

PROGRAMME OF MINI SURVEYS: SAUSAGES SURVEY

Summary

The Food Standards Agency has recently carried out a survey to look at the levels of a limited range of nutrients, including sodium (salt), fat and sugar, in a range of sausages. The results of this survey show that the salt content of standard sausages has increased since they were last tested from 2.2g per portion to 2.4g; and the fat content of “high quality” sausages has increased from 15g per portion to over 20g. However, the average levels of salt and fat in sausages overall (across all types) have fallen since they were last analysed in 1991.

Key Points

- Sixty-five (65) samples of sausages from 10 different categories, including premium, standard, economy range and “healthy eating” pork sausages, as well as other meat (e.g. beef) and vegetarian products, were purchased and analysed to determine the levels of a limited number of nutrients, including sodium (salt), fat and sugar. The sausages were analysed raw as individual samples and, once cooked, as composite samples made up of the different brands from each category.
- Results from this survey show that:
 - Standard pork sausages have higher levels of salt than when they were last tested, in 1991. Average salt content of these products has increased from 2.2g per portion (two sausages) to 2.4g. This is over a third of the target daily salt intake for an adult (6g).
 - Overall, the average salt content of meat sausages has reduced by 11% since they were last tested.

- This is mainly due to the reduction in the amounts of salt in the low/reduced fat sausages range (from 2.4g per portion to 1.8g) – a decrease of around 25% for this category. However, a portion of low/reduced fat sausages still provides nearly a third of the target daily intake for adults.
- Whilst the average fat content of most categories has reduced since 1991, high quality brands have up to 35% more fat than when last measured - from 15g per portion to over 20g.
- Overall, the average fat content of meat sausages has reduced by 25% since they were last tested. Again, this is mainly due to the reduction in the amounts of fat in low/reduced fat sausages (from 11.1g to 4.9g) – a decrease of around 56%.
- Sausage brand leader Richmond had the highest salt content in its pork sausages out of all the products surveyed at 35% of the target daily intake per portion. Marks & Spencer's Premium Pork Sausages and Co-op's Butchers Select Sausages contain only 15% of the recommended daily amount of salt per portion. The Co-op is also moving towards using Lo-salt (a low sodium alternative to salt) in many of their own-brand products.
- A typical sausage meal, eg two sausages served with chips and beans, would provide 4.3g of salt, around 72% of the daily target amount for an adult. A children's meal of sausage, chips and beans would provide around 43% of the target daily intake for children aged 7 to 10 years, at over 2g of salt per meal.

Background

The objective of the programme of mini surveys is to provide up-to-date and reliable information on the levels of sodium (salt), fat, sugar and a limited range of other nutrients, in processed foods. This includes those foods that are major contributors to salt, fat and sugar in the diets of both adults and children. The data obtained will be used to raise consumer awareness of related food and diet issues and also to inform discussions with the food industry, and other bodies, aimed at encouraging changes in the composition of processed foods. This will, in turn, help consumers to be better able to choose a healthy diet and achieve nutrient intake guidelines.

Salt intakes of adults are currently around 9 grams per person per day,¹ which is considerably higher than the target daily intake 6 grams per person per day, originally made by the Committee on Medical Aspects of Food Policy in 1994.² This

recommendation was endorsed by the Scientific Advisory Committee on Nutrition (SACN) in its recent report on Salt and Health.³

The SACN report also made recommendations on the maximum amounts of salt that children should have in their diet. These amounts are:

- up to 6 months old – less than 1g per day
- 7 to 12 months – 1g per day
- 1 to 3 years – up to 2g per day
- 4 to 6 years – 3g per day
- 7 to 10 years – 5g per day

From the age of 11, children should be having no more than about 6g per day. This is the same level that is recommended for adults.

A habitually high intake of sodium has been linked to a higher than average blood pressure, which may lead to an increased risk of suffering heart disease or a stroke.

The National Diet and Nutrition Survey (NDNS) of adults aged 19 to 64 years showed that the mean daily total fat intake for men is currently around 86g and for women is approximately 61g.¹ Current recommendations are that fat should contribute, on average, no more than 35 per cent of daily food energy intake.⁴ This equates to approximately 95g of fat per day for a man and 70g of fat per day for a woman. The fat intakes from the NDNS give means of 35.8 per cent of daily food energy coming from fat for men and 34.9 per cent for women, and thus current mean fat intakes are close to the recommendation. A habitually high intake of fat is linked to becoming overweight and developing heart disease.

