. Meat ingredients were analysed for fat, nitrogen and hydroxyproline using the methods listed in Table 3, to allow calculation of the fat, protein and collagen content. Connective tissue content is defined as the percentage of collagen in total meat protein. Hydroxyproline is the chemical marker for collagen, and the collagen content is defined as hydroxyproline x 8. Finished products were analysed for their meat content using all the methods of analysis detailed in Table 3.

**Table 2 Meat Products Sampled**

Product Type	Number (%)
Sausages	104 (55%)
Burgers	56 (29%)
Kebabs	11 (6%)
Pies	20 (10%)
<b>Total</b>	<b>191 (100%)</b>



## Quality Assurance

8. The public analyst laboratories taking part in the survey are all accredited by UKAS for the BS methods (or their equivalent) listed in Table 3. In addition, quality control checks on the analytical values were included by duplicating 1 in 10 samples, and using a canned meat reference material to check each batch of analyses.

**Table 3 Analytical Methods Used for Meat Ingredients and Meat Products**

Analyte	Method Reference	Principle
Nitrogen	BS 4401 Pt 2 or equivalent	Kjeldahl
Fat	BS 4401 Pt 4	Acid Hydrolysis/Solvent Extraction
Moisture	BS 4401 Pt 3 or equivalent	Oven Drying at 100°C
Ash	BS 4401 Pt 1	Incineration at 500°C
Hydroxyproline	BS 4401 Pt 11	Acid hydrolysis, oxidation, colorimetry

## Calculation of Meat Content

9. The Agency issued Guidance Notes on the Labelling and Composition of Meat Products<sup>(4)</sup>, and recommended two possible methods for manufacturers to calculate meat content declarations based on recipes and the mixing bowl.

## FSA Method

10. The introduction of fat and connective tissue limits implies that these components need to be determined before the QUID meat content can be calculated. The FSA method was devised as a practical rather than analytical method for calculating the meat content. The calculation relies on the manufacturer's estimation of the VL content of each meat ingredient by eye. The fat and connective tissue contents of the meat ingredients are taken from reference tables in the Guidance Notes based on their species, VL, and type of meat cuts. These values are used to calculate the total amount of fat and connective tissue for each meat species ingredient, based on the ingoing weight in the recipe, which are compared to the limits given in Table 1. If the fat and/or connective tissue is/are in excess, the meat ingredient content is adjusted down by allowing the fat and/or connective tissue only up to the permitted limits. The detail of the calculation is given in Annex 2. A meat content calculator spreadsheet is available on the Agency's website<sup>(5)</sup>, which will calculate the QUID automatically on entering the recipe and type of meat ingredient.

## **CLITRAVI (Liaison Centre for the Meat Processing Industry in Europe) Method**

11. The second calculation proposed is called the CLITRAVI method, after the European trade association that proposed it, and is the method recommended by the European Commission. This method requires that the fat and connective tissues contents of all the meat ingredients are determined analytically. It also uses the recipe information to calculate the meat content and any excess fat or connective tissue. The only other substantial difference between the FSA and CLITRAVI calculations is that a conversion factor for collagen to connective tissue of 4.625 (37÷8) is used to calculate any excess connective tissue. Details of the CLITRAVI calculation can be found in Annex 3.

### **Visual lean**

12. As the estimation of VL content is central to the FSA calculation, the survey included a check on how well manufacturers are carrying out this estimation by comparing it to the lean/fat content determined through analysis. Underestimation of VL content will result in a reduced meat content using the FSA calculation. Annex 6 identifies both the estimated and actual VL for each meat product. VL is calculated as follows, which takes into account a further 10% “hidden” fat in the meat tissues:

Total fat % = (100 - % estimated VL) + 0.1 x % estimated VL; and

Actual VL % = (100 – analytical fat content) ÷ 0.9

### **Stubbs and More Calculation using Nitrogen Factors**

13. This method is a standard approach to measure the meat content of a meat product, and is based on determining the nitrogen content of the product as a marker for meat content. Nitrogen factors for all the main meat species and cuts have been determined in previous studies (see Annex 4). The meat based nitrogen is determined by subtracting any non-meat nitrogen (usually rusk or soya) from the total nitrogen of the product. The fat free meat is calculated using the nitrogen factor, and then the fat is added to give the total meat content. This calculation has been revised to take into account the fat and connective tissue limits applied to meat ingredients. As nitrogen factors are specific for each species and even each cut, this calculation can only effectively be used in single species meat products. The details of the calculation can be found in Annex 4.

### **Uncertainty**

14. As with all analytical determinations, there is an experimental uncertainty which has to be taken into account when calculating meat content by the CLITRAVI and Stubbs and

More calculations. This is outlined in Annex 5, and for meat contents up to 90%, the uncertainty for the CLITRAVI method (determining fat, nitrogen and hydroxyproline) has been calculated as 6% meat content. The Stubbs and More calculation involves the analytical determinations of moisture, ash, fat, nitrogen, and hydroxyproline content, as well as the uncertainty around the use of an average nitrogen factor. The uncertainty using the Stubbs and More method has been calculated as 7% meat content for meat contents up to 90%.

## **Results**

15. Six (3%) of the 191 products sampled by enforcement officers did not provide the quantitative ingredient declaration. As meat content declarations have been required in sausages, burgers, pies etc since 1984, it was a little surprising this number of the products examined in the survey failed to declare the meat content. A further four products (2%) quantified the meat, but did not declare it in the correct format. Most of these gave a 'total meat %' rather than identifying species separately e.g. pork %, beef %. These problems would have been raised and discussed by the enforcement officers with the manufacturer when samples were taken or at a subsequent visit.

16. The meat contents of all products were calculated by the three methods (Stubbs and More for single species products), and the results of these calculations along with the QUID (declaration) given by the manufacturer, the estimated VL and the actual VL of the meat ingredients are given in Annex 6.

17. In order to determine how well manufacturers are coping with meat content declarations and Agency Guidance Notes, two questions are posed:

- (a) How accurate are the manufacturers' meat contents?
- (b) Is the FSA method still appropriate to calculate meat contents?

### **How accurate are the manufacturers' meat contents?**

18. In order to answer question (a), the declaration from the CLITRAVI calculation and the Stubbs and More calculations, which are based on either the analysis of the ingredients or the final products, were compared to the manufacturers' meat content declarations (QUID). The results of this comparison are given in Table 4. Overdeclaration of meat content i.e. declaring more meat than is actually present in the product is undesirable because it misleads the consumer into believing there is more meat than there

actually is. Comparing with the meat contents derived from the CLITRAVI and Stubbs and More calculation, 3% (CLITRAVI) and 4% (Stubbs and More) of quantitative ingredient declarations in the sampled products were overdeclared.

**Table 4 Comparison of the CLITRAVI and Stubbs and More Calculation of Meat Contents with the Manufacturers' QUID**

	CLITRAVI Number and (% of samples)	Stubbs and More Number and (% of samples)
<b>QUID within tolerance*</b>	102 (53%)	82 (43%)
<b>QUID underdeclared</b>	78 (41%)	76 (40%)
<b>QUID overdeclared</b>	5 (3%) {2 sausages, 2 kebabs, 1 pie}	8 (4%) {6 sausages, 1 kebab, 1 pie}
<b>No QUID given</b>	6 (3%)	6 (3%)
<b>Not analysed (mixed species)</b>	---	19 (10%)

\*CLITRAVI - analytical tolerance of 6% for 90% meat content

\* Stubbs and More - analytical tolerance of 7% for 90% meat content

#### **Suitability of the FSA method.**

19. To answer question (b), the declarations calculated by the FSA method were compared with the meat contents calculated by the CLITRAVI method. As a comparison the Stubbs and More meat contents were also compared with the CLITRAVI method (see Table 5). In addition, as the estimation of VL is such an important part of the FSA calculation, an indication whether the VL has been estimated correctly has also been presented in Table 5. Comparing the FSA and CLITRAVI calculations of meat content and using a 5% tolerance, in almost 70% of the samples the two meat contents were in agreement, but in 30% of the samples the FSA calculation gave a lower meat content. Only one sample gave a higher meat content using the FSA calculation than CLITRAVI.

20. The results in Annex 6 were sent to both the manufacturers whose products had been sampled, and the local authorities who had collected the samples. Although written comments were requested, none were received. However a number of manufacturers and local authorities telephoned the Agency to discuss their results. Local authority enforcement officers were also asked whether any action had been taken as a result of the findings.

**Table 5 Comparison of Meat Declarations Calculated by the FSA Method and Stubbs and More with the CLITRAVI Method**

	VL Number and (% of samples)	Number and (% of samples)
<b>FSA Comparison with CLITRAVI</b>		
Declarations within 5%	VL underestimated	61
	VL correct	61
	VL not provided	11
		133 (69.5%)
Lower meat content by > 5%	VL underestimated	48
	VL correct	9
		57(30%)
Higher meat content by >5%	VL correct	1
		1 (0.5%) {pork sausage}
<b>Stubbs &amp;More Comparison with CLITRAVI</b>		
Declarations within 5%	---	125 (65%)
Lower meat content by >5%	---	13 (7%)
Higher meat content by >5%	---	34 (18%)
Not analysed (mixed species)	---	19 (10%)

## Discussion

### Accuracy of the meat declaration

21. Where manufacturers follow their recipes closely, the CLITRAVI calculation should be the most accurate method for the calculation of meat content. A comparison of the CLITRAVI method with manufacturers' declarations in Table 4 shows that when taking into account the analytical tolerance only five (3%) samples were overdeclaring the meat content. Seventy eight (41%) of the samples were underdeclaring the meat content, which could disadvantage the manufacturer, but is not normally regarded as misleading the consumer.

