

NUTRIENT ANALYSIS REPORT

Chicken Farmers of Canada

EXECUTIVE SUMMARY

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TABLE OF CONTENTS

Executive Summary.....	3
Introduction.....	4
Methods.....	5

COMPARATIVE ANALYSIS

Organic and Regular Cuts of Chicken.....	6
Regular Chicken Cooked with Skin and Regular Chicken Cooked without Skin.....	9
Chicken Breast Cooked with Skin & Tested for Meat Only.....	11
Nutrient Comparisons and Nutrient Claims.....	11
Canadian Nutrient File Data Comparison to Silliker Data.....	18

NUTRITION AND HEALTH

Key Nutrients.....	26
Protein in Your Diet.....	29

FINAL REMARKS

Conclusions and Future Analysis.....	30
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REFERENCES AND APPENDIX

References.....	31
Appendix A: CFIA Regulations/Guidelines for Nutrient Content Claims.....	33

NUTRIENT ANALYSIS REPORT

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EXECUTIVE SUMMARY

Consumers want to know they are making smart choices when they put food on the table for their families. Chicken has been seen as a healthy choice for years, but until now; Chicken Farmers of Canada did not have the most up to date information to support this claim.

The following report provides information on the nutrient composition and comparisons of various cuts of organic and non-organic (referred to as regular in the report) chicken, for a 100 g serving, from data collected in 2013 by Silliker Labs, an international food testing laboratory¹. This report also provides a comparative analysis between the data provided by Silliker in 2013 and the data from Health Canada's nutritional database, The Canadian Nutrient File (CNF), for a 100 g serving size of seven cuts of chicken for regular broilers (the CNF values are for regular chicken because it currently does not have any data on organic cuts). The raw data provided by Silliker and the analysis of the data in this report provide CFC with useful information to continue promoting chicken as a healthy choice.

The following cuts of chicken were roasted according to CFC [cooking guidelines](#) and tested at a Silliker laboratory in Markham, Ontario:

- Regular and Organic Chicken Breast (skinless)
- Regular and Organic Chicken Breast (with skin)
- Regular Breast with skin on and removed after roasting
- Regular and Organic Chicken Thighs (skinless)
- Regular and Organic Chicken Thighs (with skin)
- Regular and Organic Chicken Legs (skinless)
- Regular and Organic Chicken Legs (with skin)
- Regular and Organic Chicken Wings

KEY FINDINGS:

- All cuts of chicken, both regular and organic, are eligible for multiple nutrient claims under the Canadian Food Inspection Agency regulations. This report lists eligible claims for regular cuts; the most widely purchased cuts by Canadian consumers.
- The main nutritional differences are seen when chicken is cooked with its skin on vs. skinless. Whereas all cuts of chicken can carry the claim “excellent source of protein” independent of whether or not they have skin on, a “lean” or “extra lean” nutrient claim cannot be made for any cut when the skin is on.
- The nutrient content of chicken breast differs only slightly compared to dark meat; breast has more niacin (vitamin B3) and less fat, including saturated fat, than dark meat, but dark meat also contains higher amounts of zinc. Dark meat also contains more vitamin B12 than white; almost three fold more or about 47% of the DV. The content of the other vitamins and minerals analyzed didn’t differ in a meaningful way between breast and dark meat.
- When comparing regular & organic cuts with skin, the primary difference is the fat content; the skins of regular cuts have more fat than organic. However, once the skin is removed, the fat content of meat only is similar across most cuts for both organic and regular cut.
- A breast of chicken cooked with skin-on and then removed has less fat and calories, and more moisture than a skinless breast. This means that consumers can cook their chicken with the skin on, retaining all the moisture and flavour they love, and then remove it prior to serving to achieve the same health benefit as a skinless cut.
- Finally, it is difficult to make conclusive comparisons with our data to that found in the CNF due to varying methodologies. Silliker Labs Markham, Ontario laboratory tested 15 random samples of chicken from the Metropolitan Toronto area, whereas Health Canada’s data are weighted means of raw aggregated data from nationally representative sample sets.

INTRODUCTION

As the competitive landscape of commodities in Canada continues to change, consumers are increasingly demanding more transparency and information on the foods they eat. With health, fitness and nutrition having become hot topics among Canadian consumers, the Chicken Farmers of Canada commissioned the first industry study of the nutritional value of chicken in nearly 20 years. This study provides a thorough examination of the nutritional value of today’s chicken and re-emphasizes its strength and value as a healthy option for Canadian families. Given over two decades of advancements in how the birds are bred, raised, fed and processed, today’s chicken is fundamentally safer, healthier and more convenient than ever before.

METHODS

Silliker Labs in Markham, Ontario laboratory tested 15 random samples of chicken from the Metropolitan Toronto area. CFC understood the limitations of sampling in the Toronto area alone, which included limited sampling scope, different feeds with different concentrations of nutrients used in other areas in Canada, etc.).

The following cuts of chicken were tested:

- Regular and Organic Chicken Breast (skinless)
- Regular and Organic Chicken Breast (with skin)
- Regular Chicken Breast with skin on and removed after roasting
- Regular and Organic Chicken Thighs (skinless)
- Regular and Organic Chicken Thighs (with skin)
- Regular and Organic Chicken Legs (skinless)
- Regular and Organic Chicken Legs (with skin)
- Regular and Organic Chicken Wings

A nutrient analysis was determined for both a 100 g serving and a 75 g serving; 75 g being a standardized serving size for meats, fish and poultry in *Eating Well with Canada's Food Guide* and is the standardized serving size used for the Nutrition Facts Table on food labels.

