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**Rural Industries Research and  
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# **Nutrient Composition of Chicken Meat**

by  
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# Foreword

The Australian food composition data for chicken meat has been identified as outdated and has not been updated with analytical data since the 1980s. Since this time a number of changes have happened within the chicken meat industry relating to regulation and feeding practices. These changes mean there is a need for an update of the Australian food composition data for chicken meat. Previously commissioned work provided analysed data for chicken breast, wing, thigh, leg, skin and fat. This data required further interpretation before made available to the Australian food industry. This project utilised the analysed data, identifying gaps from nutrients that were not considered for analysis or where insufficient samples were available. The gaps were each addressed and filled using mean imputation analysis or borrowed data or recommendations were provided for further analysis.

The findings of this report indicate that there is a need to continue to update the data for Australian chicken meat to make it comparable with that of overseas databases. Australia needs to develop a model by which food composition data is regularly reviewed to avoid data becoming outdated and reliant on calculated values. Industry also needs to become aware of these issues and provide government bodies with the relevant analytical data as it becomes available.

This report, an addition to RIRDC's diverse range of over 1800 research publications, forms part of our Chicken Meat R&D program, which aims to support increased sustainability and profitability in the chicken meat industry through focused research and development.

Most of our publications are available for viewing, downloading or purchasing online through our website:

- downloads at [www.rirdc.gov.au/fullreports/index.html](http://www.rirdc.gov.au/fullreports/index.html)
- purchases at [www.rirdc.gov.au/eshop](http://www.rirdc.gov.au/eshop)

**Peter O'Brien**

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## Abbreviations

ALA	Alpha linolenic acid	4:0	Butyric acid
AU	Australia	6:0	Caproic acid
CLA	Conjugated linoleic acids	8:0	Caprylic acid
Cu	Copper	10:0	Capric acid
DHA	Docosahexaenoic acid	12:0	Lauric acid
EPA	Eicosapentaenoic acid	14:0	Myristic acid
FA	Fatty acid	15:0	Pentadecanoic acid
Fe	Iron	16:0	Palmitic acid
FSANZ	Food Standards Australia New Zealand	17:0	Margaric acid
kcal	Kilocalories	18:0	Stearic acid
kJ	Kilojoules	20:0	Arachidic acid
Mn	Manganese	22:0	Behenic acid
MUFA	Monounsaturated fatty acids	24:0	Lignoceric acid
NA	Not Available	14:1	Myristoleic acid
NCEFF	National Centre of Excellence in Functional Foods	16:1	Palmitoleic acid
NMI	National Measurement Institute	18:1	Oleic acid
NPC	Nutrition Panel Calculator	20:1	Gadoleic acid
NUTTAB	Nutrient composition tables	22:1	Erucic acid
NZ	New Zealand	24:1	Selacholeic acid
PUFA	Polyunsaturated fatty acids	18:2 n-6	Linoleic acid
RA	Recommend re-analysis	18:3 n-3	$\alpha$ -Linolenic acid
RIRDC	Rural Industries Research and Development Corporation	18:3 n-6	gamma Linolenic acid
Se	Selenium	20:2 n-6	Eicosadienoic acid
SFA	Saturated fatty acids	20:3 n-3	Eicosatrienoic acid
US	United States of America	20:3 n-6	Homogamma linolenic acid
USDA	United States Department of Agriculture	20:4 n-6	Arachidonic acid
Zn	Zinc	20:5 n-3	Eicosapentanoic acid
$\alpha$	Alpha	22:2 n-6	Docosadienoic acid
$\omega$	Omega	22:4 n-6	Docosatetraenoic acid
%E	Percentage of total energy	22:5 n-3	Docosapentaenoic acid
%fat	Percentage of total fat	22:6 n-3	Docosahexaenoic acid

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# Executive Summary

## ***What the report is about***

The Rural Industries Research and Development Corporation (RIRDC) Chicken Meat Program has identified that the Australian food composition for chicken meat is quite outdated. It has previously commissioned analytical work which requires further interpretation and may be used in updating food composition databases. This project will utilise this data to produce nutrient composition information for Australian chicken meat. Such data will be useful for updating the existing Australian nutrient composition database.

## ***Who is the report targeted at?***

The findings of this report are specifically targeted at those working within the chicken meat industry and those who regularly use food composition databases, whether Australian or international.

## ***Background***

Research conducted in the past has shown a variation among the body composition of chicken with different ages, gender and bird breed. As a broiler chicken grows the composition of its carcass changes and fat deposits increase. This is seen earlier in the female chicken for reproductive purposes. Ultimately the nutrient composition of chicken is a response to the diet it consumes particularly in the early stages of life. Knowing the nutritional composition of the product is central to communicating ways in which chicken may form part of a healthy diet.

## ***Aims/Objectives***

The aim of this project is to review the nutrient composition information for chicken meat from the AGAL analysis and fill gaps in the dataset with those from existing Australian and overseas data. This data may provide the basis for an update of the available Australian nutrient composition data for chicken.

## ***Methods used***

The Australian Government Analytical Laboratories (AGAL) were previously commissioned by the Australian Chicken Meat Federation and Australian New Zealand Food Authority (now Food Standards Australia and New Zealand), with funding provided by RIRDC (Chicken Meat Program), to conduct a nutritional analysis of a number of cuts of chicken as well as chicken fat and skin. Data from this analysis was provided for the work of this project. A spreadsheet of the macronutrient, micronutrient and fatty acid data for chicken meat was created and gaps identified. Existing food composition data for chicken from Australia and other countries was sourced and added to the spreadsheet. Data for each country was matched for nutrients and cut of chicken. Databases were compared with the AGAL data to determine suitability for imputing values to fill the gaps. Where multiple datasets were available to compare with the AGAL data, ratio plots were created for the macronutrient data to determine the most appropriate countries to source data from. Where only a single dataset was available to compare with AGAL data, percentage comparisons were calculated. Where multiple comparison datasets were available, mean imputation analyses were conducted to determine the most relevant data to fill the gap. Where only a singular dataset was available, the percentage comparisons were assessed for the appropriateness of 'borrowing' the data for fill the missing values. Values within 10% of the AGAL data were considered to be appropriate for imputation. The final filled dataset for chicken was further compared with nutrient composition data for beef, lamb, pork and fish.

## **Results/Key findings**

### ***Nutritional composition of chicken meat***

- Comparisons made between the AGAL data and that of the other countries showed large differences in values for chicken cuts from Europe and Australia. Each cut needed to be individually compared due to the variability in total fat values. The greatest difference was in available fatty acid data and the range of nutrients listed.
- Imputation analysis was required for data on the majority of fatty acids, all amino acids and 23 vitamin and mineral categories.

### ***Comparison of chicken meat data with that from other meats***

- Based on a single value for a 100g lean fillet serve, lean chicken breast was shown to have relatively higher proportions of protein (>10% compared to beef and lamb), monounsaturated fatty acids (>20% compared to beef and tuna), and polyunsaturated fatty acids (>30% compared to beef, lamb and pork).
- Lean breast of chicken also provided relatively more Selenium (>25%) than beef, lamb and pork, and more Manganese (>90%) than lamb (data on others not available).
- Lean fillet of chicken provided relatively more vitamin E ( $\alpha$  tocopherol) than lamb and beef (>40%).
- Differences in nutritional value may relate to the ability of the chicken digestive system to take up nutrients from feeds and deposit them in the meat.
- Limitations of this comparison relate to imputations conducted in the dataset, and the inherent limitations in the NUTTAB 2006 database. Further, it is not known whether age, living conditions, gender or feed composition had an effect on the nutrient values compared.

### ***Implications for relevant stakeholders***

The findings of this report suggest that the chicken meat industry needs to work in consultation with organisations to ensure a complete dataset is available for Australian chicken meat, taking into consideration the cuts available from overseas databases. If such an update is made available via the Australian food composition databases this will provide nutrition researchers throughout Australia with a more recent and potentially more relevant information for chicken meat, especially considering the number of changes that have happened in the industry during the early 1980s.

### ***Recommendations***

The following recommendations are provided for the RIRDC Chicken Meat Program or any member of the Australian chicken meat industry hoping to undertake similar analytical work. The material contained in this report should be published in a number of ways to disseminate the important information derived from the analyses and inform future research and development in the industry.

- Future work in this area would benefit from
  - Australian data on light and dark chicken meat to allow for comparisons with overseas data
  - Australian data on whole edible chicken for nutrition based research.
- To provide consistency for comparative studies, nutrient composition data for each of the cuts of chicken with skin is desirable.
- Data for folate and saturated fatty acids is required using a measurement technique better able to capture small measures.
- To extend the database for a broader range of nutrients, analyses with pooled, separable fat and with a larger sample is desirable.
- The most credible values for fatty acid and fat soluble vitamins would come from new analyses, as the majority of values in this report are imputed from the Australian NUTTAB 2006 database calculated values.



# 1. Introduction

The breed diet and life of the chicken have been shown to influence the quality of meat produced. This results in varied nutrient composition between breed, age, cut, gender and chicken feed diet. Commercially chickens are primarily divided into layer chickens which lay eggs for human consumption/meat chickens (sometimes called broilers) which are specifically bred for producing meat. Since the late 1980s importation regulations changed and it has been possible to introduce new strains of chicken (Australian Chicken Meat Federation, 2007). Australia now has the ability to source selectively bred strains from quality breeding programs in North America and Europe, ensuring Australian birds to be of the highest international standard. The great grandparents of the meat chickens that are reared for human consumption are imported into Australia as fertile eggs, which are hatched out in quarantine facilities. Subsequent multiplication of breeding stock through grandparent/parent, and finally meat chicken generations is then done in Australia. Today, the primary strains of chicken in Australia are the Ross and Cobb strains. These are also the primary strains used by all major chicken producers around the world.

Research conducted in the past has shown that the body composition of chicken varies with age, gender and bird breed (Kumara and Aalbersberg, 2006). As a broiler chicken grows the composition of its carcass changes (Jones, 1986) and fat deposits increase. This is seen earlier in the female chicken for reproductive purposes (Kumara and Aalbersberg, 2006). Ultimately the nutrient composition of chicken is a response to the diet they consume, particularly in the early stages of life (Jones, 1986, Belt *et al.*, 1992). Knowing the nutritional composition of the product is central to communicating ways in which chicken may form part of a healthy diet.

The Rural Industries Research and Development Corporation (RIRDC) Chicken Meat Program has identified that the Australian food composition data for chicken meat is quite outdated. It has previously commissioned analytical work (undertaken by the Australian Government Analytical Laboratory (AGAL) which requires further interpretation and may be used in updating food composition databases. This project will utilise this data to produce nutrient composition information for Australian chicken meat. The aim of this project was to review the nutrient composition information for chicken meat from the AGAL analysis and fill gaps in the dataset with those from existing Australian and overseas data.

## 2. Objectives

- To undertake a review of the available data from a previously commissioned analysis (AGAL) funded by the RIRDC Chicken Meat Program on the nutritional value of Australian chicken meat
  - Where Australian data is deficient, to review, compare and include relevant overseas data which may assist industry to define the nutrient profile of chicken meat in the absence of solid local data.
  - To provide recommendations for where additional data is required.
- To compare Australian chicken meat data with data for equivalent cuts (e.g. high value, trimmed cuts such as fillets and breast meat) of beef, lamb, pork and fish.

## 3. Methodology

The following methodology was applied to this project. A list of all assumptions made in this report is outlined and is accompanied by recommendations for where additional data is required.

### 3.1 Nutritional analysis of chicken (1998)

The Australian Government Analytical Laboratories (AGAL) were previously commissioned by the Australian Chicken Meat Federation and Australian New Zealand Food Authority (now Food Standards Australia and New Zealand) to conduct a nutritional analysis of chicken. Detailed methodological information about the sampling and analytical techniques can be found in the original report (AGAL, 1998). Data from this analysis was provided for the work of this project.

### 3.2 Collating nutrient composition data

A spreadsheet including values for: the cut of chicken, weight, energy (kcal and kJ), moisture, protein (g), % protein, total fat (g), % fat, saturated fat (g), % saturated fat, polyunsaturated fat (g), % polyunsaturated fat, monounsaturated fat (g), % monounsaturated fat, saturated fatty acids (g) 4:0-24:0, monounsaturated fatty acids (g) 14:1-24:1, polyunsaturated fatty acids (g) 18:2-22:6, ash (g), carbohydrate (g), % carbohydrate, sugars (g), cholesterol (mg), Potassium, Magnesium, Sodium, Iron, Calcium, Copper, Manganese, Phosphorus, Selenium, Zinc, Thiamine, Riboflavin, Niacin, Vitamin B6, Vitamin B12, Folate, Retinol equivalents, Alpha tocopherol and all amino acids, was created for the following section.

1. Nutrient composition data from the AGAL report was transcribed into a Microsoft Excel (Microsoft Corporation, 2003 version 11.5612, USA) spreadsheet and gaps in the data were identified.
2. Australian food composition tables (both hard copy and electronic/PDF) were reviewed for the nutrient composition of Australian chicken meat. These tables were sourced for the years 2006 (Food Standards Australia New Zealand, 2007a), 1995 (National Food Authority, 1995) and 1989 (Cashel *et al.*, 1989) and added to the Excel spreadsheet.
3. Food composition data for chicken from other countries was sourced and added to the Excel spreadsheet. Data for each country was matched for nutrients and cut of chicken
  - o The countries included in this report include USA (USDA: Agricultural Research Services, 2007), Denmark (Technical University of Denmark: Department of Nutrition, 2007), Finland (National Public Health Institute of Finland, 2007), Canada (Health Canada, 1999), South Africa (Medical Research Council of South Africa, 2007) and New Zealand (New Zealand Institute for Crop & Food Research, 2006).
  - o The Brazilian (Brasilfoods, 2007) food composition database was also considered for this report though required translation from Portuguese into English.

### 3.3 Filling the gaps for missing nutrient values

1. Energy values were not available for any of the AGAL data. Resultantly, energy values were calculated for each cut using the formula
$$\text{Energy (kJ)} = [\text{protein (g)} \times 17] + [\text{sugars (g)} \times 16] + [\text{other available carbohydrate (g)} \times 17] + [\text{fat (g)} \times 37] + [\text{dietary fibre (g)} \times 8] + [\text{alcohol (g)} \times 29] + [\text{sorbitol (g)} \times 16] + [\text{citric/malic/quinic acids (g)} \times 10] + [\text{lactic/acetic acids (g)} \times 15]$$
2. The food composition databases for New Zealand, South Africa and Denmark only provided data for energy in kilojoules. This value was converted to kilocalories using the following formula.
$$\text{Energy (kcal)} = \text{Energy (kJ)} / 4.18$$
The above formula was also applied to the AGAL data.
3. Percentage carbohydrate, protein and total fat values were calculated for all datasets using
$$\text{Carbohydrate (\%)} = \text{Carbohydrate (g)} \times 17 / \text{Energy (kJ)} \times 100$$
$$\text{Protein (\%)} = \text{Protein (g)} \times 17 / \text{Energy (kJ)} \times 100$$

$$\text{Total fat (\%)} = \text{Total fat (g)} \times 37 / \text{Energy (kJ)} \times 100$$

4. Gram values for total and all saturated, monounsaturated and polyunsaturated fatty acids were not available for the AGAL data. AGAL fatty acid data was provided as a percentage of total fat content. Fatty acid data for all other countries were provided in either grams or milligrams. These were calculated using the following formula\*

$$\text{Fatty acid (g)} = \text{total fat} \times \text{fatty acid (\%)}$$

Similarly for countries where only gram values were provided for saturated, monounsaturated and polyunsaturated fatty acids, the percentage of total fat was calculated by

$$\text{Fatty acid (\%)} = \text{Fatty acid (g)} / \text{Total fat (g)} \times 100$$

5. Where multiple datasets were available to compare with the AGAL data, ratio plots were created for the macronutrient data to determine the most appropriate countries to source data from. These plots considered the AGAL dataset as the baseline to compare with. Where only a single dataset was available to compare with AGAL data, percentage comparisons were calculated.
6. Amino acid values for the USA were provided in grams. Each value required a conversion factor of 1000 to be applied to make it consistent with the milligram measures used elsewhere.
7. Missing values from the AGAL dataset were assessed one by one. Where any of the data for the above nutrients were not available, and only a single other dataset from another country was available, percentage comparisons were made. These comparisons were then assessed for the appropriateness of 'borrowing' nutrient the data to fill the missing values. In order to be appropriate, values needed to be within 10% of the AGAL data. Where any of the data for the above nutrients was not available, and multiple comparison datasets from other countries were available, mean imputation analysis was conducted to determine the most relevant data to fill the gap.

### 3.4 Comparing chicken meat with other meat sources

1. Nutrient composition data was obtained from the Australian nutrient composition tables (NUTTAB 2006) (Food Standards Australia New Zealand, 2007a) for beef, lamb, pork and fish.
2. Data was obtained for the highest value cuts<sup>†</sup> of beef, lamb, pork and fish from the associations and organisations related to each meat type. The Meat and Livestock Association (beef and lamb), Australian Pork Limited (pork) and ABARE economics (fish) were contacted.
3. Nutrient data for each high value cut were compared to that of raw, lean chicken breast (the highest value cut for the chicken industry) by percent comparison.

### 3.5 Recommendations and publications

Recommendations and suggestions for publications were derived from the analyses undertaken in the body of the report.

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\* Values shown as <0.1% were unable to be calculated accurately and were expressed as <Xg

<sup>†</sup> By cost per kilogram

## 4. Results and discussion

### 4.1 Missing nutrient data

The following values were identified from the AGAL report as missing, not provided, undetectable or not analysed. This table includes nutrients for which other food composition data was available but were not included in the 1998 AGAL analysis.

**Table 1: Missing, not provided, undetectable or not analysed nutrient data for each cut of chicken**

<b>Nutrient</b>	<b>Cut of chicken</b>	<b>Reason</b>
Calcium	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
Copper	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
Fluoride	All cuts	Not included in AGAL analysis
Iron	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
Magnesium	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
Manganese	All cuts	Not included in AGAL analysis
Phosphorus	All cuts	Not included in AGAL analysis
Potassium	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
Selenium	All cuts	Not included in AGAL analysis
Sodium	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
Zinc	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite	Not tested – insufficient sample
Thiamin	Skin, composite, raw	Not detected
	Separable fat, composite, raw	Not detected
	Wing, lean, baked	Not detected
	Drumstick, lean, baked	Not detected
	Skin, composite, baked	Not detected
	Drumstick, lean, casseroled	Not detected
	Skin, composite, casseroled	Not detected
	Separable fat, composite, casseroled	Not tested – insufficient sample
	Separable fat, pooled	Not tested – insufficient sample
Riboflavin	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
	Separable fat, pooled	Not tested – insufficient sample

<b>Nutrient</b>	<b>Cut of chicken</b>	<b>Reason</b>
		Not tested – insufficient sample
Niacin	Separable fat, composite, baked Separable fat, composite, casseroled Separable fat, pooled	Not tested – insufficient sample Not tested – insufficient sample Not tested – insufficient sample
Vitamin B6	All cuts	Not tested – insufficient sample Not included in AGAL analysis
Biotin	All cuts	Not included in AGAL analysis
Folate	Breast, lean, raw Wing, lean, raw Drumstick, lean raw Thigh, lean, baked Thigh, lean, casseroled Skin, composite, raw Separable fat, composite, raw Breast, lean baked, Wing, lean, baked Drumstick, lean, baked, Skin composite, baked Breast, lean, casseroled Wing, lean, casseroled Drumstick, lean, casseroled Skin, composite, casseroled Separable fat, composite, baked Separable fat, composite, casseroled Breast, stir fried, skin removed Separable fat, pooled	Not detected Not detected Not detected Not detected Not detected Not detected Not detected Not detected Not detected Not detected Trace detected, value not given Trace detected, value not given Trace detected, value not given Not detected Not detected Not tested – insufficient sample Not tested – insufficient sample Not tested – insufficient sample
Pantothenic acid	All cuts	Not included in AGAL analysis
Retinol equivalents	All cuts	Not included in AGAL analysis
Alpha tocopherol	Separable fat, composite, baked Separable fat, composite, casseroled	Not tested – insufficient sample Not tested – insufficient sample
Total and saturated fatty acids 4:0-24:0	Separable fat, composite, baked Separable fat, composite, casseroled	Not included in AGAL analysis Not included in AGAL analysis
Total and monounsaturated fatty acids 14:1-24:1	Separable fat, composite, baked Separable fat, composite, casseroled	Not included in AGAL analysis Not included in AGAL analysis
Total and polyunsaturated fatty acids 18:2-22:6	Separable fat, composite, baked Separable fat, composite, casseroled	Not included in AGAL analysis Not included in AGAL analysis
Total long chain omega-3 fatty acids	All cuts	Not included in AGAL analysis
Cholesterol	Breast, lean, Casseroled Separable fat, composite, casseroled	Not tested – insufficient sample Not tested – insufficient sample
All amino acids	All cuts	Not included in AGAL analysis
Pyridoxine	Separable fat, composite, baked Separable fat, composite, casseroled	Not tested – insufficient sample Not tested – insufficient

<b>Nutrient</b>	<b>Cut of chicken</b>	<b>Reason</b>
	Separable fat, pooled	sample Not tested – insufficient sample
Chloride	Separable fat, composite, baked	Not tested – insufficient sample
	Separable fat, composite, casseroled	Not tested – insufficient sample
	Separable fat, pooled	sample Not tested – insufficient sample

## 4.2 Australian chicken meat data

Due to the changes in the Australian importation regulations, only the data for NUTTAB 1995 (National Food Authority, 1995) and NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) were compared for this report. Data prior to this time would not have included the same genotypes of chicken as used today.

Nutrient data for the following cuts of chicken were available in the electronic (PDF) version of the NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) database using calculations as indicated by the ‘C’ in the identification code shown below.