22. The Stubbs and More calculations of meat content give similar results when compared with the manufacturers' QUID in Table 4. Only eight (4%) of samples were overdeclaring the meat content by 7% or more in comparison with the Stubbs and More determination, and 76 (40%) of samples were underdeclaring the QUID.

### Suitability of the FSA calculation to give a QUID

23. In Table 5, when the FSA calculation is compared to the CLITRAVI calculation using a 5% tolerance, almost 70% of meat contents were in agreement. Given that the FSA calculation depends on visual estimation and typical fat and connective tissue tables, this is a good result. Only one sample gave a higher meat content compared to the CLITRAVI calculation. These survey results therefore confirm that the FSA method is a less onerous approach and continues to be a valid method for meat content calculation.

24. In the remaining 57 (30%) of the samples where the FSA calculated meat content was lower the CLITRAVI meat content, 48 (25%) of these cases could be explained because the VL of the meat ingredients was underestimated. In many cases, fat levels were found to be nearly half of those estimated, which would bring them below the limits set in the definition of meat and increase the meat content. Some manufacturers have admitted that they are aware that they are underdeclaring the meat content to give a margin of error due to the variability of fat content in the meat.

### **Visual Lean**

25. VL determination by eye can be a subjective measurement, and requires experience. Bulk supplies of meat are traded in different VL categories, and cutting plant operators are more experienced in VL determination. Until the labelling rules changed, smaller businesses did not need to determine VL of their meat ingredients so accurately. In this survey, in 109 (57%) of the products, the VL estimation of the main meat ingredient was underestimated by 10% or more. VL levels of 75-80VL for pork, and 80-85VL for beef or lamb are the limits at which the ingredients count 100% towards the meat content (assuming no excess connective tissue). An underestimation of the VL around these levels can make a significant difference to the meat content using the FSA method. Therefore assisting businesses (for example, providing colour photographs to aid comparison or more objective methods) will improve how the VL is determined and subsequently improve the accuracy of the FSA method.

### **Comparison of CLITRAVI with Stubbs and More calculation**

26. The Stubbs and More calculation has a long standing use by public analysts to decide whether meat contents have been declared correctly. With the change in labelling rules, the use of nitrogen factors is in most cases only suitable for single species meat products. In this survey, 19 of the products were of mixed species. In Table 5, 65% of the meat contents calculated by the Stubbs and More method accord within 5% of the

CLITRAVI calculation, which is a very positive result. Only 13 (7%) of the samples gave a lower calculated meat content when compared against the CLITRAVI method. There were 18% of samples which gave higher meat content than CLITRAVI. This could be explained partly by the uncertainty of the analytical results and partly because the nitrogen factor applied may not have been appropriate to the raw materials used in the product.

27. A potential problem could arise if the meat content given by the Stubbs and More was lower by at least 10% than the meat content declared by the manufacturer, yet the QUID was correct when calculated by the CLITRAVI method. Based solely on the Stubbs and More calculation, this would be regarded by public analysts as an adverse result. Of the eight samples giving an overdeclaration of meat content with Stubbs and More, only 3 were also overdeclaring using the CLITRAVI method. The remaining five samples had a CLITRAVI meat content of 10% or less than that determined by the Stubbs and More calculation. This difference could arise if manufacturers were not following their recipes accurately, or if the appropriate nitrogen factors were not being used in the calculation. Given the discrepancy between the two calculations in the case of these five samples, it would be appropriate to carry out a further investigation and calculate the meat content using the in-factory CLITRAVI method as well as the Stubbs and More approach before deciding whether to take a prosecution.

## **Conclusions**

28. Overall the meat product manufacturers sampled appear to be coping well with the change in requirements to declare meat content (QUID) in the light of the definition of meat in the *Food Labelling Regulations* 1996 as amended.

- 3% of the products investigated gave no meat content declaration but manufacturers would have been required to provide this information either during the visit made by the enforcement officer or after receiving their results from the Agency. Similarly, the 2% of samples where the declarations were not in the correct format were also drawn to the attention of the manufacturers.
- In checking the manufacturers' declarations, 3% of the samples overdeclared the meat content according to the CLITRAVI method, and 4% using the Stubbs and More method. In terms of accuracy, 43% of the samples manufacturers had underdeclared the meat content when compared to the CLITRAVI calculation, but only 3 (2%) of the samples was the meat content overdeclared by more than 10%. Using the Stubbs and More determination, similar figures were obtained.

- The FSA calculation of meat content accorded reasonably well with the CLITRAVI method, and would permit meat content calculation without requiring any analysis of meat ingredients. Improving VL determination would achieve more accurate results so that meat contents are not underdeclared. The Agency should investigate ways to help businesses achieve this.
- The Stubbs and More method is limited to single species products, but it accords well with the CLITRAVI method based on the recipe. In some cases, high meat contents have been obtained, probably because more specific nitrogen factors should have been used. In eight cases, the determined meat content was lower by more than 7% than the declared meat content, however in only three of these cases the determined meat contents were also overdeclaring using the CLITRAVI method. Therefore, if it is possible any adverse results after checking meat content by the Stubbs and More method should follow-up with an in-factory CLITRAVI calculation.
- In those cases where there was no declaration or the meat content was overdeclared have been followed up by subsequent visits. The overdeclared meat contents have been subsequently revised. The companies are also aware of the results of their own products.

## References

- (1). The Meat Products and Spreadable Fish Products Regulations 1984, SI 1984 No 1566
- (2) The Food Labelling (Amendment) Regulation 1998, SI 1988 No 1398
- (3). Commission Directive 2001/101/EC, OJ L310 of 28.11.01, p19
- (4) Food Standards Agency Guidance Notes of the Labelling and Composition of Meat Products, Sept 2003. weblink:  
<http://www.food.gov.uk/multimedia/pdfs/meatguidance.pdf>
- (5) The Meat Content Calculator Excel spreadsheet, FSA website  
<http://www.food.gov.uk/multimedia/spreadsheets/meatcontentcalcfeb04.xls>

## Further information

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Powys County Council  
Rhondda Council  
Sheffield City Council  
Staffordshire County Council  
Stockton on Tees Council  
Suffolk County Council  
Surrey County Council  
Walsall Metropolitan Borough  
West Lothian Council  
West Yorkshire County Council

**Section 1 – Complete Ingredients Table**

The purpose of this section is to work out the overall levels of fat and connective tissue in your ingredients as a whole.

Step 1 – Write in all the ingredients from the same species in Column A. Use the table of typical values (at Annex C in Guidance Notes) to write in the figure for fat, collagen and protein for each ingredient (these are percentages).

Step 2 – For each ingredient, multiply the weight of the ingredient (column B) by the figures for fat (column C), collagen (column D), and protein (column E) in turn. Write the answers in the corresponding columns on the right of the table i.e., column F (fat), column G (collagen) and column H (protein).

Step 3 – Add up the totals of columns F, G and H, and enter the totals in the respective boxes for total fat, total collagen and total protein.

Step 4 – Divide the total fat (column F) by the total weight of the ingredients (column B) Multiply this by 100. This is the overall percentage of fat in your ingredients; enter it in the relevant box at the bottom right. Where this is above the fat limit for the species in question – you have “excess fat”. (Although bear in mind you may need to re-calculate this later).

Step 5 – Divide the total collagen (column G) by the total protein (column H). Multiply this by 100. This is the overall connective tissue percentage of your ingredients; enter it in the relevant box at the bottom right. Where this is above the connective tissue limit for the species in question – you have “excess connective tissue”.

**Example: Pork and Beef Sausage (pork ingredients).**

(The full calculation for this example is given at Annex D, example 2).

<b>Column A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
<b>Ingredient</b>	<b>Weight</b>	<b>fat</b>	<b>collagen</b>	<b>protein</b>	<b>fat</b>	<b>collagen</b>	<b>protein</b>
		<b>data from the table at Annex C</b>			<b><u>B x C</u></b> <b>100</b>	<b><u>B x D</u></b> <b>100</b>	<b><u>B x E</u></b> <b>100</b>
Lean trimmings 80vl	100	27.4	3.40	17.0	27.4	3.40	17.0
Lean with Fat 50vl	100	53.6	1.90	11.5	53.6	1.90	11.5
Rind with fat uncooked	35	35.0	14.20	22.0	12.3	4.97	7.7
Back fat	45	78.6	3.68	5.1	35.6	1.66	2.3
<b>Total</b>	<b>280</b>				<b>128.9</b>	<b>11.93</b>	<b>38.5</b>
<b>Total fat percentage =</b>	total fat, divided by the total weight, multiplied by 100 ⇒						<b>46.04</b>
<b>Total CT percentage =</b>	total collagen, divided by total protein, multiplied by 100 ⇒						<b>30.99</b>

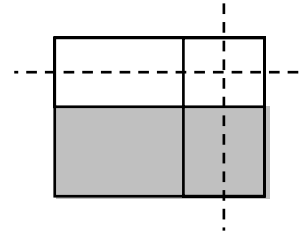
**Section 2 – Correct for Excess Connective Tissue**

The purpose of this step is to work out how much of your connective tissue may be counted towards the meat content – and how much must be deducted from your total.