A nutritional analysis was conducted for the nutrients listed below. As chicken does not contain vitamin C or carbohydrate, and therefore sugar or fibre, these nutrients were excluded from the analysis:

- Ash
- Calcium
- Calories
- Carbohydrates
- Cholesterol
- Fat (including Total and Trans)
- Iron
- Moisture
- Protein
- Sodium
- Total Vitamin A
- Biotin
- Folate
- Magnesium
- Pantothenic Acid
- Phosphorus
- Potassium
- Vitamin B1 (Thiamin)
- Vitamin B2 (Riboflavin)
- Vitamin B3 (Niacin)
- Vitamin B6
- Vitamin B12
- Vitamin E
- Zinc

This report provides a comparative analysis based on the data provided by Silliker to identify similarities and differences in the nutrient content of various cuts of chicken based on the following:

- regular vs. organic chicken
- skinless chicken vs. chicken with skin
- skinless chicken vs. chicken cooked with skin and skin removed after roasting

This report also provides a comparative analysis between the current data provided by Silliker in 2013 and data from the Canadian Nutrient File (CNF) for 100 g serving sizes of various cuts from broilers.

The analysis in this report is exploratory and serves to provide updated information. Due to the limitation of the small sample size, comparisons between regular and organic cuts, as well as comparisons to data from the CNF, are only estimates; providing some insight into the nutrient content of chicken today.

COMPARATIVE ANALYSIS

COMPARATIVE ANALYSIS BETWEEN ORGANIC AND REGULAR CUTS OF CHICKEN

The Canadian Food Inspection Agency (CFIA) oversees the certification and compliance of organic agricultural products in Canada.² In order for food to be deemed “organic” a series of specifications from the CFIA must be met.³

There is a growing consumer demand for organic poultry in North America.^{4,5} Specifically, organic chicken is the most widely available organic meat in North America, sold at many conventional and natural health food stores.⁵ Factors that influence consumers’ choice with respect to organic poultry include wholesomeness, quality, cost, and labelling.⁴ Organic meat is sold at a premium price point, yet many consumers feel that the perceived health and nutritional benefits of choosing organic is worth the extra cost.^{4,5}

In this comparative analysis, the nutritional differences between organic and regular cuts of chicken are presented. A reference amount of 100 g is used to make any health claims and comparisons as per CFIA guidelines (see Appendix A).

CHICKEN BREASTS COOKED WITH SKIN

The main nutritional difference between organic and regular chicken breasts is the fat content. Organic chicken breasts are lower in total fat than regular chicken breasts which accounts for the slightly lower calorie content; 154 vs. 175 respectively per 100 g portion.

In the reference amount, there is 5 g of total fat in the organic chicken breast and 8 g of fat in the regular chicken breast. Therefore, there is 37% less total fat in organic chicken and a “lower fat” health claim can be made for organic chicken breasts with skin.

Organic chicken breasts with skin also have less saturated fat compared to regular chicken with 1.6 g versus 2.4 g respectively; as such organic chicken breasts with skin can carry a “low in saturated fatty acids” health claim. When compared to regular chicken breasts with skin, organic chicken breasts with skin can claim to be “lower in saturated fatty acids”.

Regarding the remaining micronutrients, there’s very little difference between organic and regular chicken breasts with skin; both are also trans fat free (0.01 to 0.03 g per 100 g) and neither are a source of omega 3 fatty acids.

There are no meaningful differences in the micronutrient content between organic chicken breast with skin and regular chicken breast with skin.

CHICKEN BREASTS COOKED WITHOUT SKIN

Once the skin is removed, there is no meaningful difference in calories, total and saturated fat between organic chicken and regular chicken breasts; 1.74 g vs. 1.73 g of total fat and 140 vs. 146 calories respectively. Both cuts have the same amount of saturated fat, 0.59 g per 100 g serving. The micronutrient content of organic and regular chicken breasts without skin is essentially identical eliminating the need for comparative nutrient content claims.

CHICKEN LEGS COOKED WITH SKIN

The fat and calorie content of chicken legs (with skin) is greater in regular chicken legs than organic. Organic chicken legs have 190 calories compared to 218 calories in regular per 100 g portion and there is 14 g of fat in the 100 g portion of regular chicken legs and 11 g of fat in the organic chicken legs or 21% less compared to regular chicken legs.

A “lower fat” nutrient content claim cannot be made for organic chicken legs with skin. With only 15% of total calories coming from saturated fat, however, a “lower in saturated fat” claim can be used when compared to regular chicken legs with skin.

Similarly with chicken breasts, the micronutrient differences between organic and regular chicken legs with skin are inconsequential; both are also trans fat free and neither is a source of omega 3 fatty acids.

CHICKEN LEGS COOKED WITHOUT SKIN

The calorie and fat content is relatively similar between regular chicken legs and organic chicken legs without skin; 155 vs. 148 calories and 6.6 g vs. 5.5 g of fat respectively per 100 g portion. Both skinless organic chicken legs and regular skinless chicken legs can carry the “low in saturated fatty acids” claim since a 100 g portion provides less than 15% of energy from saturated fat.