- 08C10203 Chicken Breast, Flesh, Skin And Fat, Baked
- 08C10202 Chicken Breast, Raw, Flesh, Skin And Fat
- 08C10211 Chicken Drumstick, Baked, Flesh, Skin And Fat
- 08C10212 Chicken Drumstick, Flesh, Skin And Fat, Casseroled
- 08C10210 Chicken Drumstick, Flesh, Skin And Fat, Raw
- 08C10205 Chicken Thigh, Baked, Flesh, Skin And Fat
- 08C10206 Chicken Thigh, Flesh, Skin And Fat, Casseroled
- 08C10204 Chicken Thigh, Flesh, Skin And Fat, Raw
- 08C10208 Chicken Wing, Flesh, Skin And Fat, Baked
- 08C10209 Chicken Wing, Flesh, Skin And Fat, Casseroled
- 08C10207 Chicken Wing, Flesh, Skin And Fat, Raw
- 08C10216 Chicken, Barbeque, With Skin
- 08C10166 Chicken, Breast, Lean, Baked
- 08C10177 Chicken, Breast, Lean, Casseroled
- 08C10199 Chicken, Breast, Lean, Skin And Fat, Casseroled
- 08C10165 Chicken, Breast, Raw, Lean
- 08C10183 Chicken, Breast, Stir fried, Lean
- 08C10172 Chicken, Drumstick, Lean, Baked
- 08C10180 Chicken, Drumstick, Lean, Casseroled
- 08C10171 Chicken, Drumstick, Lean, Raw
- 08C10176 Chicken, Fat, Baked
- 08C10182 Chicken, Separable Fat, Composite, Casseroled
- 08C10175 Chicken, Separable Fat, Composite, Raw
- 08C10184 Chicken, Separable Fat, Raw
- 08C10174 Chicken, Skin, Composite, Baked
- 08C10181 Chicken, Skin, Composite, Casseroled
- 08C10173 Chicken, Skin, Composite, Raw
- 08C10215 Chicken, Thigh Fillets (Flesh And Some Fat), Raw
- 08C10170 Chicken, Thigh, Lean, Baked
- 08C10179 Chicken, Thigh, Lean, Casseroled
- 08C10169 Chicken, Thigh, Lean, Raw
- 08C10168 Chicken, Wing, Lean, Baked
- 08C10178 Chicken, Wing, Lean, Casseroled
- 08C10167 Chicken, Wing, Lean, Raw

The 1995 data for Australian food composition was limited to:

- Chicken, Breast, Raw, Lean
- Chicken, Breast, Lean, Baked
- Chicken, Drumstick, Lean, Raw
- Chicken, Drumstick, Lean, Baked
- Chicken, Skin, Composite, Raw
- Chicken, Skin, Composite, Baked

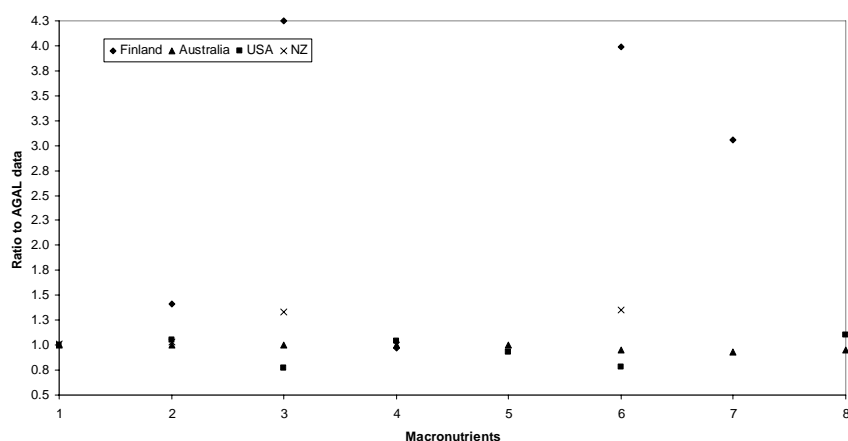
This indicates that analysed nutrient data has not been available for chicken in the Australian food composition tables since the late 1980s. For this reason only the nutrient data from the NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) database was used comparatively for this project.

### 4.3 Comparisons of Australian and overseas nutrient data

The Canadian database (Health Canada, 1999) does not contain any data for raw chicken meat and only provides macronutrient data. Similarly the Brazilian food composition database (Brasilfoods, 2007) only contained macronutrient values. The Canadian and Brazilian food databases were therefore excluded from the statistical analysis as there were no missing macronutrient values in the AGAL dataset. Many of the cuts analysed by AGAL were not available for multiple overseas databases.

#### 4.3.1 Chicken breast meat

Figure 1 indicates that for the purpose of imputation, the databases of Australia, USA and New Zealand are appropriate. The Finish data appears to be largely different in its total fat composition which may have an impact in imputed vitamin and fatty acid level.



MACRONUTRIENT KEY: 1. Moisture 2. Energy 3. Total fat 4. Protein

5. Ash 6. Saturated fatty acids 7. Monounsaturated fatty acids 8. Polyunsaturated fatty acids

**Figure 1: Comparisons of chicken breast, lean raw macronutrient data, showing ratio to AGAL data**

The percentage comparisons for the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) data for the lean breast, baked, casseroled and stir fried were all within 10% of the AGAL dataset. These comparisons are shown in Appendix A1 for all macronutrients and cooking methods for chicken breast. Values where the percentage comparison figure was greater than 10% were considered to be acceptable for imputation analysis. However, when considering the fatty acid breakdown, large differences were identified for all saturated, polyunsaturated and monounsaturated fatty acid totals. All cuts except the polyunsaturated fat content of breast, lean, for all cooking methods and the monounsaturated fat content of breast, lean stir-fried were considered useful for ‘borrowing’ nutrient data (Table 2).

**Table 2: Percentage comparisons for fatty acid between the AGAL and Australian (NUTTAB 2006) data for chicken breast meat**

Country	AGAL	Australia	% difference	AGAL	Australia	% difference	AGAL	Australia	% difference
Cut	Breast	Breast		Breast	Breast		Breast	Breast	
<b>Cooking method</b>	Baked	Baked		Casserole	Casserole		Stir-fried	Stir-fried	
<b>Description</b>	Breast, lean, baked	Breast, lean, baked		Breast, lean, casserole	Breast, lean, casserole		Breast, skin removed, stir fried	Breast, stir-fried, lean	
<b>Total SFA</b> g	1.326	1.1973	9.7	1.2691	1.200	5.4	0.2979	0.3	-0.7
<b>Total MUFA</b> g	1.9656	1.9	3.3	1.887	1.800	4.61	0.45	0.4	11.1
<b>Total PUFA</b> g	0.6006	0.0234	96.1	0.020	0.500	-2400.00	0.1539	0.1	35.0

A total of 167 gaps needed to be filled for lean, breast meat (Table 3). These gaps were primarily filled using ‘borrowed’ nutrient data from the Australian NUTTAB 2006 database although mean imputation analysis was also available for the raw dataset. Appendix C1 shows the type of imputation or recommendation for reanalysis for each of the gaps identified.

**Table 3: Breakdown of the number of gaps to be filled for lean, breast meat**

	Raw	Casserole	Baked	Stir-fried
Re-analysis suggested	3	13	16	11
Mean imputation	32	0	0	0
Borrowed data	7	29	26	30
<b>Total</b>	<b>42</b>	<b>42</b>	<b>42</b>	<b>41</b>



### 4.3.2 Chicken fat (separable and pooled)

Due to the limited data in the AGAL dataset for pooled, separable fat, further analyses were conducted with the assumption that the linear relationship between saturated, polyunsaturated and monounsaturated fatty acids can be used to calculate the value for total fat. This however did not allow the analysis to produce appropriate caloric values to compare the data. Data for separable fat from the AGAL dataset was similar in its macronutrient composition to the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) values (Table 4). No fatty acid comparisons were available for any of the cooking methods as shown in Appendix A2. For this reason imputation or borrowing of the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) and/or overseas data was not conducted as it is not known whether the values are within 10% of the AGAL data.

**Table 4: Percentage comparisons for water, energy and total fat between the AGAL and Australian (NUTTAB 2006) data for separable chicken fat**

Country	AGAL	Australia	%	AGAL	Australia	%	AGAL	Australia	
Cut	Fat	Fat	difference	Fat	Fat	difference	Fat	Fat	
<b>Cooking method</b>	Baked	Baked		Casserole	Casserole		Raw	Raw	
<b>Description</b>	Separable fat, composite, baked	Chicken, fat, baked		Separable fat, composite, casserole	Chicken, separable fat, composite, casserole		Separable fat, composite, raw	Chicken, separable fat, composite, raw	
<b>Water</b>	g	41.200	40.400	1.94	42.700	42.700	0.00	31.100	31.100
<b>Energy</b>	kJ	1890.163	1916.000	-1.37	1861.788	1862.000	-0.01	2391.375	2392.000
<b>Total fat</b>	g	46.600	47.200	-1.29	43.800	43.800	0.00	62.300	62.300

The majority of imputed values for separable chicken fat require reanalysis (Appendix C2). This is due to:

- The limited comparative values available for mean imputation analysis,
- The small sample size used in the AGAL analysis (limiting the range of nutrient analyses to be conducted), and
- The limited description of the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) database meaning that assumptions needed to be made in order to compare the values.

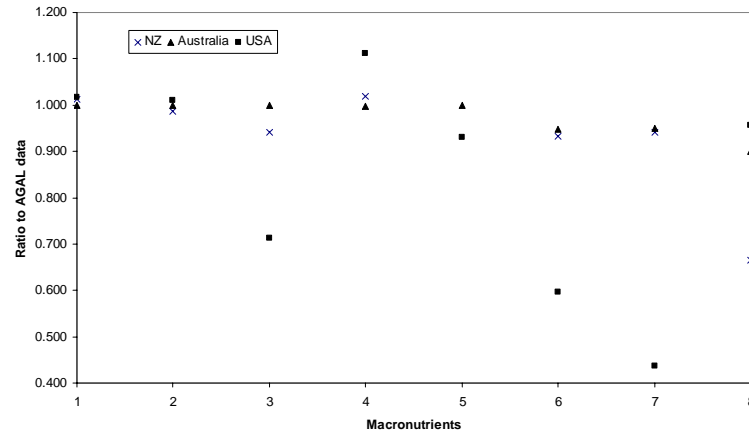
**Table 5: Breakdown of the number of gaps to be filled for chicken fat**

	Raw	Casserole	Baked
Re-analysis suggested	31	86	72
Mean imputation	0	0	0
Borrowed data	13	4	16
<b>Total</b>	<b>44</b>	<b>90</b>	<b>88</b>

‘Chicken fat’ had the largest number of gaps to be filled (Table 5) most of which were for the casserole and baked fat (Appendix C2). This was noted as a limitation of the AGAL analysis due to the small sample available for analysis.

### 4.3.3 Chicken leg meat

Figure 2 shows good agreement between the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) and New Zealand data (New Zealand Institute for Crop & Food Research, 2006) and the AGAL data, while the USA data (USDA: Agricultural Research Services, 2007) varies widely from the AGAL data. This is particularly noticeable for the total fat (3) and the saturated (6) and monounsaturated fatty acids (7). For this cut (lean, raw drumstick meat), the USA data (USDA: Agricultural Research Services, 2007) was therefore not considered to be appropriate as this variability would also see variability in the fat soluble vitamin levels which would skew the mean imputed value.



MACRONUTRIENT KEY: 1. Moisture 2. Energy 3. Total fat 4. Protein  
5. Ash 6. Saturated fatty acids 7. Monounsaturated fatty acids 8. Polyunsaturated fatty acids

**Figure 2: Comparisons of chicken drumstick, lean raw macronutrient data, showing ratio to AGAL data**

Table 6 suggests that comparisons between the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) data and the AGAL data were within the range considered suitable for ‘borrowed’ data. Only the polyunsaturated fatty acid data for casseroled chicken leg meat with outside of this acceptable range and was therefore not included in the imputation analyses.

**Table 6: Percentage comparisons for fatty acid between the AGAL and Australian (NUTTAB 2006) data for chicken leg meat**

Country	AGAL	Australia	%	AGAL	Australia	%
Cut	Leg	Leg	difference	Leg	Leg	difference
<b>Cooking method</b>	Baked	Baked		Casseroled	Casseroled	
<b>Description</b>	Drumstick, lean, baked	Chicken, drumstick, lean, baked		Drumstick, lean, casseroled	Chicken, drumstick, lean, casseroled	
<b>Total SFA</b> g	2.4624	2.300	6.60	2.277	2.200	3.38
<b>Total MUFA</b> g	3.9672	3.800	4.21	3.2934	3.100	5.87
<b>Total PUFA</b> g	1.1476	1.100	4.15	1.0032	0.900	10.29

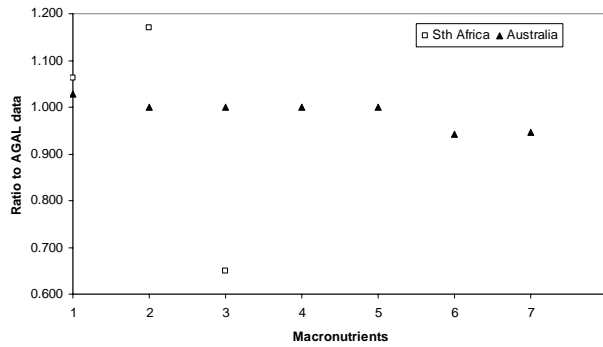
A similar number of missing values were found for lean, leg meat. The majority of these could be filled using borrowed data from the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) dataset though some imputation analysis was possible for the raw data (Appendix C3).

**Table 7: Breakdown of the number of gaps to be filled for lean, leg meat**

	Raw	Casseroled	Baked
Re-analysis suggested	12	14	14
Mean imputation	6	0	0
Borrowed data	24	29	29
<b>Total</b>	<b>42</b>	<b>43</b>	<b>43</b>

#### 4.3.4 Chicken skin

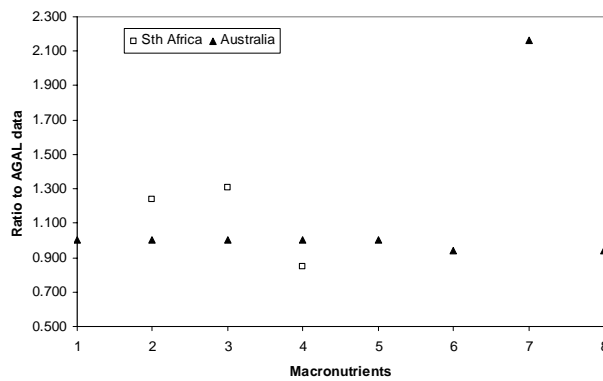
Comparisons of the AGAL nutrient data with the nutrient data from NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) revealed strong similarities between the data. All values except monounsaturated fatty acids for skin, composite raw are within 10% of the AGAL dataset. The South African database (Medical Research Council of South Africa, 2007) was not comparable (Fig. 3 and Fig. 4) and therefore was not considered for imputation analysis.



MACRONUTRIENT KEY: 1. Moisture 2. Energy 3. Total fat 4. Protein

4. Ash 6. Saturated fatty acids 7. Monounsaturated fatty acids 8. Polyunsaturated fatty acids

**Figure 3: Comparisons of chicken skin composite, baked macronutrient data, showing ratio to AGAL data**



MACRONUTRIENT KEY: 1. Moisture 2. Energy 3. Total fat 4. Protein

5. Ash 6. Saturated fatty acids 7. Monounsaturated fatty acids 8. Polyunsaturated fatty acids

**Figure 4: Comparisons of chicken skin composite, raw macronutrient data, showing ratio to AGAL data**

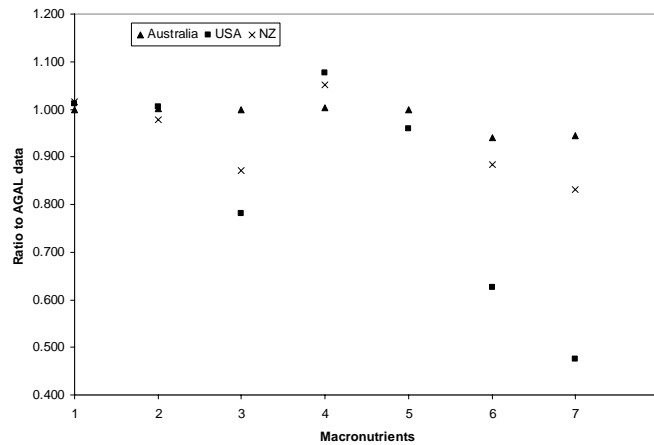
Equal numbers of gaps needed to be filled for the chicken skin dataset (Table 8). This may be due to chicken skin being omitted from the AGAL fatty acid analysis. Many overseas databases also do not contain data for chicken skin on its own and therefore the majority of the gaps were filled using borrowed data (Appendix C4).

**Table 8: Breakdown of the number of gaps to be filled for chicken skin**

	Raw	Casserole	Baked
Re-analysis suggested	32	32	32
Mean imputation	0	0	0
Borrowed data	12	12	12
<b>Total</b>	<b>44</b>	<b>44</b>	<b>44</b>

### 4.3.5 Chicken thigh meat

Figure 5 indicates a large degree of variability between the data for AGAL and those of New Zealand (New Zealand Institute for Crop & Food Research, 2006) and USA (USDA: Agricultural Research Services, 2007). Although the protein values for each of these countries are in agreement with the AGAL data, the total fat and the values for saturated, monounsaturated and polyunsaturated fatty acids are not in agreement. As there are no missing macronutrient data for the AGAL dataset, the USA (USDA: Agricultural Research Services, 2007) and New Zealand (New Zealand Institute for Crop & Food Research, 2006) data were excluded from imputation analysis due to the wide variability in fat soluble vitamins that would result from imputing such differences.



MACRONUTRIENT KEY: 1. Moisture 2. Energy 3. Total fat 4. Protein  
5. Ash 6. Saturated fatty acids 7. Monounsaturated fatty acids 8. Polyunsaturated fatty acids

**Figure 5: Comparisons of chicken thigh, lean, raw macronutrient data, showing ratio to AGAL data**

The data for baked and casseroled data for lean thigh meat are within 10% of the AGAL data and therefore considered suitable for ‘borrowing’ into the AGAL database (Table 9).

**Table 9: Percentage comparisons for fatty acid between the AGAL and Australian (NUTTAB 2006) data for chicken thigh meat**

Country	AGAL	Australia	%	AGAL	Australia	%
Cut	Thigh	Thigh	difference	Thigh	Thigh	difference
<b>Cooking method</b>	Baked	Baked		Casseroled	Casseroled	
<b>Description</b>	Thigh, lean, baked	Chicken, thigh, lean, baked		Thigh, lean, casseroled	Chicken, thigh, lean, casseroled	
<b>Total SFA</b> g	2.854	2.700	5.383	3.224	3.000	6.954
<b>Total MUFA</b> g	4.550	4.300	5.497	5.135	4.900	4.580
<b>Total PUFA</b> g	1.279	1.200	6.169	1.421	1.400	1.478

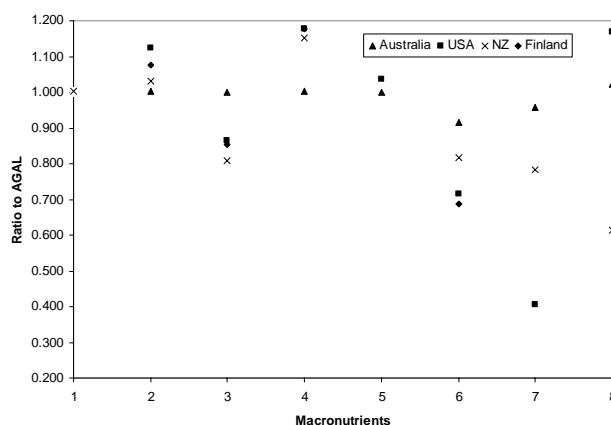
The number of gaps for lean, thigh meat was similar to lean, leg meat (Table 10). Similarly the filling of the gaps also underwent a similar process with the majority of gaps being filled using borrowed data from the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) dataset (Appendix C5).

**Table 10: Breakdown of the number of gaps to be filled for lean, thigh meat**

	Raw	Casseroled	Baked
Re-analysis suggested	16	16	16
Mean imputation	0	0	0
Borrowed data	28	29	29
<b>Total</b>	<b>44</b>	<b>45</b>	<b>45</b>

#### 4.3.6 Chicken wing meat

Figure 6 suggests variability of the nutrient values for chicken wing, lean meat, raw. The ratios for all values for New Zealand (New Zealand Institute for Crop & Food Research, 2006) and Finland where greater than 10% of the AGAL data. All nutrients for the USA (USDA: Agricultural Research Services, 2007) data except Ash were also greater than 10% of the AGAL data. For this reason all three datasets were excluded from imputation analysis.



MACRONUTRIENT KEY: 1. Moisture 2. Energy 3. Total fat 4. Protein  
5. Ash 6. Saturated fatty acids 7. Monounsaturated fatty acids 8. Polyunsaturated fatty acids

**Figure 6: Comparisons of chicken wing, lean, raw macronutrient data, showing ratio to AGAL data**

Unlike the overseas data, all values for the Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) database are in agreement with the AGAL dataset and therefore are considered useful for ‘borrowing’ data (Table 11).

**Table 11: Percentage comparisons for fatty acid between the AGAL and Australian (NUTTAB 2006) data for chicken wing meat**

Country	AGAL	Australia	% difference	AGAL	Australia	% difference	
				Wing	Wing		
Cut	Wing	Wing		Casserole	Casserole		
<b>Cooking method</b>	Baked	Baked					
<b>Total SFA</b>	g	2.479	2.400	3.202	2.904	2.700	7.025
<b>Total MUFA</b>	g	4.089	3.900	4.615	4.682	4.400	6.015
<b>Total PUFA</b>	g	1.124	1.100	2.153	1.206	1.100	8.759

Chicken wing meat appeared to require the greatest number of gaps to be filled (Table 12) when compared with other cuts of meat. There were not comparable overseas dataset available for chicken wings as all included the skin with the wing cut. The proportion of borrowed values to those requiring reanalysis, however, was similar to all other cuts (Appendix C6).

**Table 12: Breakdown of the number of gaps to be filled for lean, wing meat**

	Raw	Casserole	Baked
Re-analysis suggested	11	14	14
Mean imputation	0	0	0
Borrowed data	33	29	32
<b>Total</b>	<b>44</b>	<b>43</b>	<b>46</b>

#### 4.4 Comparing chicken meat with other meat sources

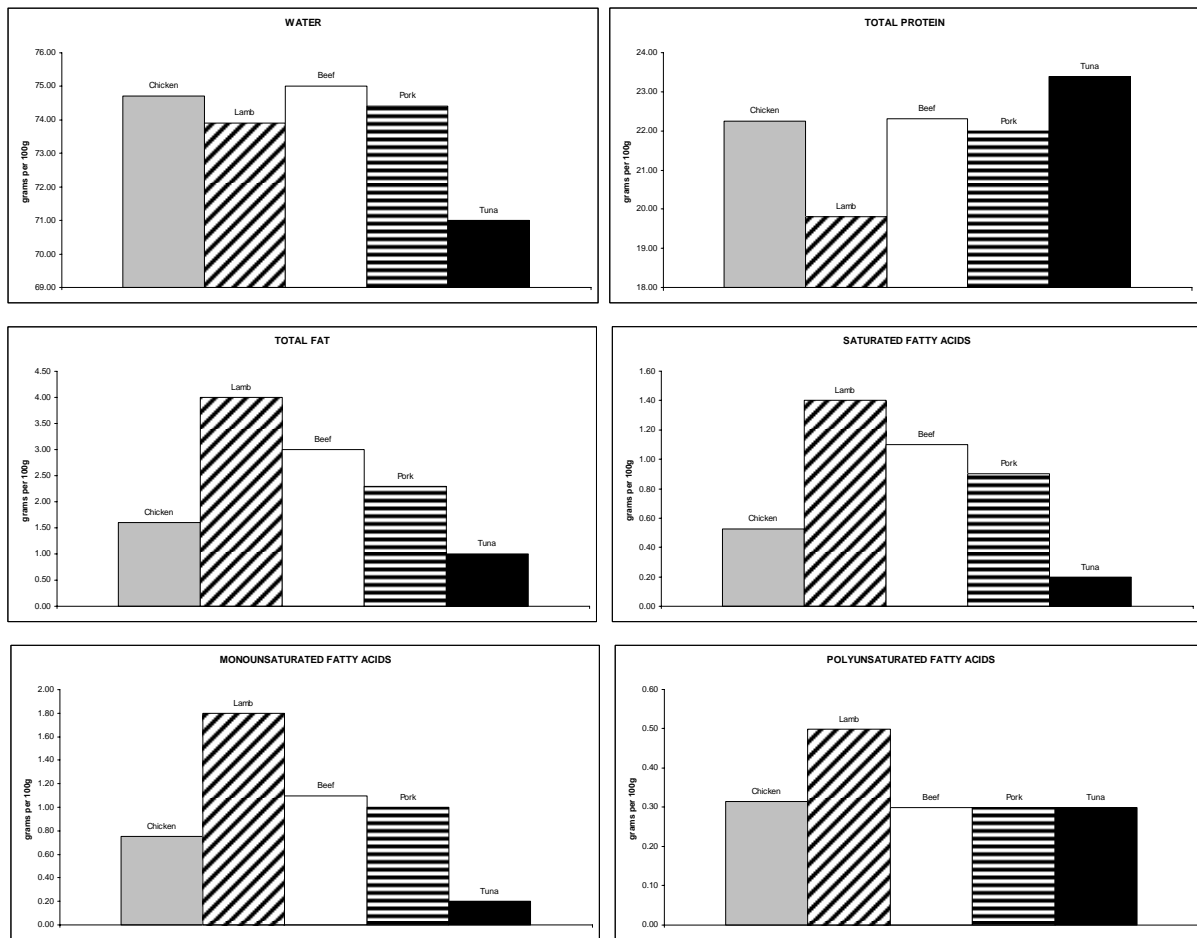
The highest value cuts for chicken, lamb, beef, pork and fish were compared. The Meat and Livestock Association (MLA) reported their highest value cuts to be lamb and beef fillet and tenderloin. Australian Pork Limited reported their highest value cut to be the pork fillet and data for fish was sourced from ABARE economics. The highest value fish was found to be tuna. Each of these was compared with the highest value cut for chicken – chicken breast. The table below shows the percentage differences between each of the cuts and chicken with the greatest differences shaded.