This NDNS also showed that, on average, men consumed around 93g of sausages over the 7 day reporting period (roughly equal to 2 large or 4 small sausages), and women approximately 44g (roughly equal to 1 large or 2 small sausages).⁵ Sausages contributed around 3 per cent to adults intake of salt (sodium)¹; and around 3 per cent to their intake of fat.⁶

The results of the sausages survey will be incorporated into the Agency's nutrient databanks for the National Diet and Nutrition Survey programme, and the Expenditure and

Food Survey, together with future publications in the series *McCance and Widdowson's The Composition of Foods*.

Meat content declaration

A new definition of meat for labelling purposes came into force on the 1 July 2003 (Commission Directive 2001/101/EC). This defines a generic description "meat" (or in English) "pork", "beef" etc.) as skeletal muscle. There are limits to the amount of fat and connective tissue (collagen/ protein %), which can be included in the meat content declaration as follows:

Meat	Fat (%)	Collagen / Protein % (Connective tissue)
Pork	30	25
Avian meat and rabbits	15	10
All other red meats and mixtures	25	25

This new definition, now harmonised with rest of the European Union, is stricter than the national definition laid down in the Meat Products and Spreadable Fish Products Regulations 1984, and used by meat product manufacturers until 1 July 2003. The limit for connective tissue for the national definition is not quantified and is on the basis of "naturally associated", and for sausages there can be up to 50% fat permitted to be included in the meat content.

As well as determining nutrient content of the sausages, the survey provided an opportunity to determine whether and how meat content declarations will change in the light of the new definition and the compositional restrictions. In order to be able to calculate the meat content, the connective tissue content of the sausages was also determined in addition to the fat and protein content.

Methodology

Sixty-five (65) samples of sausages from 10 different categories were purchased in the south Midlands during January and February 2003. The different categories of products were included in the survey to a) obtain information on products not previously tested to expand current data; and b) to re-analyse those sausages that had been tested before, to allow comparisons with previous data. For this reason, the sampling protocol tried to

mirror, as far as possible, that used previously. However, there had been some considerable changes in the range of meat contents of sausages since they were last tested so it was not always possible to undertake direct comparisons. For example, there is now a much wider range of high meat content sausages on the market, since they were last analysed. As a result, the 'High Quality' category in this most recent survey covers products included in the earlier survey (1991), with the 'Premium' category covering other high meat content sausages not included in the previous survey.

Products with a range of meat contents were included in each category, as illustrated below, to allow representative average data from the composite samples analysed to be obtained. Finally, products were included to reflect the current coverage of the UK sausages market

The categories of sausages tested were:

- “Premium” Pork sausages (approx. 70-95% meat) – individual and composite samples;
- “High Quality” Pork sausages (70-80% meat) – composite sample only;
- “Standard” Pork sausages (approx. 50-70% meat) – individual and composite samples;
- Pork & Beef sausages (approx. 50-68% meat) – individual and composite samples;
- Beef sausages (approx. 60-81% meat) – individual and composite samples;
- Chicken & Turkey sausages (approx. 65-80% meat) – individual and composite samples;
- Reduced fat sausages (approx. 65-68% meat) – individual and composite samples;
- Vegetarian sausages – individual and composite samples;
- Economy/Value sausages (approx. 50-53% meat) – individual and composite samples;
- Children’s sausages (approx. 50-66% meat) – individual samples only.

A full list of the individual samples included in the survey is given in Table 1. The absence of a particular brand means only that the brand has not been included in the survey. No further meaning should be read into its absence from the report. In addition, the samples used in this survey represent a snapshot of the sausages sector of the food industry – the survey is not exhaustive and should not be treated as such – and the resultant conclusions reached are indicative only.

The purchased sausages were analysed raw as individual samples, to enable data for the individual brands to be compared with the nutritional data on the label, wherever possible.

It also allowed individual products to be compared on a like for like basis (ie before any differences that could occur by cooking had been introduced). The sausages included in each category were also cooked and bulked together for analysis as composite samples. This process of combining samples allows a single, robust set of nutrient values to be derived for each product type for use in assessing nutrient intakes from food consumption data collected via the Agency's dietary survey programme.

The preparation and cooking methods used were based on manufacturers' recommendations given on product labels. The decision was taken to grill the sausages prior to analysis. However, the "standard" pork sausages were also analysed once they had been oven baked, shallow fried and barbecued. Sausages were not pricked before cooking apart from one composite of the "standard" pork sausages that were pricked before grilling (there was also a non-pricked, grilled sample of "standard" pork sausages).

The individual and composite samples were analysed by Campden and Chorleywood Food Research Association for a number of nutrients. A full list of these is given in Table 2. The methods used to conduct the analyses are included at Annex A, along with details of the quality control measures employed.

The sausages were also analysed for hydroxyproline (a marker of connective tissue), which by combining with the fat and protein determinations enabled meat content calculations to be carried out on the individual branded samples only. Bulked samples were not analysed for hydroxyproline. Details of the method and calculations used to obtain these data, is given at Annex B.