There are no meaningful differences between skinless organic chicken legs and regular with respect to the micronutrient content; both are also trans fat free and neither is a source of omega 3 fatty acids.

CHICKEN THIGHS WITH SKIN

The calorie content is relatively similar between regular chicken thighs and organic chicken thighs with skin; 254 vs. 221 calories respectively per 100 g portion. The difference in calories is attributed to the difference in fat content; regular chicken has 19.10 g of fat per 100 g portion compared to 14.87 g for organic chicken. Regarding the saturated fat content, regular chicken thighs has 5.85 g whereas organic chicken has 4.54 g, or per 100 g reference portion.

Because organic chicken thighs with skin is only 22% lower in saturated fat, when compared to regular thighs with skin, it does not qualify for a “lower in saturated fat” nutrient content claim. Similarly, because organic chicken thighs contain 18.4% of calories from saturated fat, they do not qualify for a “low in saturated fat” claim either.

There are no meaningful differences between skinless organic chicken legs and regular with respect to the micronutrient content; both are also trans fat free and neither is a source of omega 3 fatty acids.

CHICKEN THIGHS SKINLESS BONELESS

The calorie difference between regular skinless chicken thighs and organic skinless chicken thighs is nominal; 175 vs. 156 respectively. There is 8.43 g of fat per 100 g reference amount in regular skinless chicken thighs compared to 6.39 g in organic skinless chicken thighs or a 2 g difference. This means there is 25% less fat in organic skinless chicken thighs and therefore, a “lower fat” nutrient content claim can be made for organic skinless chicken thighs.

There are no meaningful differences between skinless organic chicken legs and regular with respect to the micronutrient content; both are also trans fat free and neither is a source of omega 3 fatty acids.

CHICKEN WINGS

While the differences in calories (232 vs. 213), fat (15.27 g vs. 13.41 g) and saturated fat (4.13 g vs. 3.71 g) are not enough to make nutrient content claims when comparing the one sample of regular chicken wings compared to the one sample from an organic butcher, the nutritional analysis for the organic wings revealed that they are lower in calories (8%), fat (12%) and saturated fat (10%). The organic wings sampled had 15.7% of calories from saturated fat which is approaching the 15% saturated fat content cut-off for a “lower in saturated fat” claim.

Regarding the micronutrient content, there are no meaningful differences between regular chicken wings and organic chicken wings; both are also trans fat free and neither is a source of omega 3 fatty acids.

General Summary of Nutritional Analysis Between Organic and Regular Cuts of Chicken

Overall, the nutritional composition of organic and regular cuts of chicken is largely comparable; there are neither meaningful differences in the micronutrient (vitamins and minerals), nor protein content between the two. The main difference between organic and regular cuts of chicken is the fat content; organic has between 5 to 13% less total fat depending on the cut. Not surprisingly, the greatest difference between any cut of chicken, regardless if it's organic or regular, is the fat, and therefore calorie content, when the skin is included. Chicken with skin has more total fat and calories than skinless cuts. Of note is the fact that chicken that is cooked with skin, and skin removed after cooking, will have the same fat content as the skinless counterpart.

Similar results were noted in a study looking at meat composition of Organic, Free Range and Conventional Broilers.⁴ It was determined that organic poultry tends to have a lower fat content in the breast and thighs.⁴ Interestingly, organic chicken breasts and thighs had more omega-3 and omega-6 fatty acids than conventional chickens.^{4, 6} In our analysis, we did not see a very large difference in these values, however it's important to note that many factors impact the nutrient and moisture content of meat which includes physical activity, genetics and feed.⁴ Future studies on Canadian organic and regular chicken would benefit from controlling variables, such as their feed, nutrient intake and physical activity to determine how these affect the nutrient profile of their meat.

COMPARITIVE ANALYSIS BETWEEN REGULAR CHICKEN COOKED WITH SKIN AND REGULAR CHICKEN COOKED WITHOUT SKIN

The following section compares the nutrients in three cuts of chicken (chicken breast, legs, and thighs) with skin on and without skin.

Note: Skinless chicken wings are not represented as the skin is very hard to remove and skinless chicken wings are not commonly found in the market place.

CHICKEN BREASTS

There is very little difference between the micronutrient content (vitamins and minerals) of chicken breasts with skin on compared to chicken breasts without skin, per 100 g reference amount. The main nutritional difference between the two is the fat, and therefore calorie content, including saturated fat; chicken with skin on has more fat, and saturated fat, than skinless chicken. Chicken breast with skin has 8 g of fat whereas chicken breast without skin has 2 g per reference amount. This means that skinless chicken breasts have 75% less fat than chicken breast with skin on and can carry a "lower in fat" nutrient content claim. Also, with only 0.6 g of, or 75 % less, saturated fat per reference amount, skinless chicken breasts are "lower in saturated fat" compared to chicken breasts with skin

CHICKEN LEGS

Like chicken breasts, there are only minor differences in the micronutrient content of chicken legs whether or not they have skin on. The most notable difference in micronutrient content between chicken breasts and chicken legs is their respective zinc content; chicken legs have between 224% and 263% more zinc than chicken breasts.