**Table 13: Comparison of available nutrient values for the highest value cuts for chicken, lamb, beef, pork and fish highlighting nutrient for which chicken meat has a greater percentage**

Meat Cut	Chicken		Lamb	Beef		Pork		Tuna		
	Breast	Tenderloin	%difference	Eye fillet	% difference	Fillet	%difference	N/A	%difference	
Cooking method	Raw	Raw		Raw		Raw		Raw		
water	g	74.70	73.90	1.07	75.00	-0.40	74.40	0.40	71.00	4.95
energy	kJ	437.45	485.00	-10.87	490.00	-12.01	458.00	-4.70	435.00	0.56
energy	kcal	104.65	116.03	-10.87	117.22	-12.01	109.57	-4.70	104.07	0.56
total fat	g	1.60	4.00	-150.00	3.00	-87.50	2.30	-43.75	1.00	37.50
total protein	g	22.25	19.80	11.01	22.30	-0.22	22.00	1.12	23.40	-5.17
total SFA	g	0.52	1.40	-166.77	1.10	-109.60	0.90	-71.49	0.20	61.89
C14:0	mg	0.02	0.08	-316.67	0.09	-368.75	0.03	-56.25	0.01	47.92
C15:0	mg	0.00	0.01	-212.50	0.01	-212.50				
C16:0	mg	0.36	0.72	-101.79	0.64	-79.37	0.54	-51.35	0.16	55.16
C17:0	mg	0.01	0.05	-681.25	0.02	-212.50	0.01	-56.25		
C18:0	mg	0.13	0.53	-303.96	0.32	-143.90	0.27	-105.79	0.05	61.89
total MUFA	g	0.75	1.80	-139.36	1.10	-46.28	1.00	-32.98	0.20	73.40
C16:1	mg	0.04	0.06	-44.23	0.09	-116.35	0.06	-44.23	0.03	27.88
C18:1	mg	0.65	1.74	-167.20	1.03	-58.17	0.88	-35.14	0.11	83.11
C20:1	mg	0.01					0.02	-212.50	0.01	-56.25
total PUFA	g	0.32	0.50	-58.63	0.30	4.82	0.30	4.82	0.30	4.82
C18:2 n-6	g	0.22	0.24	-7.14	0.15	33.04	0.24	-7.14		
C18:3 n-3	g	0.01	0.04	-177.78	0.03	-108.33	0.02	-38.89		
C18:3 n-6	mg	<0.002	14.00	>-0.14			3.00	>0.66		
C20:2 n-6	mg	0.00	12.00	-2.49x10 <sup>5</sup>			6.00	-1.25x10 <sup>5</sup>		
C20:3 n-6	mg	0.01	8.00	-9.99x10 <sup>4</sup>	14.00	-1.75x10 <sup>5</sup>	3.00	-3.74x10 <sup>4</sup>		
C20:4 n-6	mg	0.03	100.00	-3.12-x10 <sup>5</sup>	47.00	-1.47x10 <sup>5</sup>	21.00	-6.55x10 <sup>4</sup>		
C20:5 n-3	mg	0.00	19.00	-3.96x10 <sup>5</sup>	19.00	-3.96x10 <sup>5</sup>			39.00	-8.12x10 <sup>5</sup>
C22:4 n-6	mg	0.01	8.00	-9.99x10 <sup>4</sup>			2.00	-2.49x10 <sup>4</sup>		
C22:5 n-3	mg	0.01	37.00	-3.85x10 <sup>5</sup>	55.00	-5.73x10 <sup>5</sup>	6.00	-6.24x10 <sup>4</sup>	14.00	-1.46x10 <sup>5</sup>
C22:6 n-3	mg	0.01	10.00	-1.04x10 <sup>5</sup>	8.00	-8.32x10 <sup>4</sup>	6.00	-6.24x10 <sup>4</sup>	190.00	-1.98x10 <sup>6</sup>
cholesterol	mg	59.00	70.00	-18.64	58.00	1.69	95.00	-61.02	45.00	23.73
sodium	mg	41.00	69.00	-68.29	57.00	-39.02	54.00	-31.71	37.00	9.76
potassium	mg	300.00	330.00	-10.00	380.00	-26.67	405.00	-35.00	444.00	-48.00
magnesium	mg	28.00	24.00	14.29	27.00	3.57	26.00	7.14	50.00	-78.57
calcium	mg	12.00	8.00	33.33	6.00	50.00	4.00	66.67	16.00	-33.33
phosphorus	mg	231.00	240.00	-3.90	230.00	0.43	237.00	-2.60	191.00	17.32
iron	mg	0.40	2.10	-425.00	2.20	-450.00	1.10	-175.00	0.70	-75.00
zinc	mg	0.70	2.90	-314.29	3.80	-442.86	1.70	-142.86	0.50	28.57
selenium	µg	21.40	10.00	53.27	12.00	43.93	15.00	29.91	37.00	-72.90
copper	mg	0.03	0.13	-306.25	0.15	-368.75	0.09	-181.25	0.06	-87.50
manganese	mg	1.64	0.02	98.78					0.02	99.09
vitamin A, retinol activity equiv	µg	7.00	9.00	-28.57	2.00	71.43	1.00	85.71	18.00	-157.14
vitamin A	IU	15.50	9.00	41.94	2.00	87.10				
vitamin E, alpha-tocopherol	mg	2.20	0.50	77.27	0.90	59.09	0.30	86.36	0.50	77.27
vitamin C (ascorbic acid)	mg	0.80			1.00	-25.00			1.00	-25.00
niacin equiv	mg	11.00	9.40	14.55	11.60	-5.45	10.20	7.27	14.30	-30.00
riboflavin	mg	0.19	0.27	-42.11	0.22	-15.79	0.19	0.00	0.05	73.68
thiamin (vitamin B1)	mg	0.11	0.09	18.18	0.05	54.55	0.82	-645.45	0.43	-290.91
vitamin B-12 (cobalamin)	µg	0.38	1.30	-242.11	1.90	-400.00	0.30	21.05	0.50	-31.58

Abbreviations: SFA- Saturated fatty acids, MUFA- Monounsaturated fatty acids, PUFA- Polyunsaturated fatty acids

Chicken meat, when compared with other meat sources appears to be the one of highest protein source of the 'traditional' meats though the equal second when compared with fish (Fig. 7B). Similarly the polyunsaturated fatty acid levels in chicken meat are also higher than all other high value cuts of meat (Fig.7F) however the proportion of each of the fatty acids to the total fat profile should be considered as Table 14 shows tuna clearly having a higher proportion of polyunsaturated fatty acids. Overall, however, chicken meat appears to have the largest amount of monounsaturated fatty acids than all other meats used as a comparison in this report (Table 14). These nutrient levels may relate to the ability of chickens to utilise the nutrients from their feeds more effectively than other animals (Bourre, 2005).

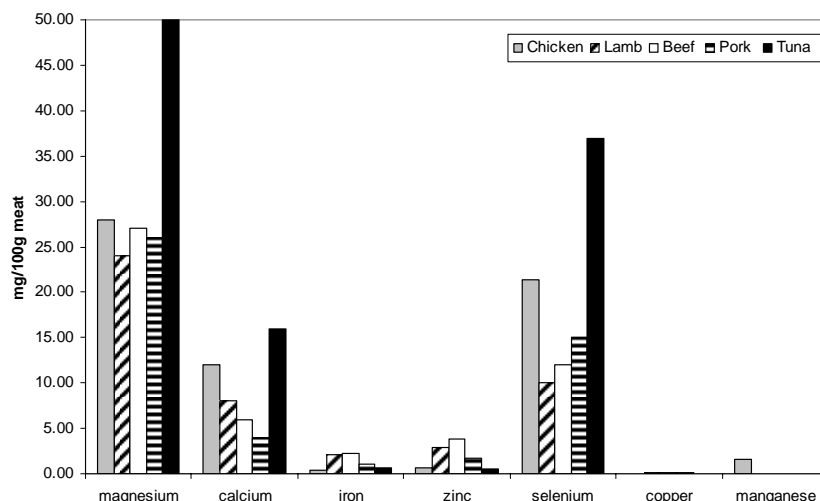


**Figure 7: Comparison of macronutrient content of different types of meat (high value cuts).**

**Table 14: Comparison of fatty acid proportions for different types of meat (high value cuts)**

	Chicken	Lamb	Beef	Pork	Tuna
saturated fatty acids	32.80	35.00	36.67	39.13	20.00
polyunsaturated fatty acids	19.70	12.50	10.00	13.04	30.00
monounsaturated fatty acids	47.00	45.00	36.67	43.48	20.00

Chicken meat appears to be higher in a number of micronutrient values than other raw meats, except fish. The levels of Magnesium, Calcium, Selenium, Manganese (Fig. 8) and Phosphorus are all greater than those found in the highest value cuts of beef, lamb and pork. Values for Iron and Zinc are not as strong. By comparison chicken meat also appears to contain greater amounts of retinol equivalents than beef and pork, more alpha-tocopherol than all traditional meat sources (excluding fish), more niacin equivalents than lamb and pork, more thiamin than lamb and beef and more vitamin B12 than pork. These outcomes should be considered with caution as the data are from different sources and the animals quite possibly of varying ages, genders, feeds and living conditions, and differences do not necessarily reflect significance in terms of recommended dietary intakes.



**Figure 8: Comparison of selected micronutrient values for different types of meat (high value cuts)**

#### 4.5 Post project findings

Upon contacting FSANZ to determine the most recent procedure for submitting an application to NUTTAB, a number of interesting and significant findings were discovered.

- The electronic (PDF) version and online version of NUTTAB 2006 are not identical but rather the PDF contains only 1750 food items as compared with 2600 food items in the online version. Background data that should accompany the analytical data and guidelines of the sampling strategies are provided in Appendix F.
  - Review of the sampling information confirmed that the information provided to the research team by RIRDC was consistent with the information currently in NUTTAB 2006. It was also noted that much of this information was quite dated as shown below.
- The sampling information also indicated that where this current project used borrowed data from the NUTTAB 2006 database, the source of the data was actually from the following
  - Amino acids: Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. *Food Technology in Australia* 40:320-323.
  - Selenium and Zinc: Food Standards Australia New Zealand. (2003) The 20th Australian Total Diet Survey, Canberra, Food Standards Australian New Zealand.
  - Iodine: Food Standards Australia New Zealand. (2005) The 22nd Australian Total Diet Survey, Canberra, Food Standards Australian New Zealand and FSANZ, Iodine Project, 2006
  - Folate: Arcot, J. & Shrestha, A. 2005, Folate: methods of analysis, *Trends in Food Science & Technology*, vol. 16, pp. 253-266
  - Moisture: FSANZ, Iodine Project, 2006
  - Vitamin C: Imputed (though the source of the imputation is not specified in NUTTAB 2006 online)
- Due to the variability of the above data sources the recommendation for reanalysis of Australian Chicken meat data is still important, especially for data which considers an analysis of the amino acid profile.
- The availability of the sampling information also indicates that the majority of cuts of chicken from this project are noted as ‘Analysed’ although when the coding system used by FZANZ is considered a ‘C’ for Calculated remains in the identification code.
- Data for Australian Lamb meat provided below as an example shows these inconsistencies span further than the chicken meat category. The example shows an identification code containing ‘A’ for analysed data and sampling details which clearly state “nutrients have been calculated



by...”. Such inconsistencies need to be addressed by FSANZ in order for the databases to be of the same quality as many of the overseas databases.

#### **Lamb, Drumstick, Raw, Lean**

<b>Food ID:</b>	08A20215
<b>Description:</b>	Raw meat with external separable fat removed.
<b>Group:</b>	Meat and Meat Products: Lamb
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Nutrients have been calculated by combining values in the separable lean (0.92 x 08a20214) and internal separable fat (0.08 x 08a20297) records in the proportions found in this particular lamb sample (08a20215). Iodine was calculated from the 22nd ATDS, 2004 value (Lamb, loin chops, grilled, separable lean).
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.
<b>Edible Portion:</b>	
<b>Inedible Portion:</b>	
<b>Fat Factor:</b>	0
<b>Nitrogen Factor:</b>	6.25

*Source: Food standards Australia and New Zealand, NUTTAB online.*

## 5. Conclusion

Nutrient composition studies are strongly affected by the animal itself. The sex, age, health status, time of sampling, feeding regime and genotype of the chicken will influence the composition of the meat. A number of studies for example, have shown that feeding different oils such as corn oil, linseed oil or fish oil can have an impact on the ALA and DHA fatty acid composition (Bourre, 2005). Poultry, in particular, are able to maintain their intestinal physiology resulting in a good preservation of the dietary polyunsaturated fatty acids which is not the case for other meats. These fatty acids have been shown to be easily absorbed into the tissue of the birds, making chicken meat a target for modified omega-3 meats for example. This uptake of fatty acids, however, appears to be influenced by the ability of the individual genotypes to increase their adipose tissue (Bourre, 2005). These effects may be a reason for the results found in this report. When comparing the fatty acid composition of lean, breast meat with Australian data, large differences were identified. These differences may be the result of different feeds prior to conducting the nutrient analysis. The AGAL data was found to be higher in all polyunsaturated fatty acid levels, suggesting that the feed may be impacting on the composition of the meat.

When comparing the AGAL data to that of other countries, a number of limitations in the overseas datasets were identified. The data provided within Australia included a larger number of cuts in general and also includes a range of cooking methods for each cut. Overseas datasets tend not to provide a range of cuts, nor do they provide a range of cooking methods. Furthermore, Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) data is primarily available for lean skin free chicken meat, whilst many overseas datasets provide data for chicken meat with skin. This limitation meant that imputation was not recommended for a number of cuts as only one comparable dataset was found. Similarly when comparing nutrient data from around the world one must consider the variability of the measurement techniques used. The nutrient data in food composition tables may not always be in the same measure e.g. mg, grams, and percentage.

Nutrient composition data from the two European countries used in this report, Finland and Denmark, did not refer to as many cuts of chicken, nor did they provide a range of cooking methods. When the data was found to be comparable, a large difference in the fatty acid composition of the chicken meat was observed even when a skin free cut was identified. This may relate to the different housing and butchering techniques used, with the Australian techniques resulting in a leaner cut of chicken for the consumer. The identification and implementation of universal protocols for nutrient databases would be useful for future projects of this nature, though the European INFOODS program appears to be on the way to such standards.

When considering chicken meat in particular, it may be important to differentiate between the fresh and frozen chicken meat (as was found in the South African dataset) and white and dark cuts of chicken meat (found in the South African, New Zealand and USA datasets) in nutrient analysis of chicken (van Heerden *et al.*, 2002). Similarly, removal of the skin will considerably lower the fat content of chicken (Mavromichalis *et al.*, 2000) and also affect the nutrient composition of the meat. Many trace elements are found in higher concentrations in parts of the chicken traditionally considered inedible. Furthermore, dark chicken meat may have higher concentrations of nutrients such as Zinc and Iron, although it also contains higher levels of fat (Mavromichalis *et al.*, 2000). A final consideration for the nutrient composition of chicken is the method of analysis of protein. Commonly calculated from the total nitrogen content using a conversion factor of 6.25, this is also influenced by the genotype, cut of the chicken and absence/presence of skin (Analytical Methods Committee, 2000). These factors should also be considered when developing a food composition database and noted to allow comparative studies such as this to be made.

## 5.1 Assumptions

- As no energy values were provided in the AGAL data, these were calculated from the macronutrient data. This technique assumes that the fat and protein are the key macronutrients as no values were provided for carbohydrate.
- The separable fat, composite, baked data for AGAL was unable to be matched with any other datasets. For the purpose of this report, comparisons have been made between this and the closest available data (comparable by macronutrient values) for Australia i.e. chicken fat, baked. This was due to the electronic (PDF) Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) database not providing details in the description as to whether the fat was actually separable or composite data. These comparative assumptions were required for baked, raw and casseroled fat data.
- Protein was measured rather than calculated from nitrogen for all datasets in this project.
- The South African food composition database refers to roasting while all other databases referred to baking. Upon comparing the fat content of the different cuts of chicken it was assumed that this is a terminological difference rather than a different method of preparation.
- As there is very little carbohydrate found in chicken meat, it was assumed for this report that calculated carbohydrate using the following formula:  
Carbohydrate by difference (g) = 100 – (water + protein + fat + dietary fibre + ash + alcohol + (if quantified or added to the food) organic acids + sugar alcohols + polydextrose (g)  
and available carbohydrate, determined by analysis of:  
Available carbohydrate (g) = fructose (g) + glucose (g) + sucrose (g) + lactose (g) + maltose (g) + galactose (g) + maltotriose (g) + starch (g) + glycogen (g) + oligosaccharides (g) + maltodextrin (g) + dextrins (g),  
are the same.

## 5.2 Limitations

- NUTTAB 2006 was developed with the intent of replacing all previously available food composition data for Australia. The analytical values contained in the database are those for which data analysis was commissioned by FSANZ since the 1980s. Other values are sourced from overseas databases, the food industry, food labels, recipes and calculated values (Food Standards Australia New Zealand, 2006).
- Percentage fat trimmed data was not available for all datasets obtained for this study and therefore country comparisons for the fattiness of the meat were unable to be made.
- Total omega-3 fatty acid and omega-6 fatty acid data was only available for the USA (USDA: Agricultural Research Services, 2007) database and not provided in the AGAL dataset.
- Comparison of chicken meat with other meat sources does not consider the variability of the feed that each of the animals was reared on. Chicken meat has been shown to easily absorb the nutrients contained within the feed and may therefore appear to have a more beneficial nutrient profile in some areas.
- The need to impute the amino acid values may not be compatible with the measured protein levels in the AGAL dataset. Amino acid levels are highly variable and therefore are best measured rather than calculated.
- At the time of this report, the fatty acid data for New Zealand were unable to be obtained. This may have an impact on the mean imputation values.
- At the time of this report, only the highest value cuts were available for comparison. Data for the cut consumed in the greatest amounts and at the highest price would have been useful.
- The Australian NUTTAB 2006 (Food Standards Australia New Zealand, 2007a) database contains mixed measures for fatty acids. Some fatty acids are measured in milligrams while others are measured in grams. The Australian database should be adjusted so it better aligns with the overseas databases, which do not use mixed measures.
- Use of the electronic (PDF) version (Food Standards Australia New Zealand, 2007a) of the Australian NUTTAB 2006 database rather than the online version (Food Standards Australia

New Zealand, 2007b) was a limitation to this project as prior knowledge of the incorporation of the AGAL data into NUTTAB 2006 would have enabled a different approach.

## 6. Recommendations

- Food composition databases from USA, South Africa and New Zealand provide pooled compositional data for light (breast) and dark (thigh and leg) chicken meat. To be consistent across countries, it would be useful to have similar pooled data available for Australian chicken meat
- Food composition databases from USA, South Africa, Finland, Denmark and New Zealand provide compositional data for whole chicken. To be consistent across countries, it may be useful to have similar data available for Australian chicken meat. This would be particularly useful in nutrition based research where participants of a clinical trial for example may not be able to specify exactly which cut of a whole chicken they consumed.
- A re-analysis of chicken meat data for folate and for saturated fatty acids would be required using more sensitive measurement techniques.. A number of the overseas datasets have captured folate values for their chicken meat data and the saturated fatty acid levels appear to have been detected in the Australian dataset (despite using calculations for the 2006 values).
- A reanalysis of pooled, separable fat with a larger sample is recommended to allow for a boarder range of nutrients to be analysed.
- The majority of imputed values in this report are from the Australian NUTTAB 2006 database (Food Standards Australia New Zealand, 2007a). This database primarily contains calculated nutrient values despite a number of the macronutrient values appearing very similar to those of the AGAL dataset. Re analysis of missing values will provide the most credible data for the fatty acid analysis and fat soluble vitamins as well.
- Data form this report should be published to make the information more widely available to the general research community.
- Future analyses should adhere to accepted protocols. Suggested protocols can be found in Appendix E.
- The availability of the sampling information also identifies a further need for Australia to streamline the food composition database. Only one dataset should be available in either online or hardcopy format. Multiple (and varied) datasets are not beneficial to those utilising the information. These inconsistencies are also found elsewhere.

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## 8. Appendices

Appendix A: Comparisons between AGAL and Australian data for all macronutrients and cooking methods

- A1- Chicken breast
- A2- Chicken fat (separable and pooled)
- A3- Chicken leg
- A4- Chicken skin
- A5- Chicken thigh
- A6- Chicken wing

Appendix B: All nutrient data available for chicken meat for AGAL and other countries with gaps shaded in grey.