Results

The results of the main nutrient analyses of the individual and composite samples can be found in Table 3; and the results of the fatty acids analyses can be found at Table 4.

In order to make comparisons easier, the salt and fat content of a portion of sausages was calculated for each product tested. For the purposes of this survey, a portion is defined as two sausages from a typical 450g pack of eight sausages. After cooking this gives a portion size of approximately 80g. A child's portion is 50g cooked weight, equivalent to about 5 small, cocktail-type sausages. These figures can be found in Table 5. The salt and fat content of a portion were then compared to the target daily intakes – for adults,

these are 6g salt, and 82.5g fat (this is an average of the intakes for men and women, which are 95g and 70g, respectively); for children, these are 5g salt (the target daily intake for 7-10 year olds), and 72g fat (an average of the requirement for boys and girls aged 7-10 years, which are 76.6g and 67.7g respectively).

Products have been compared on both an individual and composite sample basis. The comparison of the individual products allows differences to be highlighted for different brands of the same product. The comparisons of the composite samples allows differences to be highlighted between the different types of products, as well as making comparisons to the data obtained during previous analyses⁷ (where available).

Individual products - Salt

Of those products tested, the 3 products with the highest salt content per portion (as a percentage of the target daily intake) were:

- Richmond Irish Recipe Pork Sausages – 2.1g (35%);
- Safeway Pork and Beef Sausages – 1.9g (32%);
- D G Pritchard Thin Pork Sausages – 1.85g (31%).

The 3 products with the lowest salt content per portion were:

- Co-op Butchers 8 Select Pork Sausages, Goodlife 6 Vegetarian Sausages and Marks & Spencer Premium Pork Sausages – 0.9g (15%).

There were 3 products aimed at children included in the survey. Per child's portion, these sausages contained (as a % of the maximum daily intake for children aged 7 to 10 years):

- Sainsbury's Blue Parrot Café 20 Mini Skinless Pork Sausages – 0.67g (13%);
- Hall's Wee Wille Winkies 20 Mini Skinless Pork Sausages – 0.7g (14%);
- Tesco 24 Pork Cocktail Sausages – 0.95g (19%).

Individual products – Fat

Of those products tested, the 3 with the highest fat content per portion (as a percentage of the target daily intake – 82.5g) were:

- Asda Aberdeen Angus Beef Sausages – 26g (32%);
- Iceland Thick Pork Sausages (frozen) and Co-op Butchers Select Pork Sausages – 24g (29%).

Of the products tested, the 4 with the lowest fat content per portion were:

- Safeway Cumberland Less than 5% Fat Pork Sausages and Tesco Healthy Eating Pork Sausages Less than 3% Fat – 2.4g (3%);
- Asda Good for You Less than 5% Fat Pork Sausages and Quorn Sausages – 3.3g (4%).

Per child's portion, the sausages aimed at children contained (as a % of the maximum daily intake for children aged 7-10 years):

- Sainsbury's Blue Parrot Café 20 Mini Skinless Pork Sausages – 5.7g (8%);
- Hall's Wee Wille Winkies 20 Mini Skinless Pork Sausages – 10.6g (15%);
- Tesco 24 Pork Cocktail Sausages – 13g (18%).

Composite samples - Salt

On comparison with data obtained from previous analytical surveys, results from the composite samples analysed for most recent survey suggest:

- "Standard" pork sausages had the highest amount of salt per portion (2.4g salt or 40% of the target daily intake), and "high quality" pork sausages had the lowest (1.48g or 25%).
- Overall, the average salt content of meat sausages has reduced by 11% since they were last tested. This is mainly due to the reduction in the amounts of salt in the low/reduced fat sausages range (from 2.4g per portion to 1.8g) – a decrease of around 25% for this category. However, a portion of low/reduced fat sausages still provides nearly a third of the target daily intake for adults.
- The salt content of the beef and vegetarian sausages had also fallen slightly; while the salt content of the "high quality" pork sausages had remained about the same.
- The salt content of "standard" pork sausages has increased slightly by about 9% (from 2.2g per portion to 2.4g).

Composite samples - Fat

On comparison with data obtained from previous analytical surveys, results from the composite samples analysed for most recent survey suggest:

- The “high quality” pork sausages had the highest average fat content per portion (20.2g fat or 24% of the target daily intake), and the low/reduced fat sausages had the lowest (4.9g or 6% of the target daily intake).
- Overall, the average fat content of meat sausages has reduced by 25% since they were last tested. As for salt, this is mainly due to the reduction in the amounts of fat in the low/reduced fat sausages (from 11.1g to 4.9g per portion) – around 56%.
- The average fat content of “standard” pork, beef, low fat, vegetarian and economy sausages have also all reduced since they were last analysed.
- The average fat content of “high quality” pork sausages is now higher, by 35%, than when these were previously tested (increasing from 15g per portion to 20.2g).