The caloric difference between chicken legs with skin on and skinless chicken legs is greater than what was seen in chicken breasts; about 63 kcal per 100 g portion. Also, as with chicken breasts, the main nutritional difference between chicken legs with skin compared to skinless chicken is the fat and calorie content; the former having more of both.

There is about 14 g of fat per reference amount of chicken legs with skin on compared to 7 g fat per reference amount in skinless chicken legs. Therefore, skinless chicken legs have 50% less fat than chicken legs with skin and can carry a “lower in fat” claim. Also, skinless chicken legs are “lower in saturated fat” compared to chicken legs with skin, and as a cut, is “low in saturated fat.”

CHICKEN THIGHS

Like chicken breasts and chicken legs, there are only minor differences in the micronutrient content of chicken thighs with, or without skin on. While the difference in the zinc content between chicken breasts and chicken thighs is not as great as it is with chicken breasts and legs, chicken thighs still have more zinc than breasts; 170% to 218% more.

When comparing skinless chicken thighs and chicken thighs with skin, the greatest difference is in the amount of calories. There are 79 more calories per reference amount in chicken thighs with skin than skinless chicken thighs. The largest contributor to this caloric difference is the greater fat content in chicken thighs with skin; 19 g of fat per reference amount in chicken thighs with skin on compared to 8 g in a similar amount of skinless chicken thighs. Therefore, skinless chicken thighs are 58% lower fat than chicken thighs with skin and can carry a “lower in fat” health claim. Also, skinless chicken thighs are “lower in saturated fat” compared to chicken thighs with skin, and like skinless chicken legs, are “low in saturated fat”.

COMPARITIVE ANALYSIS BETWEEN BONELESS, SKINLESS CHICKEN BREAST, AND CHICKEN BREAST ROASTED WITH SKIN ON AND REMOVED AFTER ROASTING (MEAT ONLY TESTED)

For years, consumers have been advised to choose skinless cuts of chicken and/or to remove the skin from chicken after cooking as a way to reduce the amount of fat, specifically saturated fat, in their diet. Consumers will be pleased to learn this is indeed sound advice; the results of this analysis show this to be an effective strategy to cut calories, fat and saturated fat intake.

The amount of calories and fat in chicken breasts cooked with skin and skin removed is, practically speaking, the same as the calorie and fat content of skinless chicken breast. Chicken breast cooked with skin on and skin removed after cooking has 134 calories and 1.37 g of fat compared to skinless chicken breast with 146 calories and 1.73 g of fat per 100 g reference amount.

This is also great news since cooking chicken with the skin on locks in moisture and flavour resulting in a tastier and juicer piece of chicken that consumers love; skinless chicken breasts have less moisture compared to chicken cooked with skin and skin removed; 64.96 g vs. 67.47 g respectively.

When prepared in this manner, consumers can confidently choose chicken as a nutritious food, rich in protein that is flavourful, moist, full of taste, and as low in calories and fat as skinless chicken.

NUTRIENT COMPARISONS & NUTRIENT CLAIMS FOR REGULAR CHICKEN WITH AND WITHOUT SKIN

The CFIA enforces the policies and standards set by Health Canada for the use of Nutrient Claims.² A complete guide to Nutrient Content Claims allowed in Canada can be found on the CFIA website.⁷ The reference amount for cooked poultry is 100g and the suggested serving size for cooked poultry is 50-100 g (See Appendix A).

Claims can only be made for vitamins and minerals that have an established Daily Value.⁷ A nutrient content claim cannot be made for a vitamin or mineral unless the portion of the food contains at least 5% DV.⁷

If a portion of food has less than 30% of its calories coming from fat or has less than 3 g of fat per 100 g serving, it can carry the “low in fat” nutrient claim. Also, if a portion of food has less than 10% of its calories coming from fat, it can carry the “lean” nutrient claim; less than 7.5% of calories coming from fat and it can be classified as “extra lean”.

A “low in saturated fatty acids”, “low in saturated fat”, or “low source of saturated fatty acids” is granted to a portion of food that has less than 2 g of saturated fat per stated serving, per 100 g serving or if less than 15% of total calories come from saturated fat. If there is less than 0.2 g of trans fat per reference amount, a food can be called “trans fat free”.

In order to carry the claim “source of”, “contains” or “provides” omega-6 fats or omega-3 fats, a portion of food must provide 2 g of omega 6 fats or 0.3 g of omega 3 per reference amount or 100 g serving respectively.

A portion of food that contains at least 5% of the DV of a vitamin or mineral can carry the claim “a source of”, or “contains”; if it contains at least 15% of the DV then it can carry the claim “a good source of”, or “high in”; and the claim “excellent source”, “very high in”, or “rich in” can be used when the portion contains 25% or more of the DV.