- B1- Chicken breast
- B2- Chicken fat (separable and pooled)
- B3- Chicken leg
- B4- Chicken skin
- B5- Chicken thigh
- B6- Chicken wing

Appendix C: Complete dataset with imputed nutrient data including justification for type of imputation required

- C1- Chicken breast
- C2- Chicken fat (separable and pooled)
- C3- Chicken leg
- C4- Chicken skin
- C5- Chicken thigh
- C6- Chicken wing

Appendix D: Suggested protocols for cooking samples for future analyses

Appendix E: Submitting analytical data for consideration for NUTTAB

Appendix F: NUTTAB 2006 Online information for chicken meat showing sampling strategies used

## Appendix A: Comparisons between AGAL and Australian data for all macronutrients and cooking methods

### A1. Raw Nutrient comparisons (Breast)

Country	AGAL	Australia	% difference	AGAL	Australia	% difference	AGAL	Australia	% difference	
<b>Cooking method</b>	Baked	Baked		Casserole	Casserole		Stir-fried	Stir-fried		
<b>Description</b>	Breast, lean, baked	Breast, Lean, Baked		Breast, lean, Casserole	Breast, Lean, Casserole		Breast, skin removed, stir fried	Breast, Stir-Fried, Lean		
<b>water</b>	g	67.600	67.600	0.00	66.700	66.700	0.00	68.600	68.600	0.000
<b>energy</b>	kJ	638.044	637.000	0.16	596.113	596.000	0.02	519.075	520.000	-0.178
<b>fat, total</b>	g	3.900	3.900	0.00	3.700	3.700	0.00	0.900	0.900	0.000
<b>protein, total</b>	g	29.044	29.000	0.15	27.013	27.000	0.05	28.575	28.600	-0.087
<b>ash</b>	g	1.200	1.200	0.00	1.000	1.000	0.00	1.200	1.200	0.000
<b>total SFA</b>	g	1.326	1.197	9.71	1.269	1.200	5.44	0.298	0.300	-0.705
<b>total MUFA</b>	g	1.966	1.900	3.34	1.887	1.800	4.61	0.450	0.400	11.111
<b>total PUFA</b>	g	0.601	0.023	96.10	0.020	0.500	-2400.00	0.154	0.100	35.023

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

### A2. Raw Nutrient comparisons (Fat)

Country	AGAL	Australia	% difference	AGAL	Australia	% difference	AGAL	Australia	% difference	
<b>Cooking method</b>	Baked	Baked		Casserole	Casserole		Raw	Raw		
<b>Description</b>	Separable fat, composite, baked	Chicken, Fat, Baked		Separable fat, composite, casserole	Chicken, Separable Fat, Composite, Casserole		Separable fat, composite, raw	Chicken, Separable Fat, Composite, Raw		
<b>water</b>	g	41.200	40.400	1.94	42.700	42.700	0.00	31.100	31.100	0.00
<b>energy</b>	kJ	1890.163	1916.000	-1.37	1861.788	1862.000	-0.01	2391.375	2392.000	-0.03
<b>fat, total</b>	g	46.600	47.200	-1.29	43.800	43.800	0.00	62.300	62.300	0.00
<b>protein, total</b>	g	9.763	9.900	-1.41	14.188	14.200	-0.09	5.075	5.100	-0.49
<b>ash</b>	g	0.800	0.800	0.00	0.600	0.600	0.00	0.600	0.600	0.00
<b>total SFA</b>	g		14.900			13.300		32.200	19.000	40.99
<b>total MUFA</b>	g		23.800			22.200		53.500	31.600	40.93
<b>total PUFA</b>	g		5.800			5.600		13.700	8.000	41.61

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids



### A3. Raw Nutrient comparisons (Leg)

Country	AGAL	Australia	% difference	AGAL	Australia	% difference
<b>Cooking method</b>	Baked	Baked		Casserole	Casserole	
<b>Description</b>	Drumstick, lean, baked	Chicken, Drumstick, Lean, Baked		Drumstick, lean, casserole	Chicken, Drumstick, Lean, Casserole	
<b>water</b>	g	63.900	0.00	64.400	64.400	0.00
<b>energy</b>	kJ	748.488	-0.07	729.550	730.000	-0.06
<b>fat, total</b>	g	7.600	0.00	6.600	6.600	0.00
<b>protein, total</b>	g	27.488	-0.05	28.550	28.600	-0.18
<b>ash</b>	g	1.000	0.00	0.900	0.900	0.00
<b>total SFA</b>	g	2.4624	6.60	2.277	2.200	3.38
<b>total MUFA</b>	g	3.9672	4.21	3.2934	3.100	5.87
<b>total PUFA</b>	g	1.1476	4.15	1.0032	0.900	10.29

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

### A4. Raw Nutrient comparisons (Skin)

Country	AGAL	Australia	% difference
<b>Cooking method</b>	Casserole	Casserole	
<b>Description</b>	Skin, composite, casserole	Chicken, Skin, Composite, Casserole	
<b>water</b>	g	43.900	44.500
<b>energy</b>	kJ	1741.281	1742.000
<b>fat, total</b>	g	38.800	38.800
<b>protein, total</b>	g	17.981	18.000
<b>ash</b>	g	0.600	0.600
<b>total SFA</b>	g	12.144	11.400
<b>total MUFA</b>	g	21.030	19.800
<b>total PUFA</b>	g	5.548	5.200

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## A5. Raw Nutrient comparisons (Thigh)

Country	AGAL	Australia	% difference	AGAL	Australia	% difference
<b>Cooking method</b>	Baked	Baked		Casseroled	Casseroled	
<b>Description</b>	Thigh, lean, baked	Chicken, Thigh, Lean, Baked		Thigh, lean, casseroled	Chicken, Thigh, Lean, Casseroled	
<b>water</b>	g	65.600	0.000	63.100	63.100	0.000
<b>energy</b>	kJ	733.300	0.041	809.063	810.000	-0.116
<b>fat, total</b>	g	8.700	0.000	9.800	9.800	0.000
<b>protein, total</b>	g	24.200	0.000	26.263	26.300	-0.143
<b>ash</b>	g	1.000	0.000	0.900	0.900	0.000
<b>total SFA</b>	g	2.854	5.383	3.224	3.000	6.954
<b>total MUFA</b>	g	4.550	5.497	5.135	4.900	4.580
<b>total PUFA</b>	g	1.279	6.169	1.421	1.400	1.478

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## A6. Raw Nutrient comparisons (Wing)

Country	AGAL	Australia	% difference	AGAL	Australia	% difference
<b>Cooking method</b>	Baked	Baked		Casseroled	Casseroled	
<b>Description</b>	Wing, lean, baked	Chicken, Wing, Lean, Baked		Wing, lean, casseroled	Chicken, Wing, Lean, Casseroled	
<b>water</b>	g	60.500	0.000	62.600	62.600	0.000
<b>energy</b>	kJ	810.306	0.038	800.113	800.000	0.014
<b>fat, total</b>	g	7.700	0.000	8.800	8.800	0.000
<b>protein, total</b>	g	30.906	0.020	27.913	27.900	0.045
<b>ash</b>	g	1.100	0.000	0.800	0.800	0.000
<b>total SFA</b>	g	2.479	3.202	2.904	2.700	7.025
<b>total MUFA</b>	g	4.089	4.615	4.682	4.400	6.015
<b>total PUFA</b>	g	1.124	2.153	1.206	1.100	8.759

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

**Appendix B: All nutrient data available for chicken meat for AGAL and other countries with gaps shaded in grey**

**B1. Raw nutrient data for chicken (Breast)**

country	AGAL	Australia	AGAL	Australia	AGAL	Finland	Australia	USA	NZ	AGAL	Australia	
cooking method	Baked	Baked	Casserole	Casserole	Raw	Raw	Raw	Raw	Raw	Stir-fried	Stir-fried	
	Breast, lean, baked	Breast, Lean, Baked	Breast, lean, Casseroled	Breast, Lean, Casseroled	Breast, lean, raw	Chicken breast without skin	Chicken, Breast, Raw, Lean	Breast, meat only, raw	Breast, flesh, lean, raw	Breast, skin removed, stir fried	Breast, Stir-Fried, Lean	
<b>water</b>	g	67.600	67.600	66.700	66.700	74.700	75.000	74.760	75.500	68.600	68.600	
<b>energy</b>	kcal	152.642	152.392	142.611	142.584	104.653	104.785	110.000	108.373	124.181	124.402	
<b>energy</b>		638.044	637.000	596.113	596.000	437.450	617.000	438.000	460.000	519.075	520.000	
<b>carbohydrate</b>	g						0.000	0.000	0.000			
<b>fat, total</b>	g	3.900	3.900	3.700	3.700	1.600	6.800	1.600	1.240	2.130	0.900	0.900
<b>protein, total</b>	g	29.044	29.000	27.013	27.000	22.250	21.500	22.300	23.090	22.300	28.575	28.600
<b>ash</b>	g	1.200	1.200	1.000	1.000	1.100		1.100	1.020		1.200	1.200
<b>starch</b>	g						0.000		0.000			
<b>sugars</b>	g		0.000		0.000		0.000	0.000	0.000	0.000		0.000
<b>fibres</b>	g						0.000		0.000			
<b>%</b>												
<b>total SFA</b>	fat	34.000	30.700	34.300	32.432	32.800	30.800		33.000		33.100	33.333
<b>total SFA</b>	g	1.326	1.197	1.269	1.200	0.525	2.094	0.500	0.409	0.710	0.298	0.300
<b>C4:0</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000	0.000		<0.001	0.000
<b>C6:0</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000	0.000		<0.001	0.000
<b>C8:0</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000	0.000		<0.001	0.000
<b>C10:0</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000	0.000		<0.001	0.000
<b>C12:0</b>	mg	0.780	0.010	0.007	0.010	0.003		0.000	0.000		0.200	0.000
<b>C14:0</b>	mg	0.047	0.050	0.052	0.050	0.019		0.020	0.010		1.200	0.010
<b>C15:0</b>	mg	0.008	0.010	0.011	0.010	0.003		0.000			0.300	0.000
<b>C16:0</b>	mg	0.905	0.860	0.884	0.840	0.357		0.340	0.210		22.900	0.200
<b>C17:0</b>	mg	0.016	0.020	0.019	0.020	0.006		0.010			0.400	0.000
<b>C18:0</b>	mg	0.316	0.300	0.285	0.270	0.131		0.120	0.100		7.700	0.060
<b>C20:0</b>	mg	0.012	0.010	0.011	0.010	0.006		0.010			0.400	0.000
<b>C22:0</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000			<0.001	0.000
<b>C24:0</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000			<0.001	0.000
<b>%</b>												
<b>total MUFA</b>	fat	50.400	48.710	51.000	1.800	47.000	33.800	43.750	30.000	0.940	50.000	44.444
<b>total MUFA</b>	g	1.966	1.900	1.887	48.649	0.752	2.298	0.700	0.372	0.020	0.450	0.400
<b>C14:1</b>	mg	0.016	0.020	0.015	0.010	0.005		0.000			0.400	0.000
<b>C16:1</b>	mg	0.218	0.210	0.218	0.210	0.042		0.040	0.030		6.000	0.050
<b>C18:1</b>	mg	1.716	1.620	1.639	1.550	0.651		0.620	0.250		43.200	0.370
<b>C20:1</b>	mg	0.016	0.020	0.015	0.010	0.006		0.010	0.000		0.400	0.000
<b>C22:1</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000	0.000		<0.001	0.000
<b>C24:1</b>	mg	<0.004	0.000	<0.004	0.000	<0.002		0.000			<0.001	
<b>%</b>												
<b>total PUFA</b>	fat	15.400	0.600	0.537	0.500	19.700	25.000	18.750	28.000	0.330	17.100	11.111
<b>total PUFA</b>	g	0.601	0.023	0.020	13.514	0.315	1.700	0.300	0.347	0.007	0.154	0.100
<b>C18:2 n-6</b>	g	0.484	0.460	0.433	0.410	0.224		0.210	0.170		12.800	0.110

## Appendix B: All nutrient data available for chicken meat for AGAL and other countries with gaps shaded in grey

### B1. Raw nutrient data for chicken (Breast)

country	AGAL	Australia	AGAL	Australia	AGAL	Finland	Australia	USA	NZ	AGAL	Australia
cooking method	Baked	Baked	Casserole	Casserole	Raw	Raw	Raw	Raw	Raw	Stir-fried	Stir-fried
C18:3 n-3	g 0.035	0.030	0.030	0.030	0.014		0.010	0.010		0.900	0.010
C20:2 n-6	mg 0.008	7.000	0.007	7.000	0.005		5.000			0.300	3.000
C18:3 n-6	mg	0.000	<0.004	0.000	<0.002		0.000			<0.001	0.000
C20:3 n-3	mg <0.004	0.000	<0.004	0.000	<0.002		0.000			<0.001	0.000
C20:3 n-6	mg	11.000	0.007	7.000	0.008		8.000			0.400	3.000
C20:4 n-6	mg 0.035	33.000	0.030	28.000	0.032		30.000			1.300	11.000
C20:5 n-3	mg <0.004	0.000	<0.004	0.000	0.005		5.000	0.000		0.200	2.000
C22:2 n-6	mg <0.004	0.000	<0.004	0.000	<0.002		0.000			<0.001	0.000
C22:4 n-6	mg 0.012	11.000	0.011	10.000	0.008		8.000			0.400	3.000
C22:5 n-3	mg 0.012	11.000	0.011	10.000	0.010		9.000	0.010		0.400	3.000
C22:6 n-3	mg 0.008	7.000	0.007	7.000	0.010		9.000	0.020		0.400	3.000
sum n-3 fatty acids	g	18.000		17.000			23.000				9.000
sum n-6 fatty acids	g										
cholesterol	mg 84.000	84.000	69.000	69.000	59.000	97.000	59.000	58.000	64.000	62.000	62.000
sodium	mg 46.000	46.000	41.000	41.000	41.000	80.000	41.000	65.000		43.000	43.000
potassium	mg 320.000	320.000	270.000	270.000	300.000	270.000	300.000	255.000	270.000	350.000	350.000
magnesium	mg 30.000	30.000	28.000	28.000	28.000	22.000	28.000	28.000	27.500	33.000	33.000
calcium	mg 8.600	9.000	11.000	11.000	12.000	8.000	12.000	11.000	9.300	9.500	10.000
phosphorus	mg	280.000		260.000		190.000	250.000	196.000	247.000		300.000
iron	mg 0.500	0.500	0.400	0.400	0.400	0.600	0.400	0.720	0.550	0.400	0.400
zinc	mg 0.900	0.800	0.900	0.900	0.700	1.100	0.700	0.800	0.860	0.700	0.700
iodide (iodine)	mg					5.000	0.000				
selenium	µg	26.100		20.000		12.000	25.000	17.800			22.800
copper	mg 0.040	0.041	0.050	0.050	0.032		0.032	0.041		0.060	0.051
manganese	mg	0.010		0.010			0.013	0.018	4.900		0.010
vitamin A, retinol activity equivalents	µg	7.000		5.000		55.000	8.000	6.000			5.000
vitamin A	IU							21.000	10.000		
vitamin D	µg					0.500					
vitamin E, alpha-tocopherol	mg 0.220	0.200	0.210	0.200	2.200	0.700	2.200	0.130		0.460	0.500
vitamin K	mg					60.000		0.200			
vitamin C (ascorbic acid)	mg	0.000		0.000		0.000	0.000	1.200	1.200		0.000
folate	mg	3.000		0.000		15.600	0.000	4.000	9.100		3.000
niacin equivalents	mg 11.000	17.700	11.000	17.200	11.000	7.500	16.200	11.194	12.200	14.000	20.600
riboflavin	mg 0.110	0.110	0.100	0.100	0.190	0.130	0.190	0.092	0.100	0.090	0.090
thiamin (vitamin B1)	mg 0.050	0.050	0.050	0.050	0.110	0.070	0.110	0.070	0.090	0.120	0.120
vitamin B12 (cobalamin)	µg					1.000		0.380			
vitamin B6 (pyridoxine hydrochloride)	µg 0.200		0.300		0.760	0.560				0.310	
pantothenic acid	mg	1.200		1.200			1.000	0.819			1.400
vitamin B6	mg	0.200		0.300			0.760	0.550			0.310
beta-carotene	mg	0.000		0.000			0.000	0.000			0.000
alpha-carotene	mg	0.000		0.000			0.000	0.000			0.000

**Appendix B: All nutrient data available for chicken meat for AGAL and other countries with gaps shaded in grey**

**B1. Raw nutrient data for chicken (Breast)**

country	AGAL	Australia	AGAL	Australia	AGAL	Finland	Australia	USA	NZ	AGAL	Australia
cooking method	Baked	Baked	Casseroled	Casseroled	Raw	Raw	Raw	Raw	Raw	Stir-fried	Stir-fried
biotin mg		4.200		3.100			2.100				3.000
alanine mg		644.000		644.000			644.000	1260.000			644.000
arginine mg		417.000		417.000			417.000	1393.000			417.000
aspartic acid mg		644.000		644.000			644.000	2058.000			644.000
cystine mg		74.000		74.000			74.000	296.000			74.000
glutamic acid mg		964.000		964.000			964.000	3458.000			964.000
glycine mg		312.000		312.000			312.000	1134.000			312.000
histidine mg		213.000		213.000			214.000	717.000			214.000
isoleucine mg		334.000		334.000			334.000	1219.000			334.000
leucine mg		526.000		526.000			526.000	1732.000			526.000
lysine mg		605.000		605.000			605.000	1962.000			605.000
methionine mg		154.000		154.000			154.000	639.000			154.000
phenylalanine mg		261.000		261.000			261.000	916.000			261.000
proline mg		266.000		266.000			266.000	949.000			266.000
serine mg		289.000		289.000			289.000	794.000			289.000
threonine mg		306.000		306.000			306.000	975.000			306.000
tryptophan mg		85.000		85.000			85.000	270.000			85.000
tyrosine mg		236.000		236.000			236.000	779.000			236.000
valine mg		351.000		351.000			351.000	1145.000			351.000

Key: AGAL missing data

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## B2. Raw nutrient data for chicken (Separable Fat)

country		AGAL	Australia	AGAL	Australia	AGAL	Australia	AGAL	Australia
cooking method		Baked	Baked	Casseroled	Casseroled	Raw	Raw	Raw	Raw
water	g	41.200	40.400	42.700	42.700	31.100	31.100	40.100	40.400
energy	kcal	452.192	458.373	445.404	445.455	572.099	572.249	881.627	
energy	kJ	1890.163	1916.000	1861.788	1862.000	2391.375	2392.000	3685.200	
carbohydrate	g								
fat, total	g	46.600	47.200	43.800	43.800	62.300	62.300	99.600	
protein, total	g	9.763	9.900	14.188	14.200	5.075	5.100		
ash	g	0.800	0.800	0.600	0.600	0.600	0.600		
starch	g								
sugars	g		0.000		0.000		0.000		
fibre	g								
total SFA	%fat		31.568		30.365	33.405	30.498	33.434	
total SFA	g		14.900		13.300	32.200	19.000	33.300	0.300
C4:0	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C6:0	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C8:0	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C10:0	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C12:0	mg		0.090		0.080	0.125	0.120	0.100	0.000
C14:0	mg		0.580		0.540	0.810	0.760	1.295	0.010
C15:0	mg		0.090		0.080	0.187	0.120	0.199	0.000
C16:0	mg		10.310		9.400	14.142	13.360	23.008	0.200
C17:0	mg		0.180		0.170	0.249	0.240	0.398	0.000
C18:0	mg		3.210		2.900	4.361	4.120	7.171	0.060
C20:0	mg		0.450		0.170	0.249	0.240	0.996	0.010
C22:0	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C24:0	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
total MUFA	%fat					55.502			
total MUFA	g		23.800		22.200	53.500	31.600	53.200	0.500
C14:1	mg		0.180		0.170	0.249	0.240	0.399	0.000
C16:1	mg		2.810		2.480	3.738	3.530	6.275	0.050
C18:1	mg		20.620		19.330	29.094	27.490	46.015	0.390
C20:1	mg		0.180		0.210	0.312	0.290	0.398	0.000
C22:1	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C24:1	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C18:4	mg								
C20:4	mg								
total PUFA	%fat				12.785	21.990	12.841		
total PUFA	g		5.800		5.600	13.700	8.000	13.100	0.100
C18:2 n-6	g		5.450		5.170	7.788	7.360	12.151	0.100
C18:3 n-3	g		0.220		0.410	0.623	0.590	0.498	0.000
C18:3 n-6	mg		45.000		0.000	<0.062	0.000		1.000
C20:2 n-6	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C20:3 n-3	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C20:3 n-6	mg		0.000		0.000	<0.062	0.000		0.000
C20:4 n-6	mg		89.000		41.000	0.062	59.000	0.199	2.000
C20:5 n-3	mg		0.000		0.000	<0.062	0.000	<0.100	0.000

## B2. Raw nutrient data for chicken (Separable Fat)

country		AGAL	Australia	AGAL	Australia	AGAL	Australia	AGAL	Australia
cooking method		<b>Baked</b>	<b>Baked</b>	<b>Casseroled</b>	<b>Casseroled</b>	<b>Raw</b>	<b>Raw</b>	<b>Raw</b>	<b>Raw</b>
C22:2 n-6	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C22:4 n-6	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C22:5 n-3	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
C22:6 n-3	mg		0.000		0.000	<0.062	0.000	<0.100	0.000
sum n-3 fatty acids	g		0.000		0.000		0.000		0.000
sum n-6 fatty acids	g								
cholesterol	mg		130.000		78.000	78.000	78.000	62.000	130.000
sodium	mg		51.000			22.000	22.000	51.000	51.000
potassium	mg		170.000			63.000	63.000	170.000	170.000
magnesium	mg		13.000			4.800	5.000	13.000	13.000
calcium	mg		11.000			9.000	9.000	11.000	11.000
phosphorus	mg		140.000				52.000		140.000
iron	mg		0.900			0.700	0.700	0.900	0.900
zinc	mg		0.900			0.300	0.300	0.900	0.900
iodide (iodine)	mg								
selenium	µg		20.000				0.000		20.000
copper	mg		0.050			0.040	0.040	0.050	0.050
manganese	mg		0.010				0.030		0.010
vitamin A retinol activity equivalents	µg		130.000				120.000		130.000
vitamin A	IU								
vitamin D	µg								
vitamin E, alpha-tocopherol	mg		1.600			0.380	0.400	1.600	1.600
vitamin K	mg								
vitamin C (ascorbic acid)	mg		0.000		0.000		0.000		0.000
folate	mg						0.000		
niacin equivalents	mg		1.700		2.400	2.000	2.900		0.000
riboflavin	mg					0.100	0.100		
thiamin (vitamin B1)	mg						0.000		
vitamin B12 (cobalamin)	µg								
vitamers pyridoxine (hydrochloride)	µg					0.110			
pantothenic acid	mg						0.300		
vitamin B6	mg		130.000				0.110		130.000
beta-carotene	µg						0.000		
alpha-carotene	µg						0.000		
biotin	µg						1.200		
tryptophan	mg								
threonine	mg								
isoleucine	mg								
leucine	mg								
lysine	mg								
methionine	mg								
cystine	mg								
phenylalanine	mg								
tyrosine	mg								
valine	mg								
arginine	mg								
histidine	mg								

## B2. Raw nutrient data for chicken (Separable Fat)

country		AGAL	Australia	AGAL	Australia	AGAL	Australia	AGAL	Australia
cooking method		Baked	Baked	Casseroled	Casseroled	Raw	Raw	Raw	Raw
alanine	mg								
aspartic acid	mg								
glutamic acid	mg								
glycine	mg								
proline	mg								
serine	mg								