**1. Calculate fat-free meat**

$$\text{total meat} \times \frac{\text{percentage of fat}}{100} = \text{total weight of fat}$$

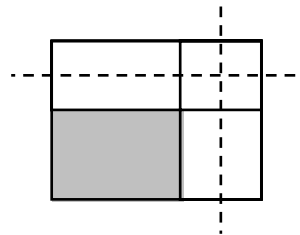
$$\text{total meat} - \text{total weight of fat} = \text{fat-free meat}$$



**3. Calculate fat-free, connective tissue-free meat**

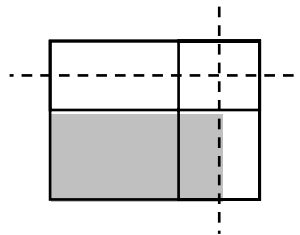
$$\text{total CT percentage} \times \frac{\text{fat-free meat}}{100} = \text{total connective tissue}$$

$$\text{fat-free meat} - \text{total connective tissue} = \text{fat-free, CT-free meat}$$



**4. Include allowed connective tissue**

$$\text{Fat-free, CT-free meat} \times \frac{100}{(100 - \text{limit for CT})} = \text{fat-free meat with CT allowance}$$



**You now need to re-calculate your overall fat percentage, as this will have changed because of the correction you have made for excess CT.**

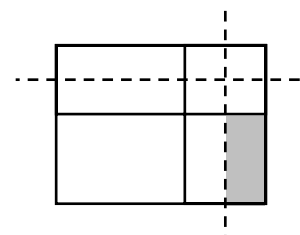
**5. Re-calculate overall fat percentage**

$$\frac{\text{weight of fat}}{\text{weight of fat} + \text{fat-free meat with CT allowance}} \times 100 = \text{overall fat percentage}$$

**If your product is to be labelled with a list of ingredients, you now need to calculate the weight of excess connective tissue in order that it can be declared in the correct position in the list.**

**6. Calculate weight of excess connective tissue (for purposes of ingredient listing)**

$$\text{fat-free meat} - \text{fat-free meat with CT allowance} = \text{excess CT (kg)}$$

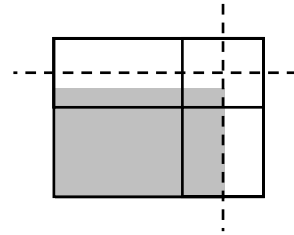


**Section 3 – Add Fat Back in (i.e., where there is no excess fat)**

The purpose of this step is simply to include your existing fat in your final meat content.

1. **Add back in fat (only where there is no excess fat)**

fat-free meat with CT allowance + total fat = final meat content

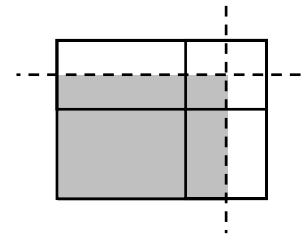


**Section 4 – Correct for Excess Fat**

The purpose of this step is to work out how much of your fat may be counted towards your meat content, and how much must be deducted from your total.

- 1. **Include allowed fat**

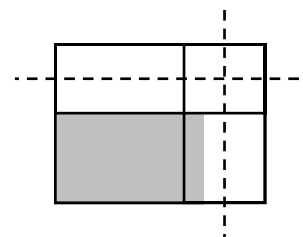
Fat-free meat with CT allowance X  $\frac{100}{(100 - \text{limit for fat})}$  = final meat content



- 1. **Calculate fat-free meat**

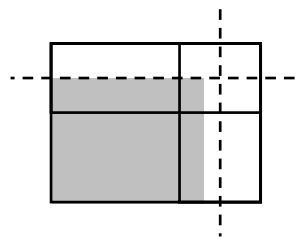
total meat X  $\frac{\text{percentage of fat}}{100}$  = total weight of fat

total meat – total weight of fat = fat-free meat



2. **Include allowed fat**

Fat-free meat X  $\frac{100}{(100 - \text{limit for fat})}$  = final meat content



**If your product is to be labelled with a list of ingredients, you now need to calculate the weight of excess fat in order that it can be declared in the correct position in the list.**

3. Calculate weight of excess fat (for purposes of ingredient listing)

total fat – (final meat content– fat-free meat with CT allowance) = excess fat

### **Section 5 – Calculate final meat content percentage**

The purpose of this step is to work out either a QUID declaration, or your compositional meat content, based on the "final meat content" you have calculated.

#### **To calculate the QUID declaration:**

1. Calculate QUID declaration

$$\frac{\text{final meat content}}{\text{total weight of final product}} \times 100 = \text{QUID declaration}$$

---

#### **To calculate your “meat content” in order to ensure that the product meets the relevant compositional standards**

1. Calculate compositional meat content

$$\frac{\text{final meat content}}{\text{total weight of all ingredients}} \times 100 = \text{compositional meat content}$$

This method requires the use of analytical data for the level of fat, meat protein and hydroxyproline/collagen present in the meat ingredients. This will require chemical analysis of representative samples of ingredients from the mixing bowl.

**1. Determining the fat and connective tissue content of the meat ingredients****Connective Tissue Content**

Where the collagen and protein content are determined by analysis from the hydroxyproline content, the connective tissue is calculated from the collagen content by using a suitable conversion factor (normally 37÷8) as follows:

**Collagen = hydroxyproline x 8,**

Connective tissue % = Collagen x 37÷8

---

Notes:

1. The values for protein, collagen and fat in the formulae below relate to the **percentage** of protein, collagen or fat in the total meat.
2. The chemical fat, hydroxyproline and protein nitrogen can be determined using ISO methods or equivalent.
3. Step 3 below requires the use of a suitable conversion factor for the conversion of collagen into connective tissue. The generally accepted factor of 37÷8 is recommended. However, where the specific nature of the connective tissue is known, and all the collagen derives from that source, then other more specific conversion factors may be used.

---

**The Calculation****1. Calculate allowed collagen content**

$$\text{allowed collagen content (\%)} = \frac{\text{limit for CT (\%)} \times (\text{protein in meat (\%)} - \text{collagen in meat (\%)})}{(100 - \text{limit for CT})}$$

**2. Calculate excess collagen**

$$\text{excess collagen (\%)} = \text{collagen in meat (\%)} - \text{allowed collagen content (\%)}$$

***If excess collagen (%) is ≤ 0, then there is no excess collagen or connective tissue; go to step 4. See also footnote on page 34.***

**1. Convert excess collagen into excess connective tissue**

excess connective tissue (%) = excess collagen (%) X [conversion factor]

**2. Calculate allowed fat content**

• **Where excess collagen > 0**

$$\text{allowed fat content (\%)} = \frac{\text{limit for fat (\%)} \times (100 - \text{excess CT} - \text{percentage of fat in total meat})}{(100 - \text{limit for fat (\%)})}$$

• **Where excess collagen ≤ 0**

$$\text{allowed fat content (\%)} = \frac{\text{limit for fat (\%)} \times (100 - \text{percentage of fat in total meat})}{(100 - \text{limit for fat (\%)})}$$

**3. Calculate excess fat**

excess fat (%) = percentage of fat in total meat – allowed fat content

**If excess fat (%) ≤ then there is no excess fat. See also footnote below.**

**4. Calculate declarable meat**

declarable meat (%) = 100 – excess fat – excess connective tissue

**NB – values for “excess fat” or “excess connective tissue” should only be included in calculation 6, where there is actually an excess of fat or connective tissue (as appropriate) in the product.**

**7. Calculate QUID declaration**

The ‘declarable meat’ represents the percentage of the total meat on which the QUID declaration may be based.

$$\text{QUID declaration (\%)} = \text{declarable meat} \times \frac{\text{total meat}}{\text{total weight of product}}$$

## STUBBS AND MORE CALCULATION USING NITROGEN FACTORS ANNEX 4

### STEP1 Calculate meat protein excluding contributions from non-meat nitrogenous sources:

$$\text{Meat Nitrogen (N}_M) = \text{Total Nitrogen (N}_T) - \text{non-meat Nitrogen (N}_{NM})$$

$$\text{Meat Protein (P}_M) = 6.25 \times \text{N}_M$$

Carbohydrate % (C) is normally determined by difference:

$$\text{Carbohydrate \% (C)} = 100 - (\text{water\%} + \text{fat\%} + \text{protein\%} + \text{ash\%})$$

*(Where there is no information on non-meat nitrogen it is assumed that  
Non meat nitrogen = 0.02 x C.*

*(Where the non meat nitrogen is known from analysis of the ingredients this figure can be used)*

### STEP2 Calculate the collagen free meat protein:

$$\text{Collagen-free meat protein (P}_{MCTFREE}) = P_M - \text{Collagen (8 x \%hydroxyproline)}$$

### STEP3 Calculate the ratio between the collagen content and the meat protein content

$$\text{Connective Tissue\% (CT\%)} = \frac{\text{Collagen \%}}{P_M} \times 100$$

### STEP4 Calculate the meat protein with the allowed collagen:

a. If  $\text{CT\%} < \text{CT}_{LIMIT} \%$

Where:  $\text{CT}_{LIMIT} \%$  = Limits for connective tissue provided by the EU Definition.

$$\text{Meat protein with allowed collagen (P}_{M+CT}) = P_{MCTFREE} + \text{collagen}$$

b. If  $\text{CT\%} > \text{CT}_{LIMIT}$

$$\text{Meat protein with allowed collagen (P}_{M+CT}) = P_{MCTFREE} \times \frac{100}{(100 - \text{CT}_{LIMIT})}$$

### STEP5 Calculate excess collagen if $\text{CT\%} > \text{CT}_{LIMIT}$

$$\text{Excess collagen \%} = \text{total Collagen} - (P_{M+CT} - P_{MCTFREE})$$

### STEP6 Calculate the fat free meat:

$$\text{Fat free meat \% (FFM)} = \frac{P_{M+CT}}{6.25 \times \text{Fat free Nitrogen Factor (N}_{ff})} \times 100$$

**STEP7 Calculate the meat content to include allowed fat:**

a. If:  $\frac{\text{fat}}{\text{FFM} + \text{fat}} \times 100 < \text{fat}_{\text{LIMIT}} \%$

Where:  $\text{Fat}_{\text{LIMIT}} \%$  = Limit for fat provided by the EU Definition.