Skinless Chicken Breast is able to carry the following Nutrient Claims as per regulations enforced by the CFIA^{7a}:

- Source of Energy
- Low in fat
- Extra lean
- Lean
- Low in saturated fatty acids/low in saturated fat
- Free of trans fats
- Protein: excellent source of protein/very high protein/ very high in protein/rich in protein
- Low in Sodium
- Potassium: a good source of/high in
- Thiamin: a source of/contains
- Riboflavin: a source of/contains
- Niacin: excellent source of/very high in/rich in
- Vitamin B6: a good source of/high in
- Vitamin B12: a source of/contains
- Pantothenate: excellent source of/very high in/rich in
- Phosphorus a good source of/ high in
- Magnesium: a source of/contains
- Zinc: a source of/contains

Chicken Breast with skin is able to carry the following Nutrient Claims as per regulations enforced by the CFIA⁷:

- Source of Energy
- Low in saturated fatty acids/low in saturated fat
- Protein: excellent source of protein/very high protein/ very high in protein/rich in protein
- Low in Sodium
- Potassium: a good source of/high in
- Thiamin: a source of/contains
- Riboflavin: a source of/contains
- Niacin: excellent source of/very high in/rich in

- Vitamin B6: a good source of/high in
- Vitamin B12: a good source of/high in
- Biotin: a source of/contains
- Pantothenate: excellent source of/very high in/rich in
- Phosphorus a good source of/high in
- Magnesium: a source of/contains
- Zinc: a source of/contains

Chicken legs without skin are able to carry the following Nutrient Claims as per regulations enforced by the CFIA⁷:

- Source of Energy
- Low in saturated fatty acids/low in saturated fat
- Free of trans fats
- Protein: excellent source of protein/very high protein/ very high in protein/rich in protein
- Low in Sodium
- Potassium: a source of/contains
- Thiamin: a source of/contains
- Riboflavin: a good source of/high in
- Niacin: excellent source of/very high in/rich in
- Vitamin B6: a good source of/high in
- Vitamin B12: excellent source of/very high in/rich in
- Biotin: a source of/contains
- Pantothenate: a good source of/high in
- Phosphorus: a good source of/high in
- Magnesium: a source of/contains
- Zinc: excellent source of/very high in/rich in
- Iron: a source of/contains

Chicken Legs with skin are able to carry the following Nutrient Claims as per regulations enforced by the CFIA⁷:

- Source of Energy
- Protein: excellent source of protein/very high protein/ very high in protein/rich in protein
- Omega 6 fats: a source of/contains/provides
- Low in Sodium
- Potassium: a source of/contains
- Thiamin: a source of/contains
- Riboflavin: a good source of/high in
- Niacin: excellent source of/very high in/rich in

- Vitamin B6: a source of/contains
- Vitamin B12: excellent source of/very high in/rich in
- Biotin: a source of/contains
- Pantothenate: a good source of/high in
- Phosphorus: a good source of/high in
- Magnesium: a source of/contains
- Zinc: a good source of/high in
- Iron: a source of/contains

Chicken Thighs without skin is able to carry the following Nutrient Claims as per regulations enforced by the CFIA⁷:

- Source of Energy
- Protein: excellent source of protein/very high protein/ very high in protein/rich in protein
- Low in Sodium
- Potassium: a source of/contains
- Vitamin E: a source of/contains
- Thiamin: a source of/contains
- Riboflavin: a good source of/high in
- Niacin: a good source of/high in
- Vitamin B6: a source of/contains
- Vitamin B12: excellent source of/very high in/rich in
- Biotin: a source of/contains
- Pantothenate: a good source of/high in
- Phosphorus: a good source of/high in
- Magnesium: a source of/contains
- Zinc: a good source of/high in
- Iron: a source of/contains

Chicken Thighs with skin is able to carry the following Nutrient Claims as per regulations enforced by the CFIA:⁷

- Source of Energy
- Omega 6 fats: a source of/contains/provides
- Protein: excellent source of protein/very high protein/ very high in protein/rich in protein
- Low in Sodium
- Potassium: a source of/contains
- Vitamin E: a source of/contains
- Thiamin: a source of/contains
- Riboflavin: a source of/contains

- Niacin: a good source of/high in
- Vitamin B6: a source of/contains
- Vitamin B12: excellent source of/very high in/rich in
- Folate: a source of/contains
- Biotin: a source of/contains
- Pantothenate: a good source of/high in
- Phosphorus: a good source of/high in
- Magnesium: a source of/contains
- Zinc: a good source of/high in
- Iron: a source of/contains

Chicken Wings is able to carry the following Nutrient Claims as per regulations enforced by the CFIA:⁷

- Source of Energy
- Omega 6 fats: a source of/contains/provides
- Protein: excellent source of protein/very high protein/ very high in protein/rich in protein
- Low in Sodium
- Vitamin E: a source of/contains
- Thiamin: a source of/contains
- Riboflavin: a source of/contains
- Niacin: excellent source of/very high in/rich in
- Vitamin B6: a good source of/high in
- Vitamin B12: excellent source of/very high in/rich in
- Biotin: contains/source of
- Pantothenate: a good source of/high in
- Phosphorus: a source of/contains
- Magnesium: a source of/contains
- Zinc: a good source of/high in
- Iron: a source of/contains

GENERAL ANALYSIS AND COMPARISONS BETWEEN REGULAR CUTS OF CHICKEN AND NUTRIENT CONTENT CLAIMS

MACRONUTRIENTS

Macronutrients include carbohydrate, protein and fat; nutrients that are essential for health and well-being. Of the three macronutrients, chicken is free of carbohydrate, including sugar, but contains both protein and fat.

PROTEIN

With a protein content ranging from over 20 g to over 30 g per 100 g reference amount, all cuts of chicken, including chicken wings, are an excellent source of high quality protein whether or not they have skin on. Providing a substantial amount of protein on a per serving basis, including chicken as part of a healthy diet is an easy way to help individuals meet their protein requirements.