Key: AGAL missing data

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids



### B3. Raw nutrient data for chicken (Leg)

Country	AGAL	Australia	AGAL	Australia	AGAL	NZ	Australia	USA	
Cooking method	Baked	Baked	Casserole	Casserole	Raw	Raw	Raw	Raw	
water	g	63.900	63.900	64.400	64.400	75.200	76.100	75.200	76.380
energy	kcal	179.064	179.187	174.533	174.641	117.854	116.268	117.703	119.000
energy	kJ	748.488	749.000	729.550	730.000	492.631	486.000	492.000	498.000
carbohydrate	g						0.000		0.000
fat, total	g	7.600	7.600	6.600	6.600	4.800	4.520	4.800	3.420
protein, total	g	27.488	27.500	28.550	28.600	18.531	18.900	18.500	20.590
ash	g	1.000	1.000	0.900	0.900	1.000		1.000	0.930
starch	g						0.000		
sugars	g		0.000		0.000		0.000	0.000	0.000
fibre	g						0.000		0.000
total SFA	%fat	32.400	30.263	34.500	33.333	30.800	30.531	29.167	25.731
total SFA	g	2.462	2.300	2.277	2.200	1.478	1.380	1.400	0.880
C4:0	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	0.000
C6:0	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	0.000
C8:0	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	0.000
C10:0	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	0.000
C12:0	mg	0.015	0.010	<0.007	0.000	0.010		0.010	0.020
C14:0	mg	0.091	0.090	0.079	0.080	0.058		0.050	0.020
C15:0	mg	0.015	0.010	0.020	0.020	0.010		0.010	
C16:0	mg	1.702	1.610	1.597	1.510	1.003		0.950	0.590
C17:0	mg	0.030	0.030	0.026	0.020	0.019		0.020	
C18:0	mg	0.570	0.540	0.554	0.520	0.360		0.340	0.230
C20:0	mg	0.030	0.030	<0.007	0.000	0.024		0.020	
C22:0	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	
C24:0	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	
total MUFA	%fat	52.200	50.000	49.900	46.970	50.500	50.442	47.917	30.994
total MUFA	g	3.967	3.800	3.293	3.100	2.424	2.280	2.300	1.060
C14:1	mg	0.030	0.030	0.020	0.020	0.019		0.020	
C16:1	mg	0.494	0.470	0.422	0.400	0.312		0.300	0.160
C18:1	mg	3.412	3.220	2.831	2.680	2.074		1.960	0.880
C20:1	mg	0.030	0.030	0.026	0.020	0.019		0.020	0.010
C22:1	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	0.000
C24:1	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	
C18:4	mg	15.100	14.474	15.200	13.636	18.500	13.053	16.667	0.080
C20:4	mg	1.148	1.100	1.003	0.900	0.888	0.590	0.800	0.850
total PUFA	%fat								0.093
total PUFA	g	0.942	0.890	0.858	0.810	0.677		0.640	0.650
C18:2 n-6	g		0.000		0.000			0.000	
C18:3 n-3	g	0.015	14.000	<0.007	0.000	0.010		9.000	
C18:3 n-6	mg								0.000
C20:2 n-6	mg								0.080
C20:3 n-3	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	
C20:3 n-6	mg		14.000		0.000			14.000	
C20:4 n-6	mg	0.061	57.000	0.086	81.000	0.0816		77.000	
C20:5 n-3	mg	<0.008	0.000	<0.007	0.000	<0.005		0.000	0.010

### B3. Raw nutrient data for chicken (Leg)

Country	AGAL	Australia	AGAL	Australia	AGAL	NZ	Australia	USA
C22:2 n-6	mg	<0.008	0.000	<0.007	0.000	<0.005	0.000	
C22:4 n-6	mg	0.015	14.000	<0.007	0.000	0.0192	18.000	
C22:5 n-3	mg	0.015	14.000	<0.007	0.000	0.0192	18.000	0.020
C22:6 n-3	mg	0.015	14.000	<0.007	0.000	0.0144	14.000	0.030
sum n-3 fatty acids	g		29.000		0.000		32.000	
sum n-6 fatty acids	g							
cholesterol	mg	120.000	140.000	100.000	130.000	79.00	101.000	77.000
sodium	mg	84.000	84.000	74.000	74.000	71.00	105.000	88.000
potassium	mg	380.000	290.000	220.000	220.000	260.00	333.000	226.000
magnesium	mg	26.000	26.000	23.000	23.000	22.00	22.600	23.000
calcium	mg	47.000	18.000	17.000	17.000	9.60	7.200	11.000
phosphorus	mg		290.000		220.000		204.000	166.000
iron	mg	0.850	0.900	0.900	0.900	0.60	1.020	1.030
zinc	mg	2.600	2.300	2.400	2.400	1.70	2.000	2.210
iodide (iodine)	mg							
selenium	µg		31.100		30.000			13.500
copper	mg	0.070	0.074	0.090	0.090	0.06	0.060	0.063
manganese	mg		0.020		0.020		0.020	0.021
vitamin A retinol activity equivalents	µg		18.000		16.000		16.000	17.000
vitamin A	IU							57.000
vitamin D	µg							
vitamin E, alpha-tocopherol	mg	0.370	0.400	0.670	0.700	0.31	0.300	0.310
vitamin K	mg	0.290		0.160		0.33		2.900
vitamin C (ascorbic acid)	mg	93.000	0.000	61.000	0.000	63.00	3.000	3.200
folate	mg		0.000		0.000		15.700	10.000
niacin equivalents	mg	5.000	11.400	4.000	10.600	5.00	9.900	5.778
riboflavin	mg	0.280	0.280	0.310	0.310	0.13	0.140	0.199
thiamin (vitamin B1)	mg		0.000		0.190	0.14	0.090	0.082
vitamin B12 (cobalamin)	µg							0.370
vitamers pyridoxine (hydrochloride)	µg	0.290		0.160		0.33		
pantothenic acid	mg		0.600		0.700		1.100	1.287
vitamin B6	mg		0.290		0.160		0.330	0.340
beta-carotene	µg		0.000		0.000		0.000	0.000
alpha-carotene	µg		0.000		0.000	0.000	0.000	0.000
biotin	µg		5.400		4.900		3.900	
tryptophan	mg		85.000		85.000		85.000	241.000
threonine	mg		306.000		306.000		306.000	870.000
isoleucine	mg		334.000		334.000		334.000	1087.000
leucine	mg		526.000		526.000		526.000	1545.000
lysine	mg		605.000		605.000		605.000	1750.000
methionine	mg		154.000		154.000		154.000	570.000
cystine	mg		74.000		74.000		74.000	264.000
phenylalanine	mg		261.000		261.000		261.000	817.000
tyrosine	mg		236.000		236.000		236.000	695.000
valine	mg		351.000		351.000		351.000	1021.000
arginine	mg		417.000		417.000		417.000	1242.000
histidine	mg		214.000		214.000		214.000	639.000
alanine	mg							1124.000

### B3. Raw nutrient data for chicken (Leg)

Country		AGAL	Australia	AGAL	Australia	AGAL	NZ	Australia	USA
aspartic acid	mg		644.000		644.000			644.000	1835.000
glutamic acid	mg		964.000		964.000			964.000	3084.000
glycine	mg		312.000		312.000			312.000	1012.000
proline	mg		266.000		266.000			266.000	847.000
serine	mg		289.000		289.000			289.000	708.000

Key: AGAL missing data

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## B4. Raw nutrient data for chicken (Skin)

Country		AGAL	Sth Africa	Australia	AGAL	Australia	AGAL	Sth Africa	Australia
Cooking method		Baked	Roasted	Baked	Casserole	Casserole	Raw	Raw	Raw
water	g	35.000		36.000	43.900	44.500	53.300		53.300
energy	kcal	434.999	461.722	434.928	416.574	416.746	362.141	448.923	362.440
energy	kJ	1818.294	1930.000	1818.000	1741.281	1742.000	1513.750	1876.500	1515.000
carbohydrate	g		0.000					0.000	
fat, total	g	38.900	45.500	38.900	38.800	38.800	35.100	45.800	35.100
protein, total	g	22.294	14.500	22.300	17.981	18.000	12.650	10.700	12.700
ash	g	0.900		0.900	0.600	0.600	0.500		0.500
starch	g								
sugars	g								
fibre	g		0.000	0.000		0.000		0.000	0.000
total SFA	%Fat	32.200		30.334	31.300	29.381	32.400		30.484
total SFA	g	12.526		11.800	12.144	11.400	11.372		10.700
C4:0	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C6:0	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C8:0	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C10:0	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C12:0	mg	0.078		0.070	0.078	0.070	0.070		0.070
C14:0	mg	0.545		0.520	0.504	0.480	0.491		0.460
C15:0	mg	0.078		0.070	0.078	0.070	0.070		0.070
C16:0	mg	8.869		8.380	8.614	8.140	8.038		7.600
C17:0	mg	0.156		0.150	0.155	0.150	0.140		0.130
C18:0	mg	0.265		2.500	2.522	2.380	2.422		2.290
C20:0	mg	0.156		0.150	0.155	0.150	0.140		0.130
C22:0	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C24:0	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
total MUFA	%Fat	53.800		50.900	54.200	51.031	23.200		50.142
total MUFA	g	20.928		19.800	21.030	19.800	8.143		17.600
C14:1	mg	0.156		0.150	0.155	0.150	0.140		0.170
C16:1	mg	2.567		2.430	2.638	2.490	2.211		2.090
C18:1	mg	18.050		17.060	18.042	17.050	16.146		15.260
C20:1	mg	0.156		0.150	0.400	0.150	0.140		0.130
C22:1	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C24:1	mg								
total PUFA	%Fat	13.900		13.111	14.300	13.402	13.900		13.105
total PUFA	g	5.407		5.100	5.548	5.200	4.879		4.600
C18:2 n-6	g	4.863		4.600	4.966	4.690	4.423		4.180
C18:3 n-3	g	0.428		0.400	0.427	0.400	0.386		0.360
C18:3 n-6	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C18:4	mg								
C20:4	mg			0.000		37.000			0.000
C20:2 n-6	mg	0.039		37.000	<0.039	0.000	<0.035		0.000
C20:3 n-3	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C20:3 n-6	mg			0.000		0.000			0.000
C20:4 n-6	mg	0.117		110.000	0.166	110.000	0.070		66.000
C20:5 n-3	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000

## B4. Raw nutrient data for chicken (Skin)

Country		AGAL	Sth Africa	Australia	AGAL	Australia	AGAL	Sth Africa	Australia
C22:2 n-6	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C22:4 n-6	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C22:5 n-3	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
C22:6 n-3	mg	<0.039		0.000	<0.039	0.000	<0.035		0.000
sum n-3 fatty acids	g			0.000		0.000			0.000
sum n-6 fatty acids	g								
cholesterol	mg	140.000		180.000	130.000	170.000	84.000		100.000
sodium	mg	78.000		78.000	51.000	51.000	43.000		43.000
potassium	mg	220.000		220.000	150.000	150.000	120.000		120.000
magnesium	mg	25.000		25.000	17.000	17.000	8.400		8.000
calcium	mg	54.000		54.000	13.000	13.000	13.000		13.000
phosphorus	mg			260.000		160.000			99.000
iron	mg	1.200		1.200	0.900	0.900	0.700		0.700
zinc	mg	1.500		1.500	1.100	1.100	0.700		0.700
iodide (iodine)	mg								
selenium, total	µg			30.000		20.000			0.000
copper	mg	0.080		0.080	0.060	0.060	0.040		0.040
manganese	mg			0.030		0.020			0.020
vitamin A, retinol activity equivalents	µg			130.000		100.000			110.000
vitamin A	IU								
vitamin D	µg								
vitamin E, alpha-tocopherol	mg	2.100		2.100	1.700	1.700	0.780		0.800
vitamin K	mg	0.200			0.690		0.110		
vitamin C (ascorbic acid)	mg	56.000		0.000	53.000	0.000	32.000		0.000
folate	mg			0.000		0.000			0.000
niacin equivalents	mg	6.000		9.700	4.000	7.000	2.000		4.100
riboflavin	mg	0.190		0.190	0.140	0.140	0.100		0.100
thiamin (vitamin B1)	mg			0.000		0.000			0.000
vitamin B-12 (cobalamin)	µg								
vitamin B-6	µg	0.200			0.690		0.110		
vitamin B-5 (pantothenic acid)	mg			0.700		0.600			0.300
vitamin B-6	mg			0.200		0.690			0.110
retinol	mg			130.000		100.000			110.000
carotene, beta	µg			0.000		0.000			0.000
carotene, alpha	µg			0.000		0.000			0.000
biotin	µg			3.500		3.200			1.500
tryptophan	µg								
threonine	mg								
isoleucine	mg								
leucine	mg								
lysine	mg								
methionine	mg								
cystine	mg								
phenylalanine	mg								
tyrosine	mg								
valine	mg								
arginine	mg								
histidine	mg								

## B4. Raw nutrient data for chicken (Skin)

Country		AGAL	Sth Africa	Australia	AGAL	Australia	AGAL	Sth Africa	Australia
alanine	mg								
aspartic acid	mg								
glutamic acid	mg								
glycine	mg								
proline	mg								
serine	mg								

Key: AGAL missing data

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## B5. Raw nutrient data for chicken (Thigh)

Country		AGAL	Australia	AGAL	Australia	AGAL	Australia	USA	NZ
Cooking method		Baked	Baked	Casserole	Casserole	Raw	Raw	Raw	Raw
water	g	65.600	65.600	63.100	63.100	75.000	75.000	75.810	76.100
energy	kcal	175.431	175.359	193.556	193.780	118.506	118.660	119.000	115.789
energy	kJ	733.300	733.000	809.063	810.000	495.356	496.000	498.000	484.000
carbohydrate	g							0.000	0.000
fat, total	g	8.700	8.700	9.800	9.800	5.000	5.000	3.910	4.360
protein, total	g	24.200	24.200	26.263	26.300	18.256	18.300	19.650	19.200
ash	g	1.000	1.000	0.900	0.900	1.000	1.000	0.960	
starch	g								0.000
sugars	g		0.000		0.000		0.000	0.000	0.000
fibre	g							0.000	0.000
total SFA	%Fat	32.800	31.034	32.900	30.612	31.900	30.000	25.575	32.339
total SFA	g	2.854	2.700	3.224	3.000	1.595	1.500	1.000	1.410
C4:0	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000	0.000	
C6:0	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000	0.000	
C8:0	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000	0.000	
C10:0	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000	0.000	
C12:0	mg	0.017	0.020	0.020	0.020	0.010	0.010	0.020	
C14:0	mg	0.113	0.110	0.137	0.130	0.065	0.060	0.020	
C15:0	mg	0.017	0.020	0.020	0.020	0.010	0.010		
C16:0	mg	1.966	1.860	2.254	2.130	1.095	1.040	0.670	
C17:0	mg	0.035	0.030	0.039	0.040	0.020	0.020	0.260	
C18:0	mg	0.661	0.620	0.715	0.680	0.375	0.350		
C20:0	mg	0.035	0.030	0.039	0.040	0.020	0.020		
C22:0	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000		
C24:0	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000		
total MUFA	%Fat	52.300	49.425	52.400	50.000	50.800	48.000	30.946	48.394
total MUFA	g	4.550	4.300	5.135	4.900	2.540	2.400	1.210	2.110
C14:1	mg	0.035	0.030	0.049	0.050	0.020	0.020		
C16:1	mg	0.548	0.520	0.617	0.580	0.300	0.280	0.180	
C18:1	mg	3.932	3.720	4.439	4.200	2.200	2.080	1.010	
C20:1	mg	0.035	0.030	0.039	0.040	0.020	0.020	0.010	
C22:1	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000	0.000	
C24:1	mg							0.090	
total PUFA	%Fat	14.700	13.793	14.500	14.286	17.100	16.000	24.808	13.761
total PUFA	g	1.279	1.200	1.421	1.400	0.855	0.800	0.970	0.600
C18:2 n-6	g	1.105	1.040	1.264	1.200	0.685	0.650	750.000	
C18:3 n-3	g	0.087	0.080	0.098	0.090	0.050	0.050	30.000	
C18:3 n-6	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000		
C18:4	mg							0.000	
C20:4	mg		0.000		0.000		0.000		
C20:2 n-6	mg	0.017	16.000	<0.010	0.000	0.010	9.000		
C20:3 n-3	mg	<0.009	0.000	<0.010	0.000	<0.005	0.000		

## B5. Raw nutrient data for chicken (Thigh)

Country	AGAL	Australia	AGAL	Australia	AGAL	Australia	USA	NZ
C20:3 n-6	mg		16.000		0.000	9.000		
C20:4 n-6	mg	0.061	58.000	0.069	65.000	57.000		
C20:5 n-3	mg	<0.009	0.000	<0.010	0.000	0.000	10.000	
C22:2 n-6	mg	<0.009	0.000	<0.010	0.000	0.000		
C22:4 n-6	mg	<0.009	0.000	<0.010	0.000	14.000		
C22:5 n-3	mg	<0.009	0.000	<0.010	0.000	14.000	20.000	
C22:6 n-3	mg	<0.009	0.000	<0.010	0.000	9.000	40.000	
sum n-3 fatty acids	g		0.000		0.000	24.000		
sum n-6 fatty acids	g							
cholesterol	mg	160.000	120.000	130.000	100.000	79.000	83.000	87.000
sodium	mg	76.000	76.000	62.000	62.000	62.000	86.000	92.100
potassium	mg	390.000	290.000	230.000	230.000	280.000	231.000	360.000
magnesium	mg	26.000	26.000	22.000	22.000	24.000	24.000	24.200
calcium	mg	18.000	18.000	15.000	15.000	9.500	10.000	8.000
phosphorus	mg		240.000		210.000	220.000	168.000	222.000
Iron	mg	0.900	0.900	0.900	0.900	0.700	1.040	1.010
zinc	mg	2.000	2.000	2.100	2.100	1.500	1.910	1.760
iodide (iodine)	mg							
selenium, total	µg		30.000		30.000	20.000	13.500	
copper	mg	0.070	0.070	0.080	0.080	0.060	0.067	
manganese	mg		0.020		0.020	0.020	0.020	3.700
vitamin A, retinol activity equivalents	µg		24.000		17.000	19.000	20.000	
vitamin A	IU						65.000	26.000
vitamin D	µg							
vitamin E, alpha-tocopherol	mg	0.360	0.400	0.470	0.500	0.640	0.600	0.310
vitamin K	mg	0.300		0.250		0.270	2.900	
vitamin C (ascorbic acid)	mg	84.000	0.000	64.000	0.000	69.000	0.000	3.000
folate	mg		0.000		0.000	14.000	10.000	15.700
niacin equivalents	mg	6.000	11.600	5.000	11.100	6.000	6.328	9.900
riboflavin	mg	0.330	0.330	0.220	0.220	0.270	0.188	0.140
thiamin (vitamin B1)	mg	0.060	0.060	0.190	0.080	0.110	0.076	0.090
vitamin B-12 (cobalamin)	µg						0.350	
vitamers pyridoxine (hydrochloride)	µg	0.300		0.250		0.270		
pantothenic acid	mg		0.800		0.800	1.200	1.233	
vitamin B-6	mg		0.300		0.250	0.270	0.330	
retinol	mg		24.000		17.000	19.000	20.000	26.000
carotene, beta	µg		0.000		0.000	0.000	0.000	0.000
carotene, alpha	µg		0.000		0.000	0.000	0.000	
biotin	µg		4.800		4.800	3.700		
tryptophan	µg		85.000		85.000	85.000	230.000	
threonine	mg		306.000		306.000	306.000	830.000	
isoleucine	mg		334.000		334.000	334.000	1038.000	
leucine	mg		526.000		526.000	526.000	1475.000	
lysine	mg		605.000		605.000	605.000	1670.000	
methionine	mg		154.000		154.000	154.000	544.000	



## B5. Raw nutrient data for chicken (Thigh)

Country		AGAL	Australia	AGAL	Australia	AGAL	Australia	USA	NZ
cystine	mg		74.000		74.000		74.000	252.000	
phenylalanine	mg		261.000		261.000		261.000	780.000	
tyrosine	mg		236.000		236.000		236.000	664.000	
valine	mg		351.000		351.000		351.000	975.000	
arginine	mg		417.000		417.000		417.000	1186.000	
histidine	mg		214.000		214.000		214.000	610.000	
alanine	mg							1072.000	
aspartic acid	mg		644.000		644.000		644.000	1752.000	
glutamic acid	mg		964.000		964.000		964.000	2944.000	
glycine	mg		312.000		312.000		312.000	966.000	
proline	mg		266.000		266.000		266.000	808.000	
serine	mg		289.000		289.000		289.000	676.000	

Key: AGAL missing data

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## B6. Raw nutrient data for chicken (Wing)

Country	AGAL	Australia	AGAL	Australia	AGAL	Australia	USA	NZ	Finland
Cooking method	Baked	Baked	Casseroled	Raw	Raw	Raw	Raw	Raw	Raw
water	g	60.500	60.500	62.600	62.600	74.800	74.800	74.950	75.000
energy	kcal	193.853	193.780	191.414	191.388	112.192	112.440	126.000	115.789
energy	kJ	810.306	810.000	800.113	800.000	468.963	470.000	527.000	484.000
carbohydrate	g						0.000	0.000	0.000
fat, total	g	7.700	7.700	8.800	8.800	4.100	4.100	3.540	3.320
protein, total	g	30.906	30.900	27.913	27.900	18.663	18.700	21.970	21.500
ash	g	1.100	1.100	0.800	0.800	0.800	0.800	0.830	
starch	g						0.000		0.000
sugars	g		0.000		0.000		0.000	0.000	0.000
fibre	g						0.000		0.000
total SFA	%Fat	32.200	31.169	33.000	30.682	32.000	29.268	26.554	32.229
total SFA	g	2.479	2.400	2.904	2.700	1.312	1.200	0.940	1.070
C4:0	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000	0.000	
C6:0	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000	0.000	
C8:0	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000	0.000	
C10:0	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000	0.000	
C12:0	mg	0.015	0.020	0.009	0.010	0.008	0.010	0.010	
C14:0	mg	0.100	0.100	0.106	0.100	0.049	0.050	0.030	
C15:0	mg	0.015	0.020	0.018	0.020	0.008	0.010		
C16:0	mg	1.733	1.640	2.059	1.950	0.886	0.840	0.600	
C17:0	mg	0.039	0.030	0.035	0.030	0.016	0.020		
C18:0	mg	0.562	0.530	0.651	0.620	0.312	0.290	0.290	
C20:0	mg	0.031	0.030	0.026	0.020	0.033	0.030		
C22:0	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000		
C24:0	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000		
total MUFA	%Fat	53.100	50.649	53.200	50.000	51.000	48.780	24.011	49.398
total MUFA	g	4.089	3.900	4.682	4.400	2.091	2.000	0.850	1.640
C14:1	mg	0.039	0.040	0.035	0.030	0.016	0.020		0.800
C16:1	mg	0.508	0.480	0.554	0.520	0.254	0.240	0.080	
C18:1	mg	3.511	3.320	4.048	3.820	1.808	1.710	0.730	
C20:1	mg	0.031	0.030	0.035	0.030	0.016	0.020	0.010	
C22:1	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000	0.000	
C24:1	mg								
total PUFA	%Fat	14.600	14.286	13.700	12.500	16.700	17.073		12.651
total PUFA	g	1.124	1.100	1.206	1.100	0.685	0.700	0.800	0.420
C18:2 n-6	g	0.986	0.930	1.038	0.980	0.537	0.510	0.470	<0.1
C18:3 n-3	g	0.077	0.070	0.070	0.070	0.041	0.040	0.020	470.000
C18:3 n-6	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000		10.000
C18:4	mg						0.000		
C20:4	mg		0.000		0.000		0.000	0.120	
C20:2 n-6	mg	<0.008	0.000	0.009	8.000	0.008	8.000		
C20:3 n-3	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000		