Declarable meat content =  $\text{FFM} + \text{fat}$

b. If:  $\frac{\text{fat}}{\text{FFM} + \text{fat}} \times 100 > \text{fat}_{\text{LIMIT}}$

Declarable meat content =  $\frac{\text{FFM}}{(100 - \text{fat}_{\text{LIMIT}})} \times 100$

**Step8 Calculate excess fat**

Excess fat = total fat – (declarable meat content – fat free meat)

Details of the nitrogen factors used in the above calculations can be found in the following references:

Nitrogen Factors for Pork: A Reassessment, <i>The Analyst</i> , July, 1991, No. 7, pp. 761-766
Nitrogen Factors for Beef: A Reassessment, <i>The Analyst</i> , September, 1993, Vol. 118, pp. 1217-1225
Nitrogen Factors for Sheepmeat, Part 1 Mutton <i>The Analyst</i> , June, 1995, Vol. 120, pp. 1823-1824
Nitrogen Factors for Sheepmeat, Part 2 Lamb Meat, <i>The Analyst</i> , July, 1996, Vol. 121, pp. 889-896
Nitrogen Factors for Chicken Meat, <i>The Analyst</i> , 2000, June, Vol. 125, pp. 1359-1366
Nitrogen Factors for Turkey Meat, <i>The Analyst</i> , 2002, April, Vol. 127, pp. 859-869

**a. The CLITRAVI Method**

14. The analytical uncertainty in determining the fat, nitrogen and hydroxyproline levels of the meat ingredients before using the CLITRAVI calculation has been determined as follows (using data from *The Analyst*, July, 1991, No. 7, pp. 761-766):

Relative standard uncertainty of nitrogen determination (standard U/Value)

$$= 0.022 \text{ (using } V = 2.88 \text{ N)}$$

Relative standard uncertainty of hydroxyproline determination (standard U/V)

$$= 0.035 \text{ (using } V = 0.162 \text{ Hyp)}$$

Standard uncertainty for total fat

$$= 0.4 \text{ (Using } V = 20\% \text{ fat)}$$

In the calculation of connecting tissue by the CLITRAVI method:

$$\% \text{ Connective tissue} = (\text{collagen} \div \text{protein}) \times 100$$

$$= (\text{hydroxyproline} \times 8 \div \text{nitrogen} \times 6.25) \times 100$$

$$\text{Combined uncertainty for connective tissue} = \sqrt{(0.022)^2 + (0.035)^2}$$

$$= \sqrt{.001709} = .04134$$

Uncertainty for total meat = total defatted meat + fat content

Assuming a defatted meat content of 70% and total fat content of 20%

Combined uncertainty for total meat (for total meat content around 80%)

$$= \sqrt{(70 \times .04134)^2 + (0.4)^2} = \sqrt{8.53} = 2.92$$

Taking the uncertainty at the 95% confidence level as 2x combined uncertainty for the total meat calculation = 2 x 2.92 = 6%

15. Therefore for meat contents up to 90%, a total uncertainty of  $\pm 6\%$  meat content would be acceptable to take into account methodology uncertainty for fat, protein and hydroxyproline determination using CLITRAVI calculation.

**b. Stubbs and More Calculation**

16. The analytical uncertainty is calculated similarly to CLITRAVI. However there are more analyses and a possible increased uncertainty by the use of a nitrogen factor to calculate fat free meat.

Relative standard uncertainty of nitrogen factor (NF Standard U/V) = 0.023 (using NF V = 3.50 for pork calculated from AMC Analyst 1991 Vol 116, pp761-66).

Combined relative standard uncertainty for connective tissue = 0.04134

Combined relative standard uncertainty for defatted meat content

$$= \sqrt{(.04134)^2 + (0.023)^2} = \sqrt{0.002238} = .0473$$

Assuming a defatted pork content of 70% and total fat content of 20%

Combined standard uncertainty for total meat (for total meat content around 80%)

$$= \sqrt{(70 \times .0473)^2 + (0.4)^2} = \sqrt{11.12} = 3.33$$

Taking the uncertainty at the 95% confidence level as 2 x combined uncertainty for the total meat calculation = 2 x 3.33 = 6.7% = 7%

17. Therefore for meat contents up to 90%, a total uncertainty of 7% meat content would be acceptable to take into account uncertainty for fat, protein, and hydroxyproline determination, the use of a nitrogen factor (pork) using the modified Stubbs and More approach. Note that the relative standard uncertainty for beef nitrogen factor is smaller (0.014), hence the use of an uncertainty of 7% would still be appropriate.

## RESULTS OF MEAT CONTENT CALCULATIONS

## ANNEX 6

FSA code	Name of outlet	Full Description of Product	QUID displayed	FSA Method	CLITRAVI Method	Stubbs & More Method	Estimated VL of meat ingredient(s)	Analytical VL of meat ingredient(s)
AB001	A & F Welsh Butcher	Beef Burgers (unwrapped)	Beef 70%	Beef 61%	Beef 78%	Beef 82%	Beef 70 vl	Beef 95 vl
AB002	C Lingard Butcher	Beef Sausages (Unwrapped)	Beef 70%	Beef 65%	Beef 75%	Beef 60%	Beef 75 vl	Beef 85 vl
AB003	J & G Collie Butcher	Pork Sausages (unwrapped)	Pork 65%	Pork 73%	Pork 82%	Pork 82%	Pork 70 vl	Pork 90 vl
AB004	Davidsons Butchers	Beef Sausages (unwrapped)	Beef 60%	Beef 45%	Beef 58%	Beef 60%	Beef 70 vl	Beef 90 vl
AB005	Ritchie Butchers	Steak Burger	Beef 88%	Beef 88%	Beef 88%	Beef 89%	Beef 95 vl	Beef 100 vl
AB006	West End Butchers	Aberdeen Angus Burgers	Not provided	Beef 56%	Beef 71%	Beef 67%	Beef 70 vl	Beef 95 vl
AB007	Ewan Morrice Butcher	Pork & Apple Burger	Pork 60%	Pork 78%	Pork 78%	Pork 82%	Pork 90 vl	Pork 100 vl
AB008	Glenbervie Aberdeen Angus	Premium Specially selected Scotch Steak Burgers	Beef 85%	Beef 86%	Beef 86%	Beef 87%	Beef 75 vl	Beef 85 vl
AC001	Laidlaw Butchers	Steak Sausages	Beef 64%	Beef 74%	Beef 85%	Beef 71%	Beef 75 vl	Beef 85 vl
AC002	T Strachan	Honey and Roast Pork Sausages	Pork 76%	Pork 72%	Pork 72%	Pork 72%	Pork 80 vl	Pork 85 vl
AC003	T Strachan	Steak Sausages	Beef 61%	Beef 52%	Beef 60%	Beef 50%	Beef 75 vl	Beef 85 vl
AC004	T Strachan	Pork Sausages	Pork 69%	Pork 44%	Pork 67%	Pork 66%	Pork 50 vl	Pork 85 vl
AC005	T Strachan	Steak Burgers	Beef 84%	Beef 90%	Beef 90%	Beef 91%	Beef 95 vl	Beef 100 vl
AC006	Mc William (Aberdeen)	Pork & Beef Sausage	Pork 35%, Beef 27%	Pork 46%, Beef 31%	Pork 45%, Beef 35%	Mixed species	Pork 80 vl, Beef 75 vl	Pork 75 vl, Beef 80 vl
AC007	H & S Milne & sons	Beef Sausage	Beef 33%	Beef 49%	Beef 67%	Beef 75%	Beef 60 vl	Beef 80 vl
BH004	Fakir Halal	Halal Doner Kebab	Lamb 50%, Chicken 8%	Lamb 54%, Chicken 13%	Lamb 52%, Chicken 10%	Mixed species	Not provided	Lamb 90 vl, Chicken 60 vl
BH005	Fakir Halal	Superior Halal Burgers	Beef 75%	Beef 72%	Beef 72%	Beef 85%	Beef 95 vl	Beef 95 vl