FAT

Fat is the macronutrient that varies the most both within, and between, all cuts of chicken; cuts that have skin on are higher in fat which also contributes to a higher caloric content. Removing the skin from chicken can help consumers reduce the amount of fat and calories consumed.

Both chicken breasts with skin on and skinless are “low in saturated fats” and skinless chicken breasts are “low in fat”.

Overall, both skinless and skin on dark meat has more fat than white meat. However, both skinless chicken legs and thighs are “low in saturated fat”.

Chicken wings have long been considered an undesirable choice when it comes to choosing cuts of chicken often seen as a very high fat food. Chicken wings with skin on have a similar calorie, fat and saturated fat content to that of both legs and thighs with skin on and provide comparable amounts of protein making them a suitable option.

All cuts of chicken are free of naturally occurring trans fats, and chicken legs, thighs and wings with skin on, are a “source of” omega-6 polyunsaturated fats.

MICRONUTRIENTS

Micronutrients include vitamins and minerals. Chicken is very nutritious food as it contains a variety of vitamins and minerals, and with a couple of exceptions, are found fairly equally in both white and dark meat. Chicken wings, legs and thighs are richer in zinc and vitamin B12, and legs and thighs contain more of the B vitamin biotin. Some notable mentions include:

B vitamins – Chicken contains all of the B vitamins analyzed for: thiamin (B1), riboflavin (B2), niacin (B3), pantothenate (B5), pyridoxine (B6), folate, and biotin and can carry a “source of”, “good source of”, or “high in” nutrient content claim depending on the B

vitamin. While whole grains are rightfully promoted as good sources of B vitamins, foods like chicken are an important source as well.

Vitamin B12 – Animal foods are well known to be the best source of vitamin B12 and chicken is no exception. Chicken legs and thighs, both skinless and with skin on, as well as chicken wings can all carry the claims “excellent source”, or “very high in” vitamin B12. Chicken breast with skin on can claim to be “high in”, or “a good source of” vitamin B12; skinless chicken breast is “a source of”, or “contains” vitamin B12.

Sodium – Unprocessed foods are naturally low in sodium including fresh poultry. With less than 140 mg of sodium per 100 g serving, all cuts of chicken are able to carry a “low in sodium” claim.

Potassium – Potassium is best associated with foods like fruits, vegetables, whole grains and pulses but most consumers would be surprised to learn that meats, fish and poultry are also good sources of this important mineral.

Both skinless and skin on, chicken legs, thighs and wings are a “source of” potassium with amounts ranging from 240 mg to 323 mg per 100 g portion. Both skinless chicken breasts and chicken breasts with skin on are a “good source of”, or “high in” potassium with skinless chicken breasts having the most potassium; 430 mg per 100 g serving. This is as much as a medium banana, probably best known for its potassium content.

Magnesium – Magnesium is an important mineral that many are not meeting the recommended intake of and is involved in numerous metabolic reactions vital to health. With the exception of skinless breasts which are a “good source of”, or “high in” magnesium, all other cuts of chicken, both skinless and with skin on, can carry the nutrient content claim of “source of”, or “contains” magnesium.

Iron – Iron is an important mineral that some segments of the population, growing children and women, are often not getting enough of. The iron in animal foods is absorbed more efficiently than the iron from plant foods making animal foods that initially appear to be low in iron, actually good sources.

With the exception of chicken breasts, legs, thighs, and wings can all carry the “source of”, or “contains” iron nutrient content claim.

Zinc – Like iron, zinc in animal foods is absorbed better than zinc in plant foods. Chicken legs without skin is an “excellent source of”, or “very high in zinc” and legs with skin on, chicken thighs and wings are a “good source of”, or “high in” zinc. Both cuts of chicken breasts can carry the “source of” nutrient claim for zinc.

Canadian Nutrient File Comparison

The Canadian Nutrient File (CNF) is a database of nutrient values for over 5,807 foods commonly consumed in Canada. This can be used as a resource for consumers looking to identify what specific macronutrients and micronutrients are in the foods they eat.⁹ A comparison of the nutrient content of chicken using Silliker’s data and the CNF data is presented below to identify any differences between the two data sets and what is made available to the Canadian public via the CNF.

The data used for the basis of comparison was the unrounded 100g portion of regular chicken. Organic chicken was omitted from the analysis, as the CNF currently does not have any data on organic chicken specifically.

Silliker Labs (SL) provided the following information regarding CFC’s cooking instructions: *All cuts of chicken were oven roasted, uncovered at 350°F (190°C).* The closest CNF comparison to this from the CNF to form the basis of comparison.

CHICKEN BREASTS

COMPARATIVE ANALYSIS BETWEEN CNF AND SL DATA

*Using Raw, Unrounded data (100 g)

SL: all of the cuts were oven roasted, uncovered in at 350°F (190°C).