## B6. Raw nutrient data for chicken (Wing)

Country	AGAL	Australia	AGAL	Australia	AGAL	Australia	USA	NZ	Finland
C20:3 n-6	mg		15.000		17.000		12.000		
C20:4 n-6	mg	0.046	44.000	0.062	58.000	0.049	46.000		
C20:5 n-3	mg	<0.008	0.000	<0.009	0.000	0.004	4.000	0.010	
C22:2 n-6	mg	<0.008	0.000	<0.009	0.000	<0.004	0.000		10.000
C22:4 n-6	mg	<0.008	0.000	<0.009	0.000	0.012	12.000		
C22:5 n-3	mg	<0.008	0.000	<0.009	0.000	0.012	12.000	0.030	
C22:6 n-3	mg	<0.008	0.000	<0.009	0.000	0.012	12.000	0.050	
sum n-3 fatty acids	g		0.000		0.000		27.000		50.000
sum n-6 fatty acids	g								
cholesterol	mg	84.000	160.000	69.000	130.000	59.000	79.000	57.000	77.000
sodium	mg	84.000	84.000	70.000	70.000	66.000	66.000	81.000	88.900
potassium	mg	370.000	270.000	200.000	200.000	230.000	230.000	194.000	290.000
magnesium	mg	24.000	24.000	20.000	20.000	22.000	22.000	23.100	194.000
calcium	mg	13.000	13.000	13.000	13.000	13.000	13.000	9.000	22.000
phosphorus	mg		240.000		190.000		200.000	155.000	195.000
iron	mg	0.700	0.700	0.700	0.700	0.400	0.400	0.880	0.770
zinc	mg	1.900	1.900	1.600	1.600	1.100	1.100	1.630	1.200
iodide (iodine)	mg								1.600
selenium, total	µg		30.000		20.000		20.000	17.800	6.000
copper	mg	0.070	0.070	0.050	0.050	0.030	0.030	0.041	17.800
manganese	mg		0.020		0.010		0.010	0.018	4.900
vitamin A, retinol activity equivalents	µg		21.000		22.000		37.000	18.000	
vitamin A	IU						59.000		18.000
vitamin D	µg							10.000	
vitamin E, alpha-tocopherol	mg	0.350	0.400	0.560	0.600	0.300	0.300	0.130	0.100
vitamin K	mg	0.400		0.280		0.520		0.000	0.100
vitamin C (ascorbic acid)	mg	76.000	0.000	45.000	0.000	58.000	0.000	1.200	0.000
folate	mg		0.000		0.000		0.000	4.000	1.200
niacin equivalents	mg	9.000	16.100	6.000	12.400	8.000	12.300	7.359	11.900
riboflavin	mg	0.170	0.170	0.250	0.250	0.130	0.130	0.101	0.100
thiamin (vitamin B1)	mg		0.000	0.080	0.060	0.060	0.060	0.059	0.090
vitamin B-12 (cobalamin)	µg							0.380	0.060
vitamers pyridoxine (hydrochloride)	µg	0.400		0.280		0.520			0.400
pantothenic acid	mg		0.700		0.600		0.700	0.836	0.640
vitamin B-6	mg		0.400		0.280		0.520	0.530	
retinol	mg		21.000		22.000		37.000	18.000	10.000
carotene, beta	µg		0.000		0.000		0.000	0.000	0.000
carotene, alpha	µg		0.000		0.000		0.000	0.000	
biotin	µg		4.200		3.900		2.600		
tryptophan	µg		85.000		85.000		254.000	257.000	
threonine	mg		306.000		306.000		916.000	928.000	
isoleucine	mg		334.000		334.000		999.000	1160.000	
leucine	mg		526.000		526.000		1574.000	1649.000	
lysine	mg		605.000		605.000		1810.000	1866.000	
methionine	mg		154.000		154.000		461.000	608.000	

## B6. Raw nutrient data for chicken (Wing)

Country		AGAL	Australia	AGAL	Australia	AGAL	Australia	USA	NZ	Finland
cystine	mg		74.000		74.000		221.000	281.000		
phenylalanine	mg		261.000		261.000		781.000	872.000		
tyrosine	mg		236.000		236.000		706.000	742.000		
valine	mg		351.000		351.000		1050.000	1090.000		
arginine	mg		417.000		417.000		1248.000	1325.000		
histidine	mg		214.000		214.000		640.000	682.000		
alanine	mg						1179.000	1199.000		
aspartic acid	mg		644.000		644.000		1927.000	1958.000		
glutamic acid	mg		964.000		964.000		2884.000	3290.000		
glycine	mg		312.000		312.000		934.000	1079.000		
proline	mg		266.000		266.000		796.000	903.000		
serine	mg		289.000		289.000		865.000	756.000		

Key: AGAL missing data

Abbreviations: SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## Appendix C: Imputed nutrient data with justification for type of imputation required

### C1. Nutrient data with imputed values for chicken (Breast)

Cooking method		Baked	Justification	Casseroled	Justification	Raw	Justification	Stir-fried	Justification
water	g	67.600		66.700		74.700		68.600	
energy	kcal	152.642		142.611		104.653		124.181	
energy	kJ	638.044		596.113		437.450		519.075	
carbohydrate	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Mean impute AU, NZ, USA	RA	Recommend re analysis (no comparable data)
fat	g	3.900		3.700		1.600		0.900	
protein	g	29.044		27.013		22.250		28.575	
ash	g	1.200		1.000		1.100		1.200	
starch	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Borrowed data NZ FoodFiles	RA	Recommend re analysis (no comparable data)
sugars	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Mean impute AU, NZ, USA	0.000	Borrowed data AU NUTTAB06
fibre	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Mean impute NZ, USA	RA	Recommend re analysis (no comparable data)
	%								
total SFA	fat	34.000		34.300		32.800		33.100	
total SFA	g	1.326		1.269		0.525		0.298	
4:0	mg	<0.004		<0.004		<0.002		<0.001	
6:0	mg	<0.004		<0.004		<0.002		<0.001	
8:0	mg	<0.004		<0.004		<0.002		<0.001	
10:0	mg	<0.004		<0.004		<0.002		<0.001	
12:0	mg	0.780		0.007		0.003		0.200	
14:0	mg	0.047		0.052		0.019		1.200	
15:0	mg	0.008		0.011		0.003		0.300	
16:0	mg	0.905		0.884		0.357		22.900	
17:0	mg	0.016		0.019		0.006		0.400	
18:0	mg	0.316		0.285		0.131		7.700	
20:0	mg	0.012		0.011		0.006		0.400	
22:0	mg	<0.004		<0.004		<0.002		<0.001	
24:0	mg	<0.004		<0.004		<0.002		<0.001	
	%								
total MUFA	fat	50.400		51.000		47.000		50.000	
total MUFA	g	1.966		1.887		0.752		0.450	
14:1	mg	0.016		0.015		0.005		0.400	
16:1	mg	0.218		0.218		0.042		6.000	
18:1	mg	1.716		1.639		0.651		43.200	
20:1	mg	0.016		0.015		0.006		0.400	
22:1	mg	<0.004		<0.004		<0.002		<0.001	
24:1	mg	<0.004		<0.004		<0.002		<0.001	
	%								
total PUFA	fat	15.400		0.537		19.700		17.100	
total PUFA	g	0.601		0.020		0.315		0.154	
18:2 n-6	g	0.484		0.433		0.224		12.800	
18:3 n-3	g	0.035		0.030		0.014		0.900	
18:3 n-6	mg	RA	Recommend re analysis (Australian data)	<0.004		<0.002		<0.001	

## Appendix C: Imputed nutrient data with justification for type of imputation required

### C1. Nutrient data with imputed values for chicken (Breast)

Cooking method		Baked	Justification	Casserole	Justification	Raw	Justification	Stir-fried	Justification
20:2 n-6	mg	0.008		0.007		0.005		0.300	
20:3 n-3	mg	<0.004		<0.004		<0.002		<0.001	
20:3 n-6	mg	RA	Recommend re analysis (no comparable data)	0.007		0.008		0.400	
20:4 n-6	mg	0.035		0.030		0.032		1.300	
20:5 n-3	mg	<0.004		<0.004		0.005		0.200	
22:2 n-6	mg	<0.004		<0.004		<0.002		<0.001	
22:4 n-6	mg	0.012		0.011		0.008		0.400	
22:5 n-3	mg	0.012		0.011		0.010		0.400	
22:6 n-3	mg	0.008		0.007		0.010		0.400	
sum n-3 fatty acids	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
sum n-6 fatty acids	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
cholesterol	mg	84.000		69.000		59.000		62.000	
sodium	mg	46.000		41.000		41.000		43.000	
potassium	mg	320.000		270.000		300.000		350.000	
magnesium	mg	30.000		28.000		28.000		33.000	
calcium	mg	8.600		11.000		12.000		9.500	
phosphorus	mg	280.000		260.000	Borrowed data NUTTAB06	231.000	Mean impute AU, NZ, USA	300.000	Borrowed data NUTTAB06
iron	mg	0.500		0.400		0.400		0.400	
zinc	mg	0.900		0.900		0.700		0.700	
iodide (iodine)	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)
selenium	µg	26.100	Borrowed data AU NUTTAB06 (NB: high variability depending on feed)	RA	Recommend re analysis (no comparable data)	21.4	Mean impute AU, USA	22.800	Borrowed data NUTTAB06
copper	mg	0.040		0.050		0.032		0.060	
manganese	mg	0.010	Borrowed data AU NUTTAB06	0.010	Borrowed data AU NUTTAB06	1.644	Mean impute AU, NZ, USA	0.010	Borrowed data NUTTAB06
vitamin A retinol activity equivalents	µg	7.000	Borrowed data AU NUTTAB06	5.000	Borrowed data AU NUTTAB06	7.000	Mean impute AU, USA	5.000	Borrowed data NUTTAB06
vitamin A	IU	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	15.500	Mean impute USA, NZ	RA	Recommend re analysis (no comparable data)
vitamin D	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin E, alphatocopherol	mg	0.220		0.210		2.200		0.460	
vitamin K	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.200	Borrowed data US USDA	RA	Recommend re analysis (no comparable data)
vitamin C (ascorbic acid)	mg	RA	Recommend re analysis (no comparable data)	0.000	Borrowed data AU NUTTAB06	0.800	Mean impute AU, NZ, USA	0.000	Borrowed data NUTTAB06
folate	mg	RA	Recommend re analysis (no comparable data)	0.000	Borrowed data AU NUTTAB06	4.367	Mean impute AU, NZ, USA	3.000	Borrowed data NUTTAB06
niacin equivalents	mg	11.000		11.000		11.000		14.000	

## Appendix C: Imputed nutrient data with justification for type of imputation required

### C1. Nutrient data with imputed values for chicken (Breast)

Cooking method	Baked	Justification	Casserole	Justification	Raw	Justification	Stir-fried	Justification
riboflavin	mg 0.110		0.100		0.190		0.090	
thiamin (vitamin B1)	mg 0.050		0.050		0.110		0.120	
vitamin B-12 (cobalamin)	µg RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.380	Borrowed data US USDA	RA	Recommend re analysis (no comparable data)
vitamers pyridoxine (hydrochloride)	µg 0.200		0.300		0.760		0.310	
pantothenic acid	mg 1.200	Borrowed data AU NUTTAB06	1.200	Borrowed data AU NUTTAB06	0.910	Mean impute AU, US	1.400	Borrowed data NUTTAB06
vitamin B-6	mg 0.200	Borrowed data AU NUTTAB06	0.300	Borrowed data AU NUTTAB06	0.655	Mean impute AU, US	0.310	Borrowed data NUTTAB06
beta carotene	µg 0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Mean impute AU, US	0.000	Borrowed data NUTTAB06
alpha carotene	µg 0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Mean impute AU, US	0.000	Borrowed data NUTTAB06
biotin	µg 4.200	Borrowed data AU NUTTAB06	3.100	Borrowed data AU NUTTAB06	2.100	Borrowed data AU NUTTAB	3.000	Borrowed data NUTTAB06
alanine	mg 644.000	Borrowed data AU NUTTAB06	644.000	Borrowed data AU NUTTAB06	952.000	Mean impute AU, US	644.000	Borrowed data NUTTAB06
arginine	mg 417.000	Borrowed data AU NUTTAB06	417.000	Borrowed data AU NUTTAB06	905.000	Mean impute AU, US	417.000	Borrowed data NUTTAB06
aspartic acid	mg 644.000	Borrowed data AU NUTTAB06	644.000	Borrowed data AU NUTTAB06	1351.000	Mean impute AU, US	644.000	Borrowed data NUTTAB06
cystine	mg 74.000	Borrowed data AU NUTTAB06	74.000	Borrowed data AU NUTTAB06	185.000	Mean impute AU, US	74.000	Borrowed data NUTTAB06
glutamic acid	mg 964.000	Borrowed data AU NUTTAB06	964.000	Borrowed data AU NUTTAB06	2211.000	Mean impute AU, US	964.000	Borrowed data NUTTAB06
glycine	mg 312.000	Borrowed data AU NUTTAB06	312.000	Borrowed data AU NUTTAB06	723.000	Mean impute AU, US	312.000	Borrowed data NUTTAB06
histidine	mg 213.000	Borrowed data AU NUTTAB06	213.000	Borrowed data AU NUTTAB06	465.500	Mean impute AU, US	214.000	Borrowed data NUTTAB06
isoleucine	mg 334.000	Borrowed data AU NUTTAB06	334.000	Borrowed data AU NUTTAB06	776.500	Mean impute AU, US	334.000	Borrowed data NUTTAB06
leucine	mg 526.000	Borrowed data AU NUTTAB06	526.000	Borrowed data AU NUTTAB06	1129.000	Mean impute AU, US	526.000	Borrowed data NUTTAB06
lysine	mg 605.000	Borrowed data AU NUTTAB06	605.000	Borrowed data AU NUTTAB06	1283.500	Mean impute AU, US	605.000	Borrowed data NUTTAB06
methionine	mg 154.000	Borrowed data AU NUTTAB06	154.000	Borrowed data AU NUTTAB06	396.500	Mean impute AU, US	154.000	Borrowed data NUTTAB06
phenylalanine	mg 261.000	Borrowed data AU NUTTAB06	261.000	Borrowed data AU NUTTAB06	588.500	Mean impute AU, US	261.000	Borrowed data NUTTAB06
proline	mg 266.000	Borrowed data AU NUTTAB06	266.000	Borrowed data AU NUTTAB06	607.500	Mean impute AU, US	266.000	Borrowed data NUTTAB06
serine	mg 289.000	Borrowed data AU NUTTAB06	289.000	Borrowed data AU NUTTAB06	541.500	Mean impute AU, US	289.000	Borrowed data NUTTAB06
threonine	mg 306.000	Borrowed data AU NUTTAB06	306.000	Borrowed data AU	640.500	Mean impute AU, US	306.000	Borrowed data NUTTAB06

## Appendix C: Imputed nutrient data with justification for type of imputation required

### C1. Nutrient data with imputed values for chicken (Breast)

Cooking method		Baked	Justification	Casseroled	Justification	Raw	Justification	Stir-fried	Justification
tryptophan	mg	85.000	Borrowed data AU NUTTAB06	85.000	NUTTAB06 Borrowed data AU NUTTAB06	177.500	Mean impute AU, US	85.000	Borrowed data NUTTAB06
tyrosine	mg	236.000	Borrowed data AU NUTTAB06	236.000	Borrowed data AU NUTTAB06	507.500	Mean impute AU, US	236.000	Borrowed data NUTTAB06
valine	mg	351.000	Borrowed data AU NUTTAB06	351.000	Borrowed data AU NUTTAB06	748.000	Mean impute AU, US	351.000	Borrowed data NUTTAB06

Abbreviations: RA: Re-analysis, AU: Australia, NUTTAB: Nutrient Composition Tables, SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids



## C2. Nutrient data with imputed values for chicken (Fat)

Cooking method		Baked	Justification	Casseroleed	Justification	Raw	Justification	Raw
water	g	41.200		42.700		31.100		31.100
energy	kcal	452.192		445.404		572.099		572.249
energy	kJ	1890.163		1861.788		2391.375		2392.000
carbohydrate, available	g	NA		NA		NA		
fat, total	g	46.600		43.800		62.300		62.300
protein, total	g	9.763		14.188		5.075		5.100
ash	g	0.800		0.600		0.600		0.600
starch, total	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	
sugars, total	g	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed AU NUTTAB06	0.000
fibre, total	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	
total SFA	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	32.200		19.000
4:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062		0.000
6:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062		0.000
8:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062		0.000
10:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062		0.000
12:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.125		0.120
14:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.810		0.760
15:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.187		0.120
16:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	14.142		13.360
17:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.249		0.240
18:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	4.361		4.120
20:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.249		0.240
22:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062		0.000
24:0	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062		0.000
total MUFA	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	53.500		31.600
14:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.249		0.240
16:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	3.738		3.530

## C2. Nutrient data with imputed values for chicken (Fat)

Cooking method	Baked			Casserole		Raw	
			Justification		Justification		Justification
18:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	29.094	27.490
20:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.312	0.290
22:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
24:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
total PUFA	g	5.800	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	13.700	8.000
18:2 n-6	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	7.788	7.360
18:3 n-3	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.623	0.590
18:3 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
18:4	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
20:4	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
20:2 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
20:3 n-3	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
20:3 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
20:4 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.062	59.000
20:5 n-3	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
22:2 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
22:4 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
22:5 n-3	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
22:6 n-3	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	<0.062	0.000
sum n-3 fatty acids	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (data too variable)
sum n-6 fatty acids	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
cholesterol	mg	130.000	Borrowed data AU NUTTAB06	78.000	Borrowed data AU NUTTAB06	78.000	78.000
sodium	mg	51.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	22.000	22.000
potassium	mg	170.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	63.000	63.000

## C2. Nutrient data with imputed values for chicken (Fat)

Cooking method	Baked			Casserole			Raw		
			Justification		Justification		Justification	Raw	
<b>magnesium</b>	mg	13.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	4.800		5.000	
<b>calcium</b>	mg	11.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	9.000		9.000	
<b>phosphorus</b>	mg	140.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	52.000	Borrowed AU NUTTAB06	52.000	
<b>iron, total</b>	mg	0.900	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	0.700		0.700	
<b>zinc</b>	mg	0.900	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	0.300		0.300	
<b>iodide (iodine)</b>	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
<b>selenium, total</b>	µg	20.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	0.000	Borrowed AU NUTTAB06	0.000	
<b>copper</b>	mg	0.050	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	0.040		0.040	
<b>manganese</b>	mg	0.010	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	0.030	Borrowed AU NUTTAB06	0.030	
<b>vitamin A retinol activity equivalents</b>	µg	130.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	120.000	Borrowed AU NUTTAB06	120.000	
<b>vitamin A</b>	IU	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
<b>vitamin D</b>	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
<b>vitamin E, alphatocopherol</b>	mg	1.600	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	0.380		0.400	
<b>vitamin K</b>	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
<b>vitamin C (ascorbic acid)</b>	mg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed AU NUTTAB06	0.000	
<b>folate</b>	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Borrowed AU NUTTAB06	0.000	
<b>niacin equivalents</b>	mg	1.700	Borrowed data AU NUTTAB06	2.400	Borrowed data AU NUTTAB06	2.000		2.900	
<b>riboflavin</b>	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.100		0.100	
<b>thiamin (vitamin B1)</b>	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Borrowed AU NUTTAB06	0.000	
<b>vitamin B-12 (cobalamin)</b>	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
<b>vitamers pyridoxine (hydrochloride)</b>	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.110			
<b>pantothenic acid</b>	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.300	Borrowed AU NUTTAB06	0.300	
<b>vitamin B-6</b>	mg	130.000	Borrowed data AU NUTTAB06	RA	Recommend re analysis (no comparable data)	0.110	Borrowed AU NUTTAB06	0.110	
<b>carotene, beta</b>	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	0.000	Borrowed AU NUTTAB06	0.000	

## C2. Nutrient data with imputed values for chicken (Fat)

Cooking method	Casserole			Raw	Justification	Raw
	Baked	Justification	Justification			
<b>carotene, alpha</b> µg	RA	Recommend re analysis (no comparable data)	RA	0.000	Borrowed AU NUTTAB06	0.000
<b>biotin</b> µg	RA	Recommend re analysis (no comparable data)	RA	1.200	Borrowed AU NUTTAB06	1.200
<b>tryptophan</b> mcg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>threonine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>isoleucine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>leucine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>lysine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>methionine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>cystine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>phenylalanine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>tyrosine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>valine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>arginine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>histidine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>alanine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>aspartic acid</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>glutamic acid</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>glycine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>proline</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	
<b>serine</b> mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)	

Abbreviations: RA: Re-analysis, AU: Australia, NUTTAB: Nutrient Composition Tables, SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## C3. Nutrient data with imputed values for chicken (Leg)

Cooking method	Casserole			Raw	Justification
	Baked	Justification	Justification		

### C3. Nutrient data with imputed values for chicken (Leg)

Cooking method		Casserol		Justification	Raw	Justification
		Baked	ed			
water	g	63.900	64.400		75.200	
energy	kcal	179.064	174.533		117.854	
energy	kJ	748.488	729.550		492.631	
carbohydrate, available	g	RA	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
fat, total	g	7.600	6.600		4.800	
protein, total	g	27.488	28.550		18.531	
ash	g	1.000	0.900		1.000	
starch, total	g	RA	RA	Recommend re analysis (no comparable data)	0.000	Borrowed data NZ FoodFiles
sugars, total	g	0.000	0.000	Borrowed data AU NUTTAB06	0.000	Mean impute from AU, NZ
fibre, total	g	RA	RA	Recommend re analysis (no comparable data)	0.000	Borrowed data NZ FoodFiles
total SFA	%fat	32.400	34.500		30.800	
total SFA	g	2.462	2.277		1.478	
4:0	mg	<0.008	<0.007		<0.005	
6:0	mg	<0.008	<0.007		<0.005	
8:0	mg	<0.008	<0.007		<0.005	
10:0	mg	<0.008	<0.007		<0.005	
12:0	mg	0.015	<0.007		0.010	
14:0	mg	0.091	0.079		0.058	
15:0	mg	0.015	0.020		0.010	
16:0	mg	1.702	1.597		1.003	
17:0	mg	0.030	0.026		0.019	
18:0	mg	0.570	0.554		0.360	
20:0	mg	0.030	<0.007		0.024	
22:0	mg	<0.008	<0.007		<0.005	
24:0	mg	<0.008	<0.007		<0.005	
total MUFA	%fat	52.200	49.900		50.500	
total MUFA	g	3.967	3.293		2.424	
14:1	mg	0.030	0.020		0.019	
16:1	mg	0.494	0.422		0.312	
18:1	mg	3.412	2.831		2.074	
20:1	mg	0.030	0.026		0.019	
22:1	mg	<0.008	<0.007		<0.005	
24:1	mg	<0.008	<0.007		<0.005	
total PUFA	%fat	15.100	15.200		18.500	
total PUFA	g	1.148	1.003		0.888	
18:2 n-6	g	0.942	0.858		0.677	
18:3 n-3	g	0.068	0.053		0.048	
18:3 n-6	mg					
18:4	mg	RA	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
20:4	mg	RA	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
20:2 n-6	mg	0.015	<0.007		0.010	
20:3 n-3	mg	<0.008	<0.007		<0.005	
20:3 n-6	mg					
20:4 n-6	mg	0.061	0.086		0.0816	
20:5 n-3	mg	<0.008	<0.007		<0.005	
22:2 n-6	mg	<0.008	<0.007		<0.005	