FSA code	Name of outlet	Full Description of Product	QUID displayed	FSA Method	CLITRAVI Method	Stubbs & More Method	Estimated VL of meat ingredient(s)	Analytical VL of meat ingredient(s)
BH006	T & T Foods	Halal Lamb & Beef Doner	Lamb 35%, Beef 35%	Lamb 32%, Beef 34%, Chicken 4%	Lamb 27%, Beef 34%, Chicken 5%	Mixed species	Not provided	Lamb 60 vl, Beef 85 vl, Chicken 90 vl
BH007	T & T Foods	Halal Jumbo Beef & Chicken Sausages	Beef 27%, Chicken 9%	Beef 28%, Chicken 6%	Beef 35%, Chicken 8%	Mixed species	Beef 70 vl	Beef 70 vl, Chicken 85 vl
BH008	R & J Maund	Pork Sausage	Pork 65%	Pork 60%	Pork 60%	Pork 61%	Not provided	Pork 85 vl
BL001	Middlesex Meat	Cumberland Pork Sausage	Pork 65%	Pork 72%	Pork 72%	Pork 76%	Pork 80 vl	Pork 85 vl
BL002	Bighams	Aberdeen angus steakburger	Beef 84%	Beef 85%	Beef 85%	Beef 89%	Beef 85 vl	Beef 100 vl
BL003	Kelmans	Beef Sausage	Beef 70%	Beef 65%	Beef 69%	Beef 50%	Beef 80 vl	Beef 100 vl
BL004	Hermolis	Beef Burger	Beef 34%	Beef 29%	Beef 30%	Beef 36%	Beef 85 vl	Beef 95 vl
BL005	Tiffin Bites	Lamb Sheesh Kebab	Lamb 88%	Lamb 90%	Lamb 90%	Lamb 111%	Lamb 85 vl	Lamb 85 vl
BL006	Gordon Lane & sons	Cumberland Sausages	Pork 65%	Pork 72%	Pork 72%	Pork 74%	Pork 70 vl	Pork 100 vl
BP001	Steve Hope Butchers	Steves Famous Pork Sausage	Pork 65%	Pork 66%	Pork 68%	Pork 67%	Pork 85 vl	Pork 95 vl
BP002	Steve Hope Butchers	Specially Selected Scotch Beef Steak Burger	Beef 85%	Beef 83%	Beef 83%	Beef 90%	Beef 85 vl	Beef 90 vl
BP003	I H Daniel	Shop Made Beef Burgers	Beef 80%	Beef 80%	Beef 80%	Beef 93%	Beef 90 vl	Beef 100 vl
BP004	I H Daniel	Shop Made Lamb Burgers/triangles	Lamb 60%	Lamb 67%	Lamb 80%	Lamb 77%	Lamb 70 vl	Lamb 95 vl
BP005	Choice Meats Catering	Homemade Pork Sausage	Pork 60%	Pork 63%	Pork 70%	Pork 73%	Pork 70 vl	Pork 85 vl
BP006	Taylor's of Cleveleys	Pork Pie	Pork 16%	Pork 22%	Pork 22%	Pork 23%	Pork 80 vl	Pork 95 vl
BP007	Whitegate Quality Meats	Traditional Cumberland Sausage	Meat 65%	Pork 45%	Pork 67%	Pork 81%	Pork 50 vl	Pork 75 vl

FSA code	Name of outlet	Full Description of Product	QUID displayed	FSA Method	CLITRAVI Method	Stubbs & More Method	Estimated VL of meat ingredient(s)	Analytical VL of meat ingredient(s)
BP008	Whitegate Quality Meat	Thick Pork Sausage	Meat 65%	Pork 35%, Lamb 5%	Pork 59%, Lamb 9%	Mixed species	Pork 50 vl, Lamb 50 vl	Pork 80 vl, Lamb 85 vl
BU001	Godden Butchers	Country Pork Sausages	Pork 75%	Pork 79%	Pork 79%	Pork 75%	Pork 90 vl	Pork 100 vl
BU002	Tilbury Butchers	Pork Champion Sausage	Pork 77%	Pork 70%	Pork 77%	Pork 74%	Pork 70 vl	Pork 95 vl
BU003	Keith Hill Butchers	Beef Burgers	Beef 70%	Beef 80%	Beef 83%	Beef 92%	Beef 80 vl	Beef 95 vl
BU004	Keith Hill Butchers	Pork Sausages	Pork 70%	Pork 80%	Pork 80%	Pork 84%	Pork 75 vl	Pork 95 vl
BU006	Mr Parminter & Sons	Beef Burgers	Not provided	Beef 96%	Beef 96%	Beef 89%	Beef 85 vl	Beef 95 vl
BU007	Longhursts	Pork Sausages	Pork 75%	Pork 69%	Pork 69%	Pork 66%	Pork 90 vl	Pork 100 vl
BU008	Longhursts	Home Made Beef Burgers	Beef 75%	Beef 83%	Beef 83%	Beef 84%	Beef 90 vl	Beef 100 vl
CU001	Castletown Farm Shop	Pork Sausage	Pork 60%	Pork 68%	Pork 68%	Pork 73%	Pork 80 vl	Pork 100 vl
CU003	Wils Hambling	Beef Burgers	Beef 76%	Beef 69%	Beef 71%	Beef 73%	Beef 80 vl	Beef 90 vl
CU004	Brysons of Keswick	Pork Pie	Pork 20%	Pork 26%	Pork 27%	Pork 26%	Pork 80 vl	Pork 95 vl
CU005	Haighs of Workington	Cumberland Sausage	Pork 90%	Pork 94%	Pork 94%	Pork 92%	Pork 75-80 vl	Pork 95 vl
CU006	Plumbgarths Farm Shop	Old English Pork Sausage	Pork 70%	Pork 53%	Pork 68%	Pork 74%	Pork 70 vl	Pork 100 vl
CU007	Cumbrian Fellbred Products	Pork Sausage	Pork 65%	Pork 65%	Pork 65%	Pork 64%	Pork 85 vl	Pork 85 vl
CU008	Higginsons	Home Made Steak Burgers	Beef 93%	Beef 93%	Beef 93%	Beef 96%	Beef 95 vl	Beef 100 vl
DU001	J Loughlin & sons	Honey Roast Pork Sausages	Pork 62%, Beef 9%	Pork 61%, Beef 10%	Pork 61%, Beef 11%	Mixed species	Pork 80 vl, Beef 75 vl	Pork 100 vl, Beef 95 vl
DU002	J Loughlin & Sons	Steak Burgers	Beef 80%	Beef 81%	Beef 81%	Beef 102%	Beef 80 vl	Beef 95 vl

FSA code	Name of outlet	Full Description of Product	QUID displayed	FSA Method	CLITRAVI Method	Stubbs & More Method	Estimated VL of meat ingredient(s)	Analytical VL of meat ingredient(s)
DU003	Broom Mill Farm Co Durham	All Day Breakfast Pork Sausages	Pork 78%	Pork 72%	Pork 72%	Pork 76%	Pork 80 vl	Pork 95 vl
DU004	Meat Express Co Durham	Halal Doner Kebab	Meat 90%	Lamb 41%, Beef 31%	Lamb 49%, Beef 34%	Mixed species	Lamb 65 vl, Beef 70 vl, Mutton 70 vl	Lamb 80 vl, Beef 70 vl, Mutton 70 vl
DU005	Mattisons Bakery	Pork Pie	Pork 30%	Pork 27%	Pork 35%	Pork 34%	Pork 60 vl	Pork 80 vl
DU006	H Coates & Son	Large Pork Pie	Pork 20%	Pork 34%	Pork 38%	Pork 42%	Pork 70 vl	Pork 95 vl
DU007	Dropswell Farm Shop Trimdon	Beef Burger	Beef 85%	Beef 83%	Beef 83%	Beef 86%	Beef 80 vl	Beef 95 vl
DU008	Istanbul Meats	Lamb and Beef Kebab	Lamb 63%, Beef 13%, Chicken 2%	Lamb 45%, Beef 23%, Chicken 4%	Lamb 53%, Beef 26%, Chicken 4%	Mixed species	Lamb 75 vl, Beef 70 vl, Chicken 90 vl	Lamb 80 vl, Beef 75 vl, Chicken 95 vl
FL001	Wynne Williams Flint	Traditional Pork Sausage	Pork 60%	Pork 60%	Pork 67%	Pork 79%	Pork 70 vl	Pork 85 vl
FL002	Chris Perrins	Lamb & Mint Sausage Min. 65% meat	Lamb 65%	Lamb 68%	Lamb 68%	Lamb 68%	Lamb Ing 1 60 vl, Lamb Ing 2 90 vl	Lamb Ing 1 70 vl, Lamb Ing 2 95 vl
FL003	S Vaughan	Pork & Chive Sausage	Pork 65%	Pork 64%	Pork 72%	Pork 77%	Pork Ing 1 50 vl, Pork Ing 2 80 vl	Pork Ing 1 80 vl, Pork Ing 2 95 vl
FL004	Harry's Pies	Pork Pie	Pork 25%	Pork 23%	Pork 23%	Pork 34%	Pork 90 vl	Pork 90 vl
FL005	S & C Muff	Pork & Chive Sausage	Pork 69%	Pork 61%	Pork 65%	Pork 71%	Pork 85 vl	Pork 90 vl
FL006	Hewitts Fine Foods	Pork Pie	Pork 21%	Pork 26%	Pork 31%	Pork 37%	Pork 80 vl	Pork 85 vl
FL007	Swans Farm Shop	Beef Burger	Beef 92%	Beef 92%	Beef 92%	Beef 88%	Beef 96 vl	Beef 100 vl
GL001	Ensors Gloucestershire	Pork Sausage	Pork 43%	Pork 60%	Pork 61%	Pork 71%	Pork 90-95 vl	Pork 90 vl
GL002	Ensors Gloucestershire	Pork and Leek Sausage	Pork 43%	Pork 56%	Pork 60%	Pork 66%	Pork 90-95 vl	Pork 90 vl
GL003	Ensors Gloucestershire	Beef Burger	Beef 75%	Beef 88%	Beef 88%	Beef 92%	Beef 90 vl	Beef 95 vl