CNF: (closest criteria) Chicken, broiler, breast, meat only (without skin) and, meat and skin, water chill, roasted

Nutrient	Units	Chicken Breasts 100 g			
		Meat only (without skin)		Meat and skin	
		CNF	SL	CNF	SL
Energy	kcal	159	146	189	175
Protein	kcal	32.80	32.58	25.84	26.38
Fat	g	2.06	1.73	8.74	7.7
Saturated fat	g	0.583	0.59	2.46	2.44
Trans fat	g	0	0	0	0
Monounsaturated fat	g	0.72	0.65	3.40	3.79
Polyunsaturated fat	g	0.44	0.39	1.87	1.05
Omega-6 fat	g	0.38	0.36	1.66	1
Omega-3 fat	g	0.04	0.03	0.12	0.05

Conjugated linolenic acid	g	0	0	0	0
Carbohydrate	g	0	< 1	0	< 1
Cholesterol	g	85	95.7	84	93.7
Ash	mg	1.43	1.03	1.2	0.95
Moisture	g	64.74	64.96	65.03	64.57
Sodium	g	74	42.2	60	50.5
Potassium	mg	402	430	322	365
Calcium	mg	5	4.8	5	14.3
Iron	mg	0.56	0.48	0.51	0.48
Phosphorus	mg	-	269	-	216
Magnesium	mg	29	37.6	27	30
Zinc	mg	1	0.97	1	0.98
Vitamin A	mg	6	< 20	27	< 20
Vitamin E	RE	0.26	0.3	0.3	< 0.1
Thiamin (B1)	mg	0.07	0.09	0.07	0.12
Riboflavin (B2)	mg	0.11	0.11	0.12	0.13
Niacin (B3)	mg	13.71	17.1	12.7	12
Pyridoxine (B6)	mg	0.6	0.34	0.56	0.39
Folate	mg	4	8.6	4	9.2
B12	mcg	0.34	0.27	0.32	0.39
Pantothenate (B5)	mcg	0.97	2	0.94	1.8
Biotin	mg	-	< 2	-	2.2

CHICKEN LEGS

COMPARATIVE ANALYSIS BETWEEN CNF AND SL DATA

*Using Raw, Unrounded data (100 g)

SL: all of the cuts were oven roasted, uncovered in a 350°F (190°C) oven.

CNF: (closest criteria) Chicken, broiler, leg, meat only (without skin) and, meat and skin, roasted

Nutrient	Units	Chicken Legs 100 g			
		Meat only (without skin)		Meat and skin	
		CNF	SL	CNF	SL
Energy	kcal	191	155	232	218
Protein	g	27.03	23.84	25.96	22.26
Fat	g	8.43	6.59	13.46	14.36
Saturated fat	g	2.29	1.9	3.72	4.08
Trans fat	g	0	0	0	0.02
Monounsaturated fat	g	3.05	3.12	5.24	6.89
Polyunsaturated fat	g	1.97	1.23	3	2.64
Omega-6 fat	g	1.75	1.14	2.71	2.44
Omega-3 fat	g	0.17	0.09	0.2	0.2
Conjugated linolenic acid	g	0	0	0	0
Carbohydrate	g	0	0	0	0
Cholesterol	mg	94	118	92	123
Ash	g	1	0.73	0.92	0.84
Moisture	g	64.7	68.73	60.92	63.25
Sodium	mg	91	100	87	84.3
Potassium	mg	242	323	225	283
Calcium	mg	12	12.4	12	9.6
Iron	mg	1.31	0.93	1.33	0.88
Phosphorus	mg	183	202	174	175
Magnesium	mg	24	26.4	23	22.8

Zinc	mg	2.86	2.28	2.6	2.15
Vitamin A	RE	19	< 20	41	22
Vitamin E	mg	0.27	0.29	0.27	0.31
Thiamin (B1)	mg	0.08	0.13	0.07	0.11
Riboflavin (B2)	mg	0.23	0.3	0.21	0.26
Niacin (B3)	mg	6.3	6.3	6.2	5.8
Pyridoxine (B6)	mg	0.37	0.27	0.33	0.2
Folate	mcg	8	10.3	7	9.2
B12	mcg	0.32	1.2	0.3	0.97
Pantothenate (B5)	mg	1.16	1.7	1.16	1.5
Biotin	mcg	-	4	-	3.6

CHICKEN THIGHS

COMPARATIVE ANALYSIS BETWEEN CNF AND SL DATA

*USING RAW, UNROUNDED DATA (100 G)

SL: all of the cuts were oven roasted, uncovered in a 350°F (190°C) oven.

CNF: (closest criteria) Chicken, broiler, thigh, meat only (without skin) and, meat and skin, water chill, roasted

Nutrient	Units	Chicken Thighs 100 g			
		Meat only (without skin)		Meat and skin	
		CNF	SL	CNF	SL
Energy	kcal	169	175	249	254
Protein	g	24.89	25.95	20.11	20.87
Fat	g	6.96	8.43	18.13	19.1
Saturated fat	g	1.938	2.60	5.068	5.85
Trans fat	g	0	0	0	0.11
Monounsaturated fat	g	2.655	3.92	7.198	9.2
Polyunsaturated fat	g	1.586	1.45	4.003	2.98
Omega-6 fat	g	1.426	1.38	3.652	2.81
Omega-3 fat	g	0.103	0.07	0.258	0.17
Conjugated linolenic acid	g	0	0	0	0
Carbohydrate	g	0	0	0	0
Cholesterol	mg	95	114	93	125
Ash	g	1.20	1.10	0.93	0.84
Moisture	g	67.47	65.77	61.31	59.5
Sodium	mg	88	68.3	84	70.6
Potassium	mg	238	307	222	240
Calcium	mg	12	9.2	12	9.8
Iron	mg	1.31	0.95	1.34	0.8
Phosphorus	mg	174	207	174	165
Magnesium	mg	24	26.4	22	20.6