### C3. Nutrient data with imputed values for chicken (Leg)

Cooking method	Baked		Casserol		Raw		Justification
	mg	RA	mg	RA	mg	RA	
22:4 n-6	mg	0.015			<0.007		
22:5 n-3	mg	0.015			<0.007		
22:6 n-3	mg	0.015			<0.007		
sum n-3 fatty acids	g	RA	Recommend re analysis (data to be consistent with n-3 values for data set)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (data to be consistent with n-3 values for data set)
sum n-6 fatty acids	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
cholesterol	mg	120.000		100.000		79.000	
sodium	mg	84.000		74.000		71.000	
potassium	mg	380.000		220.000		260.000	
magnesium	mg	26.000		26.000		22.000	
calcium	mg	47.000		17.000		9.600	
phosphorus	mg	290.000	Borrowed data AU NUTTAB06	220.000	Borrowed data AU NUTTAB06	202.000	Mean impute from AU, NZ
iron, total	mg	0.850		0.900		0.600	
zinc	mg	2.600		2.400		1.700	
iodide (iodine)	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
selenium, total	µg	31.100	Borrowed data AU NUTTAB06	30.000	Borrowed data AU NUTTAB06	20.000	Borrowed data AU NUTTAB06
copper	mg	0.070		0.090		0.060	
manganese	mg	0.020	Borrowed data AU NUTTAB06	0.020	Borrowed data AU NUTTAB06	1.860	Mean impute from AU, NZ
vitamin A retinol activity equivalents	µg	18.000	Borrowed data AU NUTTAB06	16.000	Borrowed data AU NUTTAB06	21.000	Mean impute from AU, NZ
vitamin A	IU	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin D	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin E, alphanol	mg	0.370		0.670		0.310	
vitamin K, total	mg	0.290		0.160		0.330	
vitamin C (ascorbic acid)	mg	93.000		61.000		63.000	
folate, total	mg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	7.850	Mean impute from AU, NZ
niacin equivalents, total	mg	5.000		4.000		5.000	
riboflavin	mg	0.280		0.310		0.130	
thiamin (vitamin B1)	mg	0.000	Borrowed data AU NUTTAB06	0.190	Borrowed data AU NUTTAB06	0.140	
vitamin B-12 (cobalamin)	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin B-6 (pyridoxine hydrochloride)	µg	0.290		0.160		0.33	
pantothenic acid	mg	0.600	Borrowed data AU NUTTAB06	0.700	Borrowed data AU NUTTAB06	1.100	Borrowed data AU NUTTAB06
vitamin B-6	mg	0.290	Borrowed data AU NUTTAB06	0.160	Borrowed data AU NUTTAB06	0.330	Borrowed data AU NUTTAB06
carotene, beta	µg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.00	Mean impute from AU, NZ
carotene, alpha	µg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06
biotin	µg	5.400	Borrowed data AU NUTTAB06	4.900	Borrowed data AU NUTTAB06	3.900	Borrowed data AU NUTTAB06
tryptophan	µg	85.000	Borrowed data AU NUTTAB06	85.000	Borrowed data AU NUTTAB06	85.000	Borrowed data AU NUTTAB06
threonine	mg	306.000	Borrowed data AU NUTTAB06	306.000	Borrowed data AU NUTTAB06	306.000	Borrowed data AU NUTTAB06
isoleucine	mg	334.000	Borrowed data AU NUTTAB06	334.000	Borrowed data AU NUTTAB06	334.000	Borrowed data AU NUTTAB06
leucine	mg	526.000	Borrowed data AU NUTTAB06	526.000	Borrowed data AU NUTTAB06	526.000	Borrowed data AU NUTTAB06
lysine	mg	605.000	Borrowed data AU NUTTAB06	605.000	Borrowed data AU NUTTAB06	605.000	Borrowed data AU NUTTAB06
methionine	mg	154.000	Borrowed data AU NUTTAB06	154.000	Borrowed data AU NUTTAB06	154.000	Borrowed data AU NUTTAB06
cystine	mg	74.000	Borrowed data AU NUTTAB06	74.000	Borrowed data AU NUTTAB06	74.000	Borrowed data AU NUTTAB06
phenylalanine	mg	261.000	Borrowed data AU NUTTAB06	261.000	Borrowed data AU NUTTAB06	261.000	Borrowed data AU NUTTAB06
tyrosine	mg	236.000	Borrowed data AU NUTTAB06	236.000	Borrowed data AU NUTTAB06	236.000	Borrowed data AU NUTTAB06

### C3. Nutrient data with imputed values for chicken (Leg)

Cooking method	Baked			Casseroled			Raw		
			Justification			Justification			Justification
valine	mg	351.000	Borrowed data AU NUTTAB06	351.000		Borrowed data AU NUTTAB06	351.000		Borrowed data AU NUTTAB06
arginine	mg	417.000	Borrowed data AU NUTTAB06	417.000		Borrowed data AU NUTTAB06	417.000		Borrowed data AU NUTTAB06
histidine	mg	214.000	Borrowed data AU NUTTAB06	214.000		Borrowed data AU NUTTAB06	214.000		Borrowed data AU NUTTAB06
alanine	mg	RA	Recommend re analysis (no comparable data)	RA		Recommend re analysis (no comparable data)	RA		Recommend re analysis (no comparable data)
aspartic acid	mg	644.000	Borrowed data AU NUTTAB06	644.000		Borrowed data AU NUTTAB06	644.000		Borrowed data AU NUTTAB06
glutamic acid	mg	964.000	Borrowed data AU NUTTAB06	964.000		Borrowed data AU NUTTAB06	964.000		Borrowed data AU NUTTAB06
glycine	mg	312.000	Borrowed data AU NUTTAB06	312.000		Borrowed data AU NUTTAB06	312.000		Borrowed data AU NUTTAB06
proline	mg	266.000	Borrowed data AU NUTTAB06	266.000		Borrowed data AU NUTTAB06	266.000		Borrowed data AU NUTTAB06
serine	mg	289.000	Borrowed data AU NUTTAB06	289.000		Borrowed data AU NUTTAB06	289.000		Borrowed data AU NUTTAB06

Abbreviations: RA: Re-analysis, AU: Australia, NUTTAB: Nutrient Composition Tables, SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## C4. Nutrient data with imputed values for chicken (Skin)

Cooking method	Baked			Casseroleed			Raw		
			Justification			Justification			Justification
water	g	35.000		43.900			53.300		
energy	kcal	434.999		416.574			362.141		
energy	kJ	1818.294		1741.281			1513.750		
carbohydrate, available	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		RA	Recommend re analysis (no comparable data)	
fat, total	g	38.900		38.800			35.100		
protein, total	g	22.294		17.981			12.650		
ash	g	0.900		0.600			0.500		
starch, total	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		RA	Recommend re analysis (no comparable data)	
sugars, total	g	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06		0.000	Borrowed data AU NUTTAB06	
fibre, total	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		RA	Recommend re analysis (no comparable data)	
total SFA	% fat	32.200		31.300			32.400		
total SFA	g	12.526		12.144			11.372		
4:0	mg	<0.039		<0.039			<0.035		
6:0	mg	<0.039		<0.039			<0.035		
8:0	mg	<0.039		<0.039			<0.035		
10:0	mg	<0.039		<0.039			<0.035		
12:0	mg	0.078		0.078			0.070		
14:0	mg	0.545		0.504			0.491		
15:0	mg	0.078		0.078			0.070		
16:0	mg	8.869		8.614			8.038		
17:0	mg	0.156		0.155			0.140		
18:0	mg	0.265		2.522			2.422		
20:0	mg	0.156		0.155			0.140		
22:0	mg	<0.039		<0.039			<0.035		
24:0	mg	<0.039		<0.039			<0.035		
total MUFA	%Fat	53.800		54.200			23.200		
total MUFA	g	20.928		21.030			8.143		
14:1	mg	0.156		0.155			0.140		
16:1	mg	2.567		2.638			2.211		
18:1	mg	18.050		18.042			16.146		
20:1	mg	0.156		0.400			0.140		
22:1	mg	<0.039		<0.039			<0.035		
24:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		RA	Recommend re analysis (no comparable data)	
total PUFA	%Fat	13.900		14.300			13.900		
total PUFA	g	5.407		5.548			4.879		
18:2 n-6	g	4.863		4.966			4.423		
18:3 n-3	g	0.428		0.427			0.386		
18:3 n-6	mg	<0.039		<0.039			<0.035		
18:4	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		RA	Recommend re analysis (no comparable data)	
20:4	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		RA	Recommend re analysis (no comparable data)	
20:2 n-6	mg	0.039		<0.039			<0.035		
20:3 n-3	mg	<0.039		<0.039			<0.035		
20:3 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		RA	Recommend re analysis (no comparable data)	
20:4 n-6	mg	0.117		0.166			0.070		
20:5 n-3	mg	<0.039		<0.039			<0.035		



## C4. Nutrient data with imputed values for chicken (Skin)

Cooking method	Baked		Casserole		Raw	
	mg	Justification	mg	Justification	mg	Justification
22:2 n-6	mg	<0.039	<0.039		<0.035	
22:4 n-6	mg	<0.039	<0.039		<0.035	
22:5 n-3	mg	<0.039	<0.039		<0.035	
22:6 n-3	mg	<0.039	<0.039		<0.035	
sum n-3 fatty acids	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
sum n-6 fatty acids	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
cholesterol	mg	140.000	130.000		84.000	
sodium	mg	78.000	51.000		43.000	
potassium	mg	220.000	150.000		120.000	
magnesium	mg	25.000	17.000		8.400	
calcium	mg	54.000	13.000		13.000	
phosphorus	mg	260.000 Borrowed data AU NUTTAB06	160.000 Borrowed data AU NUTTAB06		99.000 Borrowed data AU NUTTAB06	
iron, total	mg	1.200	0.900		0.700	
zinc	mg	1.500	1.100		0.700	
iodide (iodine)	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
selenium, total	µg	30.000 Borrowed data AU NUTTAB06	20.000 Borrowed data AU NUTTAB06		0.000 Borrowed data AU NUTTAB06	
copper	µg	0.080	0.060		0.040	
manganese	mg	0.030 Borrowed data AU NUTTAB06	0.020 Borrowed data AU NUTTAB06		0.020 Borrowed data AU NUTTAB06	
vitamin A retinol activity equivalents	mg	130.000 Borrowed data AU NUTTAB06	100.000 Borrowed data AU NUTTAB06		110.000 Borrowed data AU NUTTAB06	
vitamin A	IU	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
vitamin D	µg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
vitamin E, alphatocopherol	µg	2.100	1.700		0.780	
vitamin K, total	mg	0.200	0.690		0.110	
vitamin C (ascorbic acid)	µg	56.000	53.000		32.000	
folate, total	mg	0.000 Borrowed data AU NUTTAB06	0.000 Borrowed data AU NUTTAB06		0.000 Borrowed data AU NUTTAB06	
niacin equivalents, total	µg	6.000	4.000		2.000	
riboflavin	mg	0.190	0.140		0.100	
thiamin (vitamin B1)	mg	0.000 Borrowed data AU NUTTAB06	0.000 Borrowed data AU NUTTAB06		0.000 Borrowed data AU NUTTAB06	
vitamin B-12 (cobalamin)	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
pantothenic acid	mg	0.700 Borrowed data AU NUTTAB06	0.600 Borrowed data AU NUTTAB06		0.300 Borrowed data AU NUTTAB06	
vitamin B-6	mg	0.200 Borrowed data AU NUTTAB06	0.690 Borrowed data AU NUTTAB06		0.110 Borrowed data AU NUTTAB06	
carotene, beta	µg	0.000	0.000		0.000	
carotene, alpha	µg	0.000	0.000		0.000	
biotin	µg	3.500	3.200		1.500	
tryptophan	mcg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
threonine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
isoleucine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
leucine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
lysine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
methionine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
cystine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
phenylalanine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
tyrosine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
valine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
arginine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	
histidine	mg	RA Recommend re analysis (no comparable data)	RA Recommend re analysis (no comparable data)		RA Recommend re analysis (no comparable data)	

## C4. Nutrient data with imputed values for chicken (Skin)

Cooking method	Baked			Casseroled			Raw		
			Justification		Justification		Justification		
alanine	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
aspartic acid	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
glutamic acid	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
glycine	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
proline	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		
serine	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)		

Abbreviations: RA: Re-analysis, AU: Australia, NUTTAB: Nutrient Composition Tables, SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## C5. Nutrient data with imputed values for chicken (Thigh)

Cooking method		Baked	Justification	Casserole	Justification	Raw	Justification
water	g	65.600		63.100		75.000	
energy	kcal	175.431		193.556		118.506	
energy	kJ	733.300		809.063		495.356	
carbohydrate, available	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
fat, total	g	8.700		9.800		5.000	
protein, total	g	24.200		26.263		18.256	
ash	g	1.000		0.900		1.000	
starch, total	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
sugars, total	g	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06
fibre, total	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
total SFA	% fat	32.800		32.900		31.900	
total SFA	g	2.854		3.224		1.595	
4:0	mg	<0.009		<0.010		<0.005	
6:0	mg	<0.009		<0.010		<0.005	
8:0	mg	<0.009		<0.010		<0.005	
10:0	mg	<0.009		<0.010		<0.005	
12:0	mg	0.017		0.020		0.010	
14:0	mg	0.113		0.137		0.065	
15:0	mg	0.017		0.020		0.010	
16:0	mg	1.966		2.254		1.095	
17:0	mg	0.035		0.039		0.020	
18:0	mg	0.661		0.715		0.375	
20:0	mg	0.035		0.039		0.020	
22:0	mg	<0.009		<0.010		<0.005	
24:0	mg	<0.009		<0.010		<0.005	
total MUFA	% fat	52.300		52.400		50.800	
total MUFA	g	4.550		5.135		2.540	
14:1	mg	0.035		0.049		0.020	
16:1	mg	0.548		0.617		0.300	
18:1	mg	3.932		4.439		2.200	
20:1	mg	0.035		0.039		0.020	
22:1	mg	<0.009		<0.010		<0.005	
24:1	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
total PUFA	% fat	14.700		14.500		17.100	
total PUFA	g	1.279		1.421		0.855	
18:2 n-6	g	1.105		1.264		0.685	
18:3 n-3	g	0.087		0.098		0.050	
18:3 n-6	mg	<0.009		<0.010		<0.005	
18:4	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
20:4	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
20:2 n-6	mg	0.017		<0.010		0.010	

## C5. Nutrient data with imputed values for chicken (Thigh)

Cooking method		Baked	Justification	Casserole	Justification	Raw	Justification
20:3 n-3	mg	<0.009		<0.010		<0.005	
20:3 n-6	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
20:4 n-6	mg	0.061		0.069		0.060	
20:5 n-3	mg	<0.009		<0.010		<0.005	
22:2 n-6	mg	<0.009		<0.010		<0.005	
22:4 n-6	mg	<0.009		<0.010		0.015	
22:5 n-3	mg	<0.009		<0.010		0.015	
22:6 n-3	mg	<0.009		<0.010		0.010	
sum n-3 fatty acids	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
sum n-6 fatty acids	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
cholesterol	mg	160.000		130.000		79.000	
sodium	mg	76.000		62.000		62.000	
potassium	mg	390.000		230.000		280.000	
magnesium	mg	26.000		22.000		24.000	
calcium	mg	18.000		15.000		9.500	
phosphorus	mg	240.000	Borrowed data AU NUTTAB06	210.000	Borrowed data AU NUTTAB06	220.000	Borrowed data AU NUTTAB06
iron, total	mg	0.900		0.900		0.700	
zinc	mg	2.000		2.100		1.500	
iodide (iodine)	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
selenium, total	µg	30.000	Borrowed data AU NUTTAB06	30.000	Borrowed data AU NUTTAB06	20.000	Borrowed data AU NUTTAB06
copper	mg	0.070		0.080		0.060	
manganese	mg	0.020	Borrowed data AU NUTTAB06	0.020	Borrowed data AU NUTTAB06	0.020	Borrowed data AU NUTTAB06
vitamin A retinol activity equivalents	µg	24.000	Borrowed data AU NUTTAB06	17.000	Borrowed data AU NUTTAB06	19.000	Borrowed data AU NUTTAB06
vitamin A	IU	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin D	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin E, alphatocopherol	mg	0.360		0.470		0.640	
vitamin K, total	mg	0.300		0.250		0.270	
vitamin C (ascorbic acid)	mg	84.000		64.000		69.000	
folate, total	mg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	14.000	
niacin equivalents, total	mg	6.000		5.000		6.000	
riboflavin	mg	0.330		0.220		0.270	
thiamin (vitamin B1)	mg	0.060		0.190		0.110	
vitamin B-12 (cobalamin)	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin B-6	µg	0.300		0.250		0.270	
vitamin B-12 (cobalamin)	µg	0.300	Borrowed data AU NUTTAB06	0.800	Borrowed data AU NUTTAB06	1.200	Borrowed data AU NUTTAB06
vitamin B-6	mg	0.300	Borrowed data AU NUTTAB06	0.250	Borrowed data AU NUTTAB06	0.270	Borrowed data AU NUTTAB06
carotene, beta	µg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06
carotene, alpha	µg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06
biotin	µg	4.800	Borrowed data AU NUTTAB06	4.800	Borrowed data AU NUTTAB06	3.700	Borrowed data AU NUTTAB06
tryptophan	µg	85.000	Borrowed data AU NUTTAB06	85.000	Borrowed data AU NUTTAB06	85.000	Borrowed data AU NUTTAB06
threonine	mg	306.000	Borrowed data AU NUTTAB06	306.000	Borrowed data AU NUTTAB06	306.000	Borrowed data AU NUTTAB06

## C5. Nutrient data with imputed values for chicken (Thigh)

Cooking method		Baked	Justification	Casseroled	Justification	Raw	Justification
isoleucine	mg	334.000	Borrowed data AU NUTTAB06	334.000	Borrowed data AU NUTTAB06	334.000	Borrowed data AU NUTTAB06
leucine	mg	526.000	Borrowed data AU NUTTAB06	526.000	Borrowed data AU NUTTAB06	526.000	Borrowed data AU NUTTAB06
lysine	mg	605.000	Borrowed data AU NUTTAB06	605.000	Borrowed data AU NUTTAB06	605.000	Borrowed data AU NUTTAB06
methionine	mg	154.000	Borrowed data AU NUTTAB06	154.000	Borrowed data AU NUTTAB06	154.000	Borrowed data AU NUTTAB06
cystine	mg	74.000	Borrowed data AU NUTTAB06	74.000	Borrowed data AU NUTTAB06	74.000	Borrowed data AU NUTTAB06
phenylalanine	mg	261.000	Borrowed data AU NUTTAB06	261.000	Borrowed data AU NUTTAB06	261.000	Borrowed data AU NUTTAB06
tyrosine	mg	236.000	Borrowed data AU NUTTAB06	236.000	Borrowed data AU NUTTAB06	236.000	Borrowed data AU NUTTAB06
valine	mg	351.000	Borrowed data AU NUTTAB06	351.000	Borrowed data AU NUTTAB06	351.000	Borrowed data AU NUTTAB06
arginine	mg	417.000	Borrowed data AU NUTTAB06	417.000	Borrowed data AU NUTTAB06	417.000	Borrowed data AU NUTTAB06
histidine	mg	214.000	Borrowed data AU NUTTAB06	214.000	Borrowed data AU NUTTAB06	214.000	Borrowed data AU NUTTAB06
alanine	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
aspartic acid	mg	644.000	Borrowed data AU NUTTAB06	644.000	Borrowed data AU NUTTAB06	644.000	Borrowed data AU NUTTAB06
glutamic acid	mg	964.000	Borrowed data AU NUTTAB06	964.000	Borrowed data AU NUTTAB06	964.000	Borrowed data AU NUTTAB06
glycine	mg	312.000	Borrowed data AU NUTTAB06	312.000	Borrowed data AU NUTTAB06	312.000	Borrowed data AU NUTTAB06
proline	mg	266.000	Borrowed data AU NUTTAB06	266.000	Borrowed data AU NUTTAB06	266.000	Borrowed data AU NUTTAB06
serine	mg	289.000	Borrowed data AU NUTTAB06	289.000	Borrowed data AU NUTTAB06	289.000	Borrowed data AU NUTTAB06

Abbreviations: RA: Re-analysis, AU: Australia, NUTTAB: Nutrient Composition Tables, SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids

## C6. Nutrient data with imputed values for chicken (Wing)

Cooking method		Baked	Justification	Casserole	Justification	Raw	Justification
	water	g	60.500			74.800	
	energy	kcal	193.853			112.192	
	energy	kJ	810.306			468.963	
	carbohydrate, available	g	RA	Recommend re analysis (no comparable data)	RA	0.000	Borrowed data AU NUTTAB06
	fat, total	g	7.700		8.800	4.100	
	protein, total	g	30.906		27.913	18.663	
	ash	g	1.100		0.800	0.800	
	starch, total	g	RA	Recommend re analysis (no comparable data)	RA	0.000	Borrowed data AU NUTTAB06
	sugars, total	g	0.000	Borrowed data AU NUTTAB06	0.000	0.000	Borrowed data AU NUTTAB06
	fibre, total	g	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)
	total SFA	%fat	32.200		33.000	32.000	
	total SFA	g	2.479		2.904	1.312	
	4:0	mg	<0.008		<0.009	<0.004	
	6:0	mg	<0.008		<0.009	<0.004	
	8:0	mg	<0.008		<0.009	<0.004	
	10:0	mg	<0.008		<0.009	<0.004	
	12:0	mg	0.015		0.009	0.008	
	14:0	mg	0.100		0.106	0.049	
	15:0	mg	0.015		0.018	0.008	
	16:0	mg	1.733		2.059	0.886	
	17:0	mg	0.039		0.035	0.016	
	18:0	mg	0.562		0.651	0.312	
	20:0	mg	0.031		0.026	0.033	
	22:0	mg	<0.008		<0.009	<0.004	
	24:0	mg	<0.008		<0.009	<0.004	
	total MUFA	%fat	53.100		53.200	51.000	
	total MUFA	g	4.089		4.682	2.091	
	14:1	mg	0.039		0.035	0.016	
	16:1	mg	0.508		0.554	0.254	
	18:1	mg	3.511		4.048	1.808	
	20:1	mg	0.031		0.035	0.016	
	22:1	mg	<0.008		<0.009	<0.004	
	24:1	mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)
	total PUFA	%fat	14.600		13.700	16.700	
	total PUFA	g	1.124		1.206	0.685	
	18:2 n-6	g	0.986		1.038	0.537	
	18:3 n-3	g	0.077		0.070	0.041	
	18:3 n-6	mg	<0.008		<0.009	<0.004	
	18:4	mg	RA	Recommend re analysis (no comparable data)	RA	RA	Recommend re analysis (no comparable data)
	20:4	mg	0.000	Borrowed data AU NUTTAB06	0.000	0.000	Borrowed data AU NUTTAB06
	20:2 n-6	mg	<0.008		0.009	0.008	
	20:3 n-3	mg	<0.008		<0.009	<0.004	