FSA code	Name of outlet	Full Description of Product	QUID displayed	FSA Method	CLITRAVI Method	Stubbs & More Method	Estimated VL of meat ingredient(s)	Analytical VL of meat ingredient(s)
GL004	Ensors Gloucestershire	Pork Burgers	Pork 43%	Pork 60%	Pork 64%	Pork 73%	Pork 90-95 vl	Pork 90 vl
GL005	Ensors Gloucestershire	Lamb and Mint Burger	Lamb 75%	Lamb 78%	Lamb 78%	Lamb 93%	Lamb 90 vl	Lamb 90 vl
LI001	George Adams Pork Products	Adams Lincolnshire Sausages	Pork 70%	Pork 72%	Pork 76%	Pork 71%	Pork Ing 1 90 vl, Pork Ing 2 90 vl, Pork Ing 3 50 vl	Pork Ing 1 100 vl, Pork Ing 2 100 vl, Pork Ing 3 85 vl
LI002	George Adams Pork Products	Pork Pie	Pork 27%	Pork 18%	Pork 24%	Pork 36%	Pork 50 vl	Pork 85 vl
LI003	Parkinsons of Gedney	Lincolnshire Sausage	Pork 80%	Pork 85%	Pork 85%	Pork 83%	Pork 80 vl	Pork 90 vl
LI004	Lakings of Louth	Lincolnshire Pork Sausage	Pork 55%	Pork 68%	Pork 72%	Pork 77%	Pork Ing 1 70 vl, Pork Ing 2 95 vl	Pork Ing 1 90 vl, Pork Ing 2 100 vl
LI005	A W Garrill	Lincolnshire Sausage	Pork 67%	Pork 68%	Pork 68%	Pork 63%	Pork 80 vl	Pork 100 vl
LI006	AW Curtis & Sons	Farmhouse Style Pork Sausage	Pork 70%	Pork 68%	Pork 71%	Pork 73%	Pork 80 vl	Pork 95 vl
LI007	AW Curtis & Sons	10 oz. Pork Pie	Pork 22%	Pork 25%	Pork 30%	Pork 27%	Pork 80 vl	Pork 100 vl
LR001	Walkers Midshire Foods	Cumberland Chipolata	Pork 82%	Pork 76%	Pork 83%	Pork 86%	Pork Ing 1 90 vl, Pork Ing 2 50 vl	Pork Ing 1 90-95 vl, Pork Ing 2 75 vl
LR002	Walkers Charnwood Bakery	Mini Melton Mowbray Pork Pie	Pork 26%	Pork 30%	Pork 38%	Pork 37%	Pork Ing 1 85 vl, Pork Ing 2 65 vl	Pork Ing 1 95 vl, Pork Ing 2 90 vl
MK001	SBZ Foods	Bratwurst	Pork 53%	Pork 52%	Pork 67%	Pork 91%	Pork 50 vl	Pork 80 vl
MK002	SBZ Foods	Sliced Cooked Lincolnshire Sausage	Pork 53%	Pork 56%	Pork 51%	Pork 80%	Pork Ing 1 80 vl, Pork Ing 2 50 vl	Pork Ing 1 90 vl, Pork Ing 2 80 vl
MK003	Gilberts Kosher Food	Cocktail Vienna	Beef 70%	Beef 50%	Beef 65%	Beef 85%	Beef 90 vl	Beef 95 vl

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MK004	Mr G Windows t/a GJ Douglas	Beef Burger	Beef 100%	Beef 98%	Beef 98%	Beef 104%	Beef 100 vl	Beef 95 vl
MK006	Woburn Country Foods	Breakfast Pork Sausage	Pork 75%	Pork 89%	Pork 89%	Pork 88%	Pork Ing 1 65 vl, Pork Ing 2 90 vl	Pork Ing 1 70 vl, Pork Ing 2 100 vl
MK007	Woburn Country Foods	Apricot Apple and Ginger Sausage	Pork 75%	Pork 84%	Pork 84%	Pork 71%	Pork Ing 1 65 vl, Pork Ing 2 90 vl	Pork Ing 1 85 vl, Pork Ing 2 100 vl
NI001	Coffeys Butchers	Pork Sausage	Pork 65%	Pork 66%	Pork 74%	Pork 68%	Pork 70 vl	Pork 85 vl
NI002	Belfast Meats	Pork & Leek Sausage	Pork 42%	Pork 46%	Pork 65%	Pork 55%	Pork 66 vl	Pork 95 vl
NI003	Graham Ferguson	Steak Burger	Meat 95%	Meat 98%	Meat 98%	Meat 97%	Beef 95 vl	Beef 95 vl
NI004	Gibsons Butchers	Pork Sausage	Meat 65%	Meat 73%	Meat 81%	Meat 70%	Pork Ing 1 80 vl, Pork Ing 2 60 vl	Pork Ing 1 100 vl, Pork Ing 2 90 vl
NI006	McWhinneys Bangor Co. Down	Premium Sausage (Pork)	Pork 70%	Pork 56%	Pork 77%	Pork 81%	Pork Ing 1 80 vl, Pork Ing 2 70 vl, Pork Ing 3 20 vl	Pork Ing 1 100 vl, Pork Ing 2 90 vl, Pork Ing 3 75 vl
NI007	S.M Meats Ltd Co Down	Traditional Beef Sausage	Beef 52%	Beef 65%	Beef 80%	Beef 77%	Beef 70 vl	Beef 80 vl
NI008	S.M Meats Ltd Co Down	Steak Burger	Beef 95%	Beef 98%	Beef 98%	Beef 98%	Beef 95 vl	Beef 95 vl
NI009	Crossgar Meats	Seasoned Minced Steak Burger	Beef 70%	Beef 95%	Beef 95%	Beef 94%	Beef 95 vl	Beef 95 vl
NI010	Finnebrogue Venison	Oisín Venison Burger	Venison 94%	Venison 94%	Venison 94%	Venison 100%	Not provided	Venison 95 vl
NI011	Doherty & Gray	Irish Pork Sausage	Pork 85%	Pork 78%	Pork 85%	Pork 87%	Pork Ing 1 80 vl, Pork Ing 2 90 vl	Pork Ing 1 95 vl, Pork Ing 2 95 vl

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NI012	McAtamneys Butchers	Award Winning Quarter Pounder Steak Burger	Beef 85%	Beef 91%	Beef 91%	Beef 89%	Beef 95 vl	Beef 100 vl
NI013	McAtamnays Butchers	Honey Roast Pork Sausage	Pork 65%	Pork 61%	Pork 73%	Pork 72%	Pork 65 vl	Pork 90 vl
NI014	Sunnylands Meat Centre	Traditional Pork Sausage	Pork 64%	Pork 74%	Pork 74%	Pork 76%	Pork 80 vl	Pork 95 vl
NI015	D Watt	Steak Burger	Beef 80%	Beef 80%	Beef 80%	Beef 98%	Beef 85 vl	Beef 100 vl
NI016	Armagh Bacon Agency	Pork Sausage	Pork 51%	Pork 46%	Pork 66%	Pork 68%	Pork Ing 1 95 vl, Pork Ing 2 60 vl, Pork Ing 3 50 vl	Pork Ing 1 100 vl, Pork Ing 2 60 vl, Pork Ing 3 80 vl
NI018	Moyallon Foods	Pork & Herb Sausage	Pork 67%	Pork 68%	Pork 68%	Pork 68%	Pork 95 vl	Pork 100 vl
NI019	R M Neill Butcher	Beef Burger	Beef 80%	Beef 80%	Beef 80%	Beef 77%	Beef 85 vl	Beef 95 vl
NI020	William Baird	Pork 'n' Apple Burger	Pork 86%	Pork 85%	Pork 85%	Pork 84%	Pork 90 vl	Pork 100 vl
NI021	Mitchell Meats	Beef Sausage	Beef 66%	Beef 72%	Beef 76%	Beef 72%	Not provided	Beef 100 vl
NI022	Pauls Butchers	Steak Burger	Beef 80%	Beef 98%	Beef 98%	Beef 95%	Beef 95 vl	Beef 100 vl
NI023	Dromore Meats	Steak Burger	Beef 80%	Beef 98%	Beef 98%	Beef 94%	Beef 85 vl	Beef 100 vl
NI024	Kerry Foods	Thick Pork Sausage	Not provided	Pork 54%	Pork 58%	Pork 62%	Pork Ing 1 80 vl, Pork Ing 2 50 vl	Pork Ing 1 85 vl, Pork Ing 2 55 vl
NI025	Culbertson Spar Foodliner	Honeybee Pork Sausage	Pork 65%	Pork 84%	Pork 84%	Pork 95%	Pork 80 vl	Pork 100 vl
NK001	Archers of Norwich	Norfolk Pork Sausage	Pork 58%	Pork 79%	Pork 86%	Pork 86%	Pork 85-90 vl	Pork 85 vl
NK002	Archers of Norwich	American Burger	Beef 60%	Beef 81%	Beef 94%	Beef 100%	Beef Ing 1 80 vl, Beef Ing 2 50-60 vl	Beef Ing 1 70 vl, Beef Ing 2 100 vl
NK003	T C Fines & sons	Scottish Style Lorne Sausage	Pork 32%	Pork 33%	Pork 26%	Pork 45%	Pork 95 vl	Pork 90 vl