Other nutrients

A number of other nutrients were also analysed – starch, sugar (total and individual sugars), fibre (using AOAC and Englyst methodologies) and iron.

The iron content of most of the pork and/or beef sausage categories were about the same, with the average iron content being around 1mg per 100g. Looking at all meat sausages, levels of iron were highest in the chicken and turkey sausages at 1.4mg per 100g. Vegetarian sausages had the highest average iron content of all samples analysed at 3.6mg per 100g. This is possibly due to the use of iron oxide as a permitted colouring in one sample (Quorn sausages). Where comparisons can be made with earlier data, these new analyses are broadly similar to the levels obtained previously.

Whilst sausages are not considered to be a major contributor to sugar intakes, it is interesting to note that the sugar content for all sausages for which we have previous data has risen. The increase was greatest in the low fat sausages (from 1.2g per 100g to 3.5g per 100g).

Where comparisons with previous data are possible, levels of fibre (Englyst) and starch for some products have risen slightly since they were last analysed. As with all other nutrient differences noted, there could be a number of factors responsible for the differences observed including changes in manufacturing processes and ingredients.

When compared to the levels of nutrients given on the packaging, the results obtained for the majority of sausages were generally within the limits of analytical variation (as

determined by the Working LACORS Guidance on Tolerances to be applied to Nutritional Labelling Declaration, May 2003). However, the results obtained for some samples of sausages, for some nutrients, were outside these limits – these can be found in Table 6. The relevant manufacturers were contacted and asked to comment on these findings. The comments received can be found at Annex C.

Meals

The salt and fat contents of typical sausage meals were calculated, the details of which can be found in Table 7. The meal providing the most salt (72% of the target daily amount) and fat (48%) included pork sausages, fried chips and baked beans. The children's meal containing the same foods (in appropriate portion sizes) provided 43% of the target daily amount of salt for 7 to 10 year olds, and 35% of the target daily amount for fat (for the same age group.)

Meat content results

The results of this part of the survey can be found in Table 7.

- The fat content of meat used in sausages in the 53 samples tested vary from 4% to 51%, and the connective tissue content of the meat (as a percentage of the protein) vary from 6% to 62%.
- When the new meat definition came in force on 1 July 2003, 15 of the products will have to declare excess fat separately in the list of ingredients, and 23 products will have to declare excess connective tissue. This is because the new definition has stricter limits for the amounts of fat and connective tissue that may be counted as "meat", and the excess must be labelled separately.
- This will result in 24 of the sausage products having a lower "meat content". In the majority of cases, this "reduction" is less than 15%, although in 3 products there is a "reduction" of more than 30%.
- Some products tested in the survey were found to contain more meat than was declared on the product label, in some cases by as much as 30%. After allowing for analytical tolerances (of 1-2%), 7 products will be required to change the amount of meat they declare on their labels.

The full analytical report is available in hard copy through the FSA Library and Information Service at Aviation House.

Interpretation

The results of this survey show that the salt content of standard sausages has increased since they were last tested from 2.2g per portion to 2.4g; and the fat content of “high quality” sausages has increased from 15g per portion to over 20g. However, the average levels of salt and fat in sausages overall (across all types) have fallen since they were last analysed in 1991.

References

1. Henderson, L. et al (2003) *The National Diet and Nutrition Survey: adults aged 19 to 64 years. Volume 3: Vitamin and mineral intake and urinary analytes* London: TSO
2. Department of Health (1994) *Nutritional Aspects of Cardiovascular Disease Report on Health and Social Subjects no 46.* London: HMSO
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4. Department of Health (1991) *Dietary Reference Values for Food energy and Nutrients for the United Kingdom Report on Health and Social Subjects no 41.* London: HMSO
5. Henderson, L., Gregory, J. and Swan, G. (2002) *The National Diet and Nutrition Survey: adults aged 19 to 64 years. Volume 1: Types and quantities of foods consumed* London: TSO
6. Henderson, L., Gregory, J., Irving, K. and Swan, G. (2003) *The National Diet and Nutrition Survey: adults aged 19 to 64 years. Volume 2: Energy, protein, carbohydrate, fat and alcohol intake* London: TSO
7. LGC (1992) *Analytical Survey of Meat Products Part 2: Analytical Results* MAFF

Further Information

The report of this survey (entitled Programme of Mini Surveys: Sausages Survey) is held in the Dr Elsie Widdowson Library and Information Service at the Food Standards Agency headquarters in London. If you would like to consult or receive a copy (a small charge for photocopying will be made), please contact:

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