## C6. Nutrient data with imputed values for chicken (Wing)

Cooking method		Baked	Justification	Casserole	Justification	Raw	Justification
20:3 n-6	mg	15.000	Borrowed data AU NUTTAB06	17.000	Borrowed data AU NUTTAB06	12.000	Borrowed data AU NUTTAB06
20:4 n-6	mg	0.046		0.062		0.049	
20:5 n-3	mg	<0.008		<0.009		0.004	
22:2 n-6	mg	<0.008		<0.009		<0.004	
22:4 n-6	mg	<0.008		<0.009		0.012	
22:5 n-3	mg	<0.008		<0.009		0.012	
22:6 n-3	mg	<0.008		<0.009		0.012	
sum n-3 fatty acids	g	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	27.000	Borrowed data AU NUTTAB06
sum n-6 fatty acids	g	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
cholesterol	mg	84.000		69.000		59.000	
sodium	mg	84.000		70.000		66.000	
potassium	mg	370.000		200.000		230.000	
magnesium	mg	24.000		20.000		22.000	
calcium	mg	13.000		13.000		13.000	
phosphorus	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
iron, total	mg	0.700		0.700		0.400	
zinc	mg	1.900		1.600		1.100	
iodide (iodine)	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
selenium, total	µg	30.000	Borrowed data AU NUTTAB06	20.000	Borrowed data AU NUTTAB06	20.000	Borrowed data AU NUTTAB06
copper	mg	0.070		0.050		0.030	
manganese	mg	0.020	Borrowed data AU NUTTAB06	0.010	Borrowed data AU NUTTAB06	0.010	Borrowed data AU NUTTAB06
vitamin A retinol activity equivalents	µg	21.000	Borrowed data AU NUTTAB06	22.000	Borrowed data AU NUTTAB06	37.000	Borrowed data AU NUTTAB06
vitamin A	IU	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin D	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamin E, alphatocopherol	mg	0.350		0.560		0.300	
vitamin K, total	mg	0.400		0.280		0.520	
vitamin C (ascorbic acid)	mg	76.000		45.000		58.000	
folate, total	mg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06
niacin equivalents, total	mg	9.000		6.000		8.000	
riboflavin	mg	0.170		0.250		0.130	
thiamin (vitamin B1)	mg	0.000	Borrowed data AU NUTTAB06	0.080		0.060	
vitamin B-12 (cobalamin)	µg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)
vitamers pyridoxine (hydrochloride)	µg	0.400		0.280		0.520	
pantothenic acid	mg	0.700	Borrowed data AU NUTTAB06	0.600	Borrowed data AU NUTTAB06	0.700	Borrowed data AU NUTTAB06
vitamin B-6	mg	0.400	Borrowed data AU NUTTAB06	0.280	Borrowed data AU NUTTAB06	0.520	Borrowed data AU NUTTAB06
carotene, beta	µg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06
carotene, alpha	µg	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06	0.000	Borrowed data AU NUTTAB06
biotin	µg	4.200	Borrowed data AU NUTTAB06	3.900	Borrowed data AU NUTTAB06	2.600	Borrowed data AU NUTTAB06
tryptophan	µg	85.000	Borrowed data AU NUTTAB06	85.000	Borrowed data AU NUTTAB06	254.000	Borrowed data AU NUTTAB06
threonine	mg	306.000	Borrowed data AU NUTTAB06	306.000	Borrowed data AU NUTTAB06	916.000	Borrowed data AU NUTTAB06
isoleucine	mg	334.000	Borrowed data AU NUTTAB06	334.000	Borrowed data AU NUTTAB06	999.000	Borrowed data AU NUTTAB06
leucine	mg	526.000	Borrowed data AU NUTTAB06	526.000	Borrowed data AU NUTTAB06	1574.000	Borrowed data AU NUTTAB06

## C6. Nutrient data with imputed values for chicken (Wing)

Cooking method		Baked	Justification	Casseroled	Justification	Raw	Justification
lysine	mg	605.000	Borrowed data AU NUTTAB06	605.000	Borrowed data AU NUTTAB06	1810.000	Borrowed data AU NUTTAB06
methionine	mg	154.000	Borrowed data AU NUTTAB06	154.000	Borrowed data AU NUTTAB06	461.000	Borrowed data AU NUTTAB06
cystine	mg	74.000	Borrowed data AU NUTTAB06	74.000	Borrowed data AU NUTTAB06	221.000	Borrowed data AU NUTTAB06
phenylalanine	mg	261.000	Borrowed data AU NUTTAB06	261.000	Borrowed data AU NUTTAB06	781.000	Borrowed data AU NUTTAB06
tyrosine	mg	236.000	Borrowed data AU NUTTAB06	236.000	Borrowed data AU NUTTAB06	706.000	Borrowed data AU NUTTAB06
valine	mg	351.000	Borrowed data AU NUTTAB06	351.000	Borrowed data AU NUTTAB06	1050.000	Borrowed data AU NUTTAB06
arginine	mg	417.000	Borrowed data AU NUTTAB06	417.000	Borrowed data AU NUTTAB06	1248.000	Borrowed data AU NUTTAB06
histidine	mg	214.000	Borrowed data AU NUTTAB06	214.000	Borrowed data AU NUTTAB06	640.000	Borrowed data AU NUTTAB06
alanine	mg	RA	Recommend re analysis (no comparable data)	RA	Recommend re analysis (no comparable data)	1179.000	Borrowed data AU NUTTAB06
aspartic acid	mg	644.000	Borrowed data AU NUTTAB06	644.000	Borrowed data AU NUTTAB06	1927.000	Borrowed data AU NUTTAB06
glutamic acid	mg	964.000	Borrowed data AU NUTTAB06	964.000	Borrowed data AU NUTTAB06	2884.000	Borrowed data AU NUTTAB06
glycine	mg	312.000	Borrowed data AU NUTTAB06	312.000	Borrowed data AU NUTTAB06	934.000	Borrowed data AU NUTTAB06
proline	mg	266.000	Borrowed data AU NUTTAB06	266.000	Borrowed data AU NUTTAB06	796.000	Borrowed data AU NUTTAB06
serine	mg	289.000	Borrowed data AU NUTTAB06	289.000	Borrowed data AU NUTTAB06	865.000	Borrowed data AU NUTTAB06

Abbreviations: RA: Re-analysis, AU: Australia, NUTTAB: Nutrient Composition Tables, SFA: Saturated fatty acids, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids



## **Appendix D: Suggested protocols for cooking samples for future analyses**

### **Dry-fry**

1. Weigh raw meat.
2. Use a non- stick frying pan or sauce pan.
3. Pan fry at high temperature for 5 minutes turning regularly to prevent sticking.
4. Weigh cooked meat.

### **Stir-fry**

1. Weigh raw meat.
2. Use a non stick frying pan or wok.
3. Ensure that cooking surface is sizzling hot.
4. Stir fry meat in batches of 200g at high temperature for 3 minutes tossing meat to prevent sticking.
5. Weigh cooked meat.

### **Grill**

1. Weigh raw meat.
2. Use an electric grill.
3. Ensure that cooking surface is sizzling hot.
4. Place meat on the surface and let it cook until moisture appears on the top surface (2 minutes).
5. Turn meat over and cook until steak feels 'soft' with the back of tongs (4 minutes).
6. Weigh cooked meat.

### **Roast**

1. Weigh raw meat.
2. Preheat electric or gas oven to 200°C.
3. Place roast on a rack in a baking dish.
4. Cook for 20 minutes/500g to an internal temperature of 70°C.
5. Weigh cooked meat.

### **Bake**

1. Weigh raw meat.
2. Preheat electric or gas oven to 220°C.
3. Place roast on a rack in a baking dish.
4. Cook for 35 minutes/500g to an internal temperature of 70°C.
5. Weigh cooked meat.

### **Casserole**

1. Weigh raw meat.
2. Use a deep-sided pan.
3. Brown meat in small batches (200g) at high temperature – stirring to prevent meat from sticking.
4. When meat is brown, remove and repeat with other batches if required.
5. Return meat to the pan and add ½ cup of water per 500g meat.
6. Reduce heat to low.
7. Cover and simmer for 2 hours stirring occasionally.
8. Meat should be removed from the liquid immediately after cooked and weighed.

## Appendix E: Submitting analytical data for consideration for NUTTAB

In order for FSANZ to consider analytical data for inclusion in NUTTAB, the following information would need to be provided:

- Background about the data itself including
  - product samples and brands that were analysed
  - origin of product samples
  - number of samples analysed
  - laboratory that analysed the samples
  - year of analysis
  - nutrients analysed for
- There are no specified protocols for the number of samples that should be tested, however, a representative sample for the product is suggested. For chicken meat for example if data for the ratio of males to females, breed and region of the bird and average size for age of the bird are available, this can be used to justify the sampling method. All sampling information should accompany the submission to FSANZ. The example below shows the information submitted for the chicken, wing, lean, raw data for NUTTAB 2006 online version.
  - Food ID: 08C10167
  - Scientific Name: Gallus gallus
  - Description: Uncooked flesh from wing portion of a chicken. All skin removed.
  - Group: Meat and Meat Products: Poultry
  - Derivation: Analysed
  - Sampling Details: Ten fresh, chilled size 15 birds each were provided by Inghams and Steggle. Laboratory analysis was carried out for Proximates, minerals, fatty acids and vitamins (AGAL,1998). Amino acids were determined in various cut of lean meat purchased from retail outlets in Melbourne during 1984 (Fox *et al.*1988). Vitamin C and carbohydrates were imputed.
  - Reference: Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.
  - Edible Portion: Lean Meat 34%,
  - Inedible Portion: Other Inedible 40% , Skin 23%, Dissection loss 4%
  - Fat Factor: 0.945
  - Nitrogen Factor: 6.25
- The online version of NUTTAB allows you to enter a food name. This will then provide all of the background information relevant to sampling.

## Appendix F: NUTTAB 2006 Online information for chicken meat

The online version of NUTTAB 2006 also contains sampling information about each item contained within the database. The entries for Chicken meat are shown below.

### Chicken , Wing, Lean, Raw

<b>Food ID:</b>	08C10167
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Uncooked flesh from wing portion of a chicken. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Laboratory analysis was carried out for Proximates, minerals, fatty acids and vitamins (AGAL,1998). Amino acids were determined in various cut of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). Vitamin C and carbohydrates were imputed.
<b>Reference:</b>	(1) Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Breast, Lean, Baked

<b>Food ID:</b>	08C10166
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Baked flesh from breast portion of the chicken. All skin removed after baking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Proximates, vitamins, minerals and fatty acids were determined in a composite sample of ten fresh, chilled size 15 birds each provided by Inghams and Steggles in 1998. Whole chickens were baked in an industrial electrically heated oven without giblets, in a baking dish containing about 2cm water at 180 *C until the juices were clear (AGAL,1998). Amino acids were determined in various cuts of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). As, Cd, Cu, Hg, Pb, Sb, Se, and Zn determined in 21 samples of skin-on breasts purchased nationwide in 2000, grilled with skin and skin then removed (20th ATDS). Se also determined in a total of 6 samples of skinless breasts purchased in NSW, TAS and WA in 2004 and grilled; I, Ni, Cr, Mo also determined (22nd ATDS). Folate was estimated in a composite of 6 skinless samples purchased in Sydney during March 2005 and grilled (Arcot, J. 2005). Moisture and iodine were analysed from 8 samples of grilled chicken breasts purchased from Melbourne supermarkets in 2005 (FSANZ, Iodine Project, 2006). Vitamin C and carbohydrates were imputed.
<b>Reference:</b>	(1) Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323. (2) Food Standards Australia New Zealand. (2003) The 20th Australian Total Diet Survey, Canberra, Food Standards Australian New Zealand.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Breast, Lean, Casseroled

<b>Food ID:</b>	08C10177
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Flesh from breast portion of a chicken baked in a casserole dish with added water, then drained. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Chicken were dissected into breast, wing, thigh and drumstick portions. The portions were washed and dried before browning in a nonstick frypan. The browned pieces were cooked in a casserole dish with lid containing 250 ml of water for each kg of chicken, at 180°C for 45 min. Laboratory analysis was carried out for estimation of proximates, minerals, vitamins and fatty acids (AGAL,1998). Amino acids were determined in light and dark chicken meat from samples collected in Melbourne during 1984. Vitamin C and carbohydrates are imputed.
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Breast, Raw, Lean

<b>Food ID:</b>	08C10165
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Uncooked flesh from breast portion of the chicken. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Individual samples were processed for the laboratory analysis. Proximates, minerals, vitamins and fatty acids were measured AGAL (1998). Amino acids were determined in various cut of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). Moisture and iodine were analysed in 8 samples of unbranded chicken breasts purchased from Melbourne supermarkets in 2005 (FSANZ, Iodine project, 2006). Vitamin C and Carbohydrates were imputed.
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Breast, Stir-Fried, Lean

<b>Food ID:</b>	08C10183
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Flesh from breast portion of a chicken cut into thin strips and fried (without oil) in a pan. All separable fat trimmed before cooking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. The skin was removed and breasts were cut in to small thin strips and aliquots homogenised to form a composite. Laboratory analysis was carried out for proximates, minerals, vitamins and fatty acids (AGAL, 1998). Amino acids were determined in various cuts of lean, light and dark chicken meat from samples purchased from retail outlets in Melbourne during 1984 . Folate was estimated in a composite of 6 samples purchased in Sydney during March 2005 and cooked by grilling. As, Cd, Pb, Hg, Cu, Sb, Se and Zn determined in 21 samples of breasts (skin on) purchased nationwide in 2000, grilled with skin, then skin removed (20th ATDS). Se, I, Ni, Cr, Mo also determined in a total of 6 samples of skinless breasts purchased in NSW, TAS and WA in 2004 and grilled (22nd ATDS). Vitamin C and carbohydrates are imputed.
<b>Reference:</b>	(1) Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323. (2) Food Standards Australia New Zealand. (2003) The 20th Australian Total Diet Survey, Canberra, Food Standards Australian New Zealand.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Drumstick, Lean, Baked

<b>Food ID:</b>	08C10172
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Baked flesh from drumstick portion of a chicken. All skin removed after baking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled, size 15 birds each were provided by Inghams and Steggles. Samples were baked in an industrial electrically heated oven on low fan speed without gibblets in a baking dish containing 2cm of water and baked at 180°C until the juices ran clear. Laboratory analysis was carried out for proximates, minerals, vitamins and fatty acids (AGAL,1998). Amino acids were determined in various cuts of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). As, Cd, Cu, Hg, Pb, Se, Zn, Tin and Sb were estimated in 9 samples purchased nationwide and then baked during 1998 (19th ATDS). Moisture and iodine were analysed from 8 samples of raw chicken drumsticks purchased from Melbourne supermarkets, then baked without oil until cooked, in 2005 (FSANZ, Iodine Project, 2006). Vitamin C and carbohydrates were imputed.
<b>Reference:</b>	(1) Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

(2) Australia New Zealand Food Authority. (2001) The 19th Australian Total Diet Survey, Canberra, Australian New Zealand Food Authority.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Drumstick, Lean, Casseroled

<b>Food ID:</b>	08C10180
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Flesh from drumstick portion of a chicken baked in casserole dish with added water, then drained. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Chickens were dissected into breast, wing, drumstick and thigh portions. The portions were washed and dried before browning in a nonstick frypan. The browned pieces were cooked in a casserole dish with lid containing 250ml of water for each kg of chicken, at 180°C for 45 minutes. After cooking the portions were drained and allowed to cool. Laboratory analysis was carried out to estimate proximates, minerals, vitamins and fatty acids (AGAL, 1998). Amino acids were determined in light and dark chicken meat from samples collected in Melbourne during 1984. Vitamin C and carbohydrates are imputed.
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Drumstick, Lean, Raw

<b>Food ID:</b>	08C10171
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Uncooked flesh from drumstick portion of a chicken. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each provided by Inghams and Steggles. Laboratory analysis was carried out for proximates, fatty acids, minerals and vitamins (AGAL, 1998). Amino acids were determined in various cuts of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). Moisture and iodine were analysed from 8 samples of raw chicken drumsticks purchased from Melbourne supermarkets in 2005 (FSANZ, Iodine Project, 2006). Vitamin C and carbohydrates were imputed.
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Fat, Baked

<b>Food ID:</b>	08C10176
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Fat able to be separated from the flesh and skin of chicken after baking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled, size 15 birds each were provided by Inghams and Steggles and baked in an electric oven on low fan speed at 180°C without gibblets in a baking dish containing 2cm water until juices ran clear. Fat from all portions of the cooked chicken was combined to form a single composite sample. Laboratory analysis carried out for proximates and fatty acids (fatty acids determined on raw fat only and imputed to baked fat) (AGAL,1998). Vitamin C and carbohydrates were imputed.

*Source: Food standards Australia and New Zealand, NUTTAB online.*

### Chicken, Separable Fat, Composite, Casseroled

<b>Food ID:</b>	08C10182
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Fat from a fresh chicken, cooked in a casserole dish with added water.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Chickens were dissected into breast, wing, drumstick and thigh portions and cooked by browning in a nonstick frypan, then casseroled (250ml of water for each kg of chicken), at 180°C for 45 minutes. Fat was separated from flesh after cooking. Laboratory analysis was carried out to estimate proximates and fatty acids (AGAL, 1998). Vitamin C and carbohydrates were imputed.

*Source: Food standards Australia and New Zealand, NUTTAB online.*

### Chicken, Separable Fat, Composite, Raw

<b>Food ID:</b>	08C10175
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Fat able to be separated from flesh and skin of uncooked chicken.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled, size 15 birds each were provided by Inghams and Steggles. Fat from all portions of the bird were homogenised to form a single fat composite sample. Laboratory analysis carried out for proximates, vitamins, minerals and fatty acids (AGAL,1998). Vitamin C and carbohydrates were imputed.

*Source: Food standards Australia and New Zealand, NUTTAB online.*

### Chicken, Separable Fat, Raw

<b>Food ID:</b>	08C10184
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Uncooked fat from various parts of the chicken.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. The chicken were dissected into breast, wings, thighs and drumsticks. Fat from each piece was homogenised to form a fat composite. Moisture, minerals, fatty acids, and few vitamins were estimated by laboratory analysis (AGAL, 1998). Vitamin C and carbohydrates were imputed.

*Source: Food standards Australia and New Zealand, NUTTAB online.*

### Chicken, Skin, Composite, Baked

<b>Food ID:</b>	08C10174
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Baked skin, seperated from the flesh of chicken after baking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled, size 15 birds each were provided by Inghams and Steggles and baked in an electric oven in a baking dish containing 2cm of water at 180°C until juices ran clear. The cooked skin from the entire bird was pooled to form a composite sample. Laboratory analysis carried out for proximates, fatty acids, minerals, and vitamins (AGAL,1998). Vitamin C and carbohydrates were imputed.

*Source: Food standards Australia and New Zealand, NUTTAB online.*

### Chicken, Skin, Composite, Casseroled

<b>Food ID:</b>	08C10181
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Skin of chicken, cooked in a casserole dish with added water.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Chickens were dissected into breast, wing, thigh and drumstick portions. The portions were washed and dried before browning in a nonstick frypan. The browned pieces were cooked in a casserole dish with lid containing 250ml of water for each kg of chicken, at 180°C for 45 minutes. After cooking the portions were drained and allowed to cool, the skin was separated and equal aliquots combined. Laboratory analysis was carried out to estimate proximates, minerals, vitamins and fatty acids (AGAL, 1998). Vitamin C and carbohydrates were imputed.

*Source: Food standards Australia and New Zealand, NUTTAB online.*



### Chicken, Skin, Composite, Raw

<b>Food ID:</b>	08C10173
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Skin of chicken, removed prior to cooking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled, size 15 birds each were provided by Inghams and Steggles. The skin from the entire bird was pooled to form a composite sample. Laboratory analysis carried out for proximates, fatty acids, minerals, and vitamins (AGAL,1998). Vitamin C and carbohydrates were imputed.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Thigh, Lean, Baked

<b>Food ID:</b>	08C10170
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Baked flesh from thigh portion of a chicken. Skin and bone removed after baking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each from Inghams and Steggles were analysed. Samples were baked in an industrial electrically heated oven, the cooking carried out over a baking dish containing about 2cm water and heated at 180 *C until the juices are clear. Proximates, vitamins, minerals and fatty acids were measured (AGAL 1998). Amino acids were determined in various cuts of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). Vitamin C and carbohydrates were imputed.
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

### Chicken, Thigh, Lean, Casseroled

<b>Food ID:</b>	08C10179
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Flesh from thigh portion of a chicken baked in a casserole dish with added water, then drained. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Chicken were dissected into breast, thigh, wings and drumstick portions. The portions were washed and dried before browning in a nonstick frypan. The browned pieces were cooked in a casserole dish with a lid containing 250ml of water for each kg of chicken, at 180*C for 45 min. After cooking the portions were drained and allowed to cool. Laboratory analysis was carried out for proximates, minerals, vitamins and fatty acid (AGAL,1998). Amino acids were determined in light and dark chicken meat from samples collected in

<b>Reference:</b>	in Melbourne during 1984. Vitamin C and carbohydrates are imputed. Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.
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Source: Food standards Australia and New Zealand, NUTTAB online.

#### Chicken, Thigh, Lean, Raw

<b>Food ID:</b>	08C10169
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Uncooked flesh from thigh portion of a chicken. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Proximates, vitamins, minerals and fatty acids were estimated (AGAL 1998). Amino acids were determined in various cut of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). Vitamin C and carbohydrates were imputed.
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

#### Chicken, Wing, Lean, Baked

<b>Food ID:</b>	08C10168
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Baked flesh from wing portion of a chicken. All skin removed after baking.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed
<b>Sampling Details:</b>	Ten fresh, chilled size 15 birds each were provided by Inghams and Steggles. Samples were baked in an industrial electrically heated oven, the cooking carried out over a baking dish containing about 2cm water and baked at 180°C until the juices are clear. Proximates, vitamins, minerals and fatty acids were determined AGAL(1998). Amino Acids were determined in various cut of lean meat purchased from retail outlets in Melbourne during 1984 (Fox <i>et al.</i> 1988). Vitamin C and carbohydrates were imputed.
<b>Reference:</b>	Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. Food Technology in Australia 40:320-323.

Source: Food standards Australia and New Zealand, NUTTAB online.

#### Chicken, Wing, Lean, Casseroled

<b>Food ID:</b>	08C10178
<b>Scientific Name:</b>	Gallus gallus
<b>Description:</b>	Flesh from wing portion of a chicken baked in a casserole dish with water added, then drained. All skin removed.
<b>Group:</b>	Meat and Meat Products: Poultry
<b>Derivation:</b>	Analysed

**Sampling  
Details:**

Ten fresh, chilled size 15 birds each were provided by Inghams and Steggle. Chickens were dissected into breast, wing, thigh and drumstick portions. The portions were washed and dried before browning in a nonstick frypan. The brown pieces were cooked in a casserole dish with lid containing 250 ml of water for each kg of chicken, at 180°C for 45 minutes. After cooking the portions were drained and allowed to cool. Laboratory analysis was carried out for proximates, minerals, vitamins and fatty acids. An additional 20 wings were cooked to provide sufficient lean meat for analysis (AGAL,1998). Amino acids were determined in light and dark chicken meat from samples collected in Melbourne during 1984. Vitamin C and carbohydrates are imputed.

**Reference:**

Fox, M., Rayner, C. and Wu, P. (1988) Amino acid composition of Australian foods. *Food Technology in Australia* 40:320-323.

*Source: Food standards Australia and New Zealand, NUTTAB online.*