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NK004	F Spurgeon	Pork Sausage	Pork 65%	Pork 71%	Pork 76%	Pork 82%	Pork 70 vl	Pork 75 vl
NK005	Tavern Tasty Meats	Norfolk Pork Pie	Not provided	Meat 48%	Meat 50%	Meat 55%	Pork Ing 1 70 vl, Pork Ing 2 90-95 vl	Pork Ing 1 85 vl, Pork Ing 2 100 vl
NK006	Tavern Tasty Meats	English Breakfast Sausage	Pork 85%	Pork 70%	Pork 78%	Pork 85%	Pork 70 vl	Pork 85 vl
NK007	Tavern Tasty Meats	Pork & Apple Steakburger - Gluten Free	Pork 85%	Pork 79%	Pork 87%	Pork 97%	Pork 70 vl	Pork 85 vl
PB001	Yerbeston Gate Farm Shop	Traditional Pork Sausage	Pork 65%	Pork 78%	Pork 78%	Pork 77%	Pork 90 vl	Pork 100 vl
PB002	Preseli Gold	Traditional Pork Sausage	Pork 70%	Pork 73%	Pork 73%	Pork 77%	Pork 90 vl	Pork 95 vl
PB003	Preseli Gold	Pork & Apple Grill	Pork 70%	Pork 80%	Pork 80%	Pork 84%	Pork 90 vl	Pork 100 vl
PB004	Bethseda Fresh Farm Meats	Garlic & Herb Pork Sausage	Pork 68%	Pork 70%	Pork 70%	Pork 71%	Pork 90 vl	Pork 100 vl
PB005	Bethseda Fresh Farm Meats	Pork & Apple Burger	Pork 80%	Pork 83%	Pork 83%	Pork 83%	Pork 90 vl	Pork 100 vl
PB006	G Davies Butchers	Pork Chipolata	Pork 75%	Pork 70%	Pork 70%	Pork 75%	Pork Ing 1 80 vl, Pork Ing 2 75 vl	Pork Ing 1 90 vl, Pork Ing 2 75 vl
PO001	Welsh Sausage Company	Pork & Leek Sausage	Pork 65%	Pork 68%	Pork 68%	Pork 68%	Pork 90 vl	Pork 100 vl
PO002	Welsh Sausage Company	Pork Sausage	Pork 65%	Pork 65%	Pork 69%	Pork 76%	Pork 90 vl	Pork 100 vl
PO003	L V Meats	Pork Sausage (42% Pork content)	Pork 42%	Pork 75%	Pork 77%	Pork 77%	Pork 90 vl	Pork 100 vl
PO004	FJ Layton & sons	Welsh Black Beef Sausage	Beef 60%	Beef 76%	Beef 73%	Beef 64%	Beef 95 vl	Beef 100 vl
PO005	Burger Manufacturing Co.	Steak Burger	Beef 99%	Beef 99%	Beef 99%	Beef 94%	Beef Ing 1 95 vl	Beef 100 vl

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PO006	Burger Manufacturing co.	Superior Beef Burger	Beef 80%	Beef 80%	Beef 77%	Beef 92%	Beef Ing 1 85 vl, Beef Ing 2 90 vl	Beef Ing 1 85 vl, Beef Ing 2 95 vl
PO007	Welsh Venison Centre	Traditional Pork Sausage	Not provided	Pork 71%	Pork 71%	Pork 73%	Pork 80 vl	Pork 95 vl
PO008	Welsh Venison Centre	Original Venison Sausage	Venison 69% Pork 10%	Venison 74% Pork 14%	Venison 74% Pork 14%	Mixed species	Pork 80 vl	Venison 90 vl, Pork 100 vl
RH001	Mid Glam Meats	Pork Sausage	Pork 44%	Pork 54%	Pork 67%	Pork 70%	Pork Ing 1 80 vl, Pork Ing 2 50 vl	Pork Ing 1 100 vl, Pork Ing 2 60 vl
RH002	Mid Glam Meats	Pork & Beef Sausage	Pork 28%, Beef 5%	Pork 36%, Beef 8%	Pork 48%, Beef 8%	Mixed species	Pork Ing 1 95 vl, Pork Ing 2 50 vl, Beef 95 vl	Pork Ing 1 95 vl, Pork Ing 2 50 vl, Beef 100 vl
RH003	W Tudor	Pork Sausage	Pork 67%	Pork 67%	Pork 67%	Pork 69%	Pork 90 vl	Pork 100 vl
RH004	KJS Quality Meats Butchers	Beef Burger	Not provided	Beef 88%	Beef 88%	Beef 91%	Beef 90 vl	Beef 95 vl
RH005	Bevans Quality Meat	Beef Burger	Beef 75%	Beef 85%	Beef 84%	Beef 93%	Beef 85 vl	Beef 85 vl
RH006	N Margery	Beef Sausage	Beef 62%	Beef 69%	Beef 69%	Beef 76%	Beef 90 vl	Beef 100 vl
RH007	N Margery	Pork Sausage	Pork 69%	Pork 73%	Pork 73%	Pork 74%	Pork 90 vl	Pork 100 vl
RH008	Winnie's the Market Butcher	Beef Burger	Beef 80%	Beef 80%	Beef 80%	Beef 78%	Beef 95 vl	Beef 100 vl
SF001	Wootton Organic Wholesale	Organic Beef Burger	Beef 80%	Beef 81%	Beef 81%	Beef 83%	Beef 85 vl	Beef 100 vl
SF002	Wootton Organic Wholesale	Organic Pork & Leek Sausage minced & shaped pork	Beef 70%	Beef 75%	Beef 76%	Beef 83%	Pork Ing 1 90 vl, Pork Ing 2 50 vl	Pork Ing 1 90 vl, Pork Ing 2 80 vl
SF003	Lower Farm Hurst	Organic Quarter Pounder Beef Burger	Beef 96%	Beef 94%	Beef 94%	Beef 94%	Not provided	Beef 100 vl
SF004	Tennant Craft Bakery	1lb Pork Pie	Pork 25%	Pork 24%	Pork 26%	Pork 32%	Pork Ing 1 80 vl, Pork Ing 2 50 vl	Pork Ing 1 100 vl, Pork Ing 2 70 vl

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SF005	Velis Donner Kebabs	Lamb Salt Kebab	Lamb 65%	Lamb 80%	Lamb 71%	Lamb 88%	Lamb Ing 1 80 vl, Lamb Ing 2 80 vl, Lamb Ing 3 80 vl, Lamb Ing 4 80 vl	Lamb Ing 1 90 vl, Lamb Ing 2 60 vl, Lamb Ing 3 70 vl, Lamb Ing 4 80 vl
SF006	Velis Donner Kebabs	Beef & Lamb Kebab	Beef 41%, Lamb 21%	Beef 47%, Lamb 31%	Beef 47%, Lamb 26%	Mixed species	Beef Ing 1 75 vl, Beef Ing 2 95 vl, Lamb Ing 1 80 vl, Lamb Ing 2 80 vl, Lamb Ing 3 80 vl	Beef Ing 1 100 vl, Beef Ing 2 100 vl, Lamb Ing 1 75 vl, Lamb Ing 2 80 vl, Lamb Ing 3 60 vl
SF007	K Boxley	Gold Medal Pork Sausage - 66.3% Pork -	Pork 66%	Pork 76%	Pork 76%	Pork 76%	Pork 80 vl	Pork 80 vl
SF008	K Boxley	Beef Burger	Beef 70%	Beef 86%	Beef 88%	No analysis on the final product	Beef Ing 1 75 vl, Beef Ing 2 85 vl	Beef Ing 1 95 vl, Beef Ing 2 95 vl
SH001	Beres & Son	Pork Pie	Pork 30%	Pork 24%	Pork 32%	Pork 34%	Pork Ing 1 95, Pork Ing 2 50 vl	Pork Ing 1 100 vl, Pork Ing 2 80 vl
SH002	J W Crawshaw	Steak Pie	Beef 25%	Beef 39%	Beef 39%	Beef 56%	Beef 80 vl	Beef 100 vl
SH003	J W Crawshaw	Sausage Roll	Pork 13%	Pork 18%	Pork 23%	Pork 14%	Pork 65 vl	Pork 80 vl
SH004	Real Meat Company	Pork & Apple Burger	Pork 86%	Pork 87%	Pork 87%	Pork 81%	Pork 90 vl	Pork 95 vl
SH005	Real Meat Company	Classic Pork Sausage	Pork 85%	Pork 85%	Pork 85%	Pork 89%	Pork 90 vl	Pork 95 vl
SH006	Heather Hills Farm Meats	Pork Sausage	Pork 65%	Pork 80%	Pork 80%	Pork 81%	Pork 85 vl	Pork 95 vl
SK001	K E Hutson	Pork Sausage Meat	Pork 80%	Pork 77%	Pork 77%	Pork 80%	Pork 80 vl	Pork 85 vl
SK002	Stebbing Butchers	Traditional Pork Sausage	Pork 80%	Pork 69%	Pork 69%	Pork 69%	Pork 80 vl	Pork 100 vl

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SK003	A E Hall & Sons	Beef Burger	Beef 80%	Beef 67%	Beef 85%	Beef 100%	Beef 70 vl	Beef 85 vl
SK004	K W Clarke	Pork & Apple Burger	Pork 80%	Pork 78%	Pork 87%	Pork 95%	Pork 70 vl	Pork 90 vl
SK005	Kevin Allens Butchers	Beef Burger	Beef 90%	Beef 76%	Beef 97%	No analysis on the final product	Beef 70 vl	Beef 95 vl
SK006	Kevin Allens Butchers	Pork Sausage	Pork 80%	Pork 80%	Pork 89%	Pork 92%	Pork 70 vl	Pork 95 vl
SK007	C K Meats	Beef Burger	Beef 85%	Beef 85%	Beef 85%	No analysis on the final product	Beef 85 vl	Beef 85 vl
SK008	C K Meats	Catering Sausage	Pork 50%	Pork 50%	Pork 50%	Pork 53%	Pork 80 vl	Pork 90 vl
ST001	Martin Blackwell	Pork Sausage	Pork 76%	Pork 72%	Pork 75%	Pork 81%	Pork 75 vl	Pork 95 vl
ST002	Martin Blackwell	Pork Pie	Pork 35%	Pork 26%	Pork 27%	Pork 27%	Pork 75 vl	Pork 85-90 vl
ST003	Dennis Pawley	Pork Sausage	Pork 70%	Pork 67%	Pork 70%	Pork 71%	Pork 75 vl	Pork 100 vl
ST004	Dennis Pawley	Pork & Beef Sausage	Meat 70%	Pork 40%, Beef 40%	Pork 40%, Beef 40%	Mixed species	Pork 85 vl, Beef 90 vl	Pork 100 vl, Beef 100 vl
ST005	Meatzone UK	Lamb & Beef Kebab	Meat 90%	Lamb 64%, Beef 13%	Lamb 64%, Beef 13%	Mixed species	Lamb 80 vl, Beef 80 vl	Mixed meat 70 vl
ST006	Cleavers	Pork Sausage	Pork 70%	Pork 78%	Pork 78%	Pork 73%	Pork 85 vl	Pork 95 vl
ST007	Michael Plant	Pork Pie	Pork 20%	Pork 45%	Pork 46%	Pork 43%	Pork Ing 1 70 vl, Pork Ing 2 80 vl	Pork Ing 1 75 vl, Pork Ing 2 95 vl
ST008	Michael Plant	Pork Sausage	Pork 45%	Pork 53%	Pork 56%	Pork 54%	Pork Ing 1 60 vl, Pork Ing 2 90 vl	Pork Ing 1 70 vl, Pork Ing 2 100 vl
SU001	Ace 4 Kebabs	Lamb Kebab	Lamb 75%	Lamb 41%	Lamb 64%	Lamb 92%	Lamb Ing 1 20 vl, Lamb Ing 2 50 vl, Lamb Ing 3 80 vl, Lamb Ing 4 80 vl	Lamb Ing 1 50 vl, Lamb Ing 2 80 vl, Lamb Ing 3 80 vl, Lamb Ing 4 95 vl
SU002	Ace 4 Kebabs	Lamb & Beef Kebab	Lamb 43%, Beef 29%	Lamb 47%, Beef 38%	Lamb 47%, Beef 38%	Mixed species	Lamb 85 vl, Beef 85 vl	Lamb 85 vl, Beef 85 vl

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SU003	White Lodge Farm	Pork & Garlic Sausage	Pork 78%	Pork 79%	Pork 79%	Pork 83%	Not provided	Pork 95 vl
SU004	White Lodge Farm	Pork & Apple Sausage	Pork 70%	Pork 66%	Pork 66%	Pork 79%	Not provided	Pork 95 vl
SU005	Reg Guyett	Cumberland Pork Sausage	Pork 50%	Pork 51%	Pork 54%	Pork 47%	Not provided	Pork 70 vl
SU006	Mortimers Butchers	Home Made Plain Pork Sausage	Pork 73%	Pork 75%	Pork 75%	Pork 75%	Pork 85 vl	Pork 95 vl
SU007	Mortimers Butchers	Home Made Pork & Venison Sausage	Pork 36%, Venison 26%	Pork 38%, Venison 38%	Pork 38%, Venison 38%	Mixed species	Pork 85 vl, Venison 95 vl	Pork 95 vl, Venison 100 vl
WL001	Alex Speedie	Chip Steak	Beef 91%	Beef 91%	Beef 95%	Beef 91%	Beef 80 vl	Beef 95 vl
WL002	Hugh Black and Sons	Pork Sausage	Pork 67%	Pork 68%	Pork 75%	Pork 78%	Pork 70 vl	Pork 90 vl
WL003	James Black and Son	Pork Sausage	Pork 70%	Pork 63%	Pork 70%	Pork 54%	Pork 70 vl	Pork 90 vl
WL004	John Dewar and Son	Pork Sausage	Pork 61%	Pork 53%	Pork 80%	Pork 75%	Pork 60 vl	Pork 95 vl
WL005	J. Lawson	Beef Burger	Beef 76%	Beef 71%	Beef 91%	Beef 96%	Beef 70 vl	Beef 95 vl
WL006	Campbells Prime Meat Ltd	Steak & Parsley Burgers	Beef 85%	Beef 89%	Beef 89%	Beef 84%	Beef 98 vl	Beef 95 vl
WL007	J Livingston and Sons	Pork Sausage	Pork 55%	Pork 50%	Pork 56%	Pork 59%	Pork 70 vl	Pork 85 vl
WL008	Boghall Butchers West Lothian	Pork Sausage	Pork 58%	Pork 46%	Pork 57%	Pork 60%	Pork 60 vl	Pork 80 vl
WS001	Coopers Family Butchers	Best Pork Sausage	Pork 42%	Pork 69%	Pork 72%	Pork 77%	Pork Ing 1 80 vl, Pork Ing 2 50 vl	Pork Ing 1 85-90 vl, Pork Ing 2 70 vl
WS002	Conways	Beef Burger	Beef 62%	Beef 74%	Beef 78%	Beef 82%	Beef 80 vl	Beef 90 vl
WS003	Lawrence Meats	Popular Catering Sausage	Pork 34%, Beef 10%	Pork 38%, Beef 4%	Pork 38%, Beef 10%	Mixed species	Pork Ing 1 95 vl, Pork Ing 2 50 vl	Pork Ing 1 95 vl, Pork Ing 2 70 vl

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WS004	Lawrence Meats	Pork Sausage	Pork 54%	Pork 57%	Pork 68%	Pork 59%	Pork Ing 1 50 vl, Pork Ing 2 50 vl, Pork Ing 3 95 vl	Pork Ing 1 65 vl, Pork Ing 2 75 vl, Pork Ing 3 90 vl
WS005	Euro Kebabs	Donner Kebab	Lamb meat 70% Lamb fat 15% mutton 5%	Lamb 89%	Lamb 86%	Lamb 52%	Not provided	Lamb 90 vl
WS006	TC Morris	Medium Pork Pie	Pork 30%	Pork 27%	Pork 27%	Pork 28%	Pork Ing 1 80 vl, Pork Ing 2 80 vl	Pork Ing 1 85 vl, Pork Ing 2 90 vl
WS007	Pat Gorman	Small Pork Pie	Pork 46%	Pork 37%	Pork 45%	Pork 36%	Pork Ing 1 80 vl, Pork Ing 2 85 vl	Pork Ing 1 100 vl, Pork Ing 2 95 vl
WS008	Pat Gorman	Large Pork Pie	Pork 46%	Pork 37%	Pork 44%	Pork 40%	Pork Ing 1 80 vl, Pork Ing 2 85 vl	Pork Ing 1 100 vl, Pork Ing 2 90 vl
WY001	Farmers Boy	Thick Pork Sausage	Pork 56%	Pork 57%	Pork 65%	Pork 67%	Pork Ing 1 80 vl, Pork Ing 2 80 vl	Pork Ing 1 90 vl, Pork Ing 2 85 vl
WY002	Farmers Boy	Quarter Pounder Beef Burger	Beef 84%	Beef 82%	Beef 86%	Beef 85%	Beef 80 vl	Beef 100 vl
WY003	Farmers Boy	Pork Pie	Pork 20%	Pork 21%	Pork 22%	Pork 25%	Pork Ing 1 80 vl, Pork Ing 2 50 vl	Pork Ing 1 85 vl, Pork Ing 2 90 vl