Zinc	mg	2.57	2.23	2.36	1.65
Vitamin A	RE	48	20	48	47
Vitamin E	mg	0.26	1.1	0.26	0.75
Thiamin (B1)	mg	0.074	0.14	0.067	0.11
Riboflavin (B2)	mg	0.231	0.25	0.212	0.2
Niacin (B3)	NE	6.525	6.2	6.365	4.9
Pyridoxine (B6)	mg	0.350	0.26	0.310	0.2
Folate	mcg	8	9.8	8	10.9
B12	mcg	0.31	0.84	0.29	0.92
Pantothenate (B5)	mg	1.184	1.6	1.108	1.4
Biotin	mcg	-	3.5	-	4.1

CHICKEN WINGS

COMPARATIVE ANALYSIS BETWEEN CNF AND SL DATA

*Using raw, unrounded data (100 g)

SL: all of the cuts were oven roasted, uncovered in a 350°F (190°C) oven.

CNF: (closest criteria) Chicken, broiler, wing, meat and skin, roasted

Nutrient	Unit	Chicken Wings 100 g	
		meat and skin	
		CNF	SL
Energy	kcal	290	232
Protein	g	26.86	23.61
Fat	g	19.46	15.27
Saturated fat	g	5.45	4.13
Trans fat	g	0	0.11
Monounsaturated fat	g	7.64	7.41
Polyunsaturated fat	g	4.140	2.84
Omega-6 fat	g	3.720	2.63
Omega-3 fat	g	0.26	0.21
Conjugated linolenic acid	g	0	0.01
Carbohydrate	g	0	0
Cholesterol	mg	84	135
Ash	g	0.75	0.79
Moisture	g	55.04	61.05
Sodium	mg	82	123
Potassium	mg	184	252
Calcium	mg	15	21
Iron	mg	1.27	0.96
Phosphorus	mg	151	148
Magnesium	mg	19	19.1
Zinc	mg	1.82	1.74
Vitamin A	RE	47	40

Vitamin E	mg	0.27	0.74
Thiamin (B1)	mg	0.042	0.09
Riboflavin (B2)	mg	0.128	0.17
Niacin (B3)	NE	6.648	7.3
Pyridoxine (B6)	mg	0.420	0.3
Folate	mcg	3	7.1
B12	mcg	0.29	0.92
Pantothenate (B5)	mg	0.897	1.1
Biotin	mcg	-	2.6

Overall, the nutritional values found in the CNF were reasonably similar to those found by SL despite the small sample size. While some values differed more than others, for the most part all were within a 20% variance; an amount that would be expected when using nutritional databases to assess the dietary intake of individuals. Any variance in values would not be relevant practically speaking given that assessments take into account natural differences in and between foods selected for consumption.

Generally speaking, according to the CNF, chicken breast with skin has more calories, total and PUFA (polyunsaturated fatty acids), and more sodium than the SL analysis. Chicken breast, both with skin and skinless, has more potassium in the SL analysis and chicken breast without skin had more magnesium per the CNF.

Chicken legs, both with skin and skinless, were found to have more calories, and protein in the CNF compared to SL. Chicken legs with skin on had more MUFA (monounsaturated fatty acids), cholesterol and potassium per SL analysis.

Chicken thighs had slightly more differences; cuts with skin had more PUFA and omega-6 fat, and more sodium, zinc and riboflavin (B2) in the CNF. Skinless thighs also had more sodium in the CNF compared to SL. The SL analysis found more total and MUFA fat, cholesterol, potassium and phosphorus in the skinless cuts, and more MUFA in thighs with skin on compared to the CNF.

Finally, chicken wings were found to have more calories, total, PUFA and omega 6 fat in the CNF compared to SL which found more sodium and potassium in their analysis.

Choosing Chicken: Nutrients and Your Health

KEY NUTRIENTS

Many Canadians are not meeting the recommended intake of several key nutrients. The Canadian Community Health Survey, Cycle 2.2 revealed that both men and women struggle to get enough magnesium, zinc, iron, and the B vitamins thiamin (B1), riboflavin (B2), niacin (B3), pyridoxine (B6), folate, cobalamin (B12), and phosphorus on a consistent basis with women more at risk¹².

As this report reveals, depending on the nutrient, chicken “contains”, is “high in”, or is an “excellent source of” several of the key nutrients that many Canadians simply are not consuming enough of.

PROTEIN

Protein provides the body with the building blocks needed for growth, maintenance and repair of almost everything: skin, muscles, bone, blood cells, antibodies, hair, nails, hormones, blood vessels and more.¹³

Protein is found in all foods but those from animal sources tend to have more on a per serving basis. Animal based proteins provide all of the essential amino acids in amounts needed for health; this kind of protein is sometimes referred to as ‘complete’ protein.

Chicken is an excellent source of complete protein, ranging from about 21 g for chicken legs to about 31 g for skinless chicken breasts per 100 g portion.

FAT

It is recommended that Canadians limit the amount of saturated fats in their diet. Saturated fat can be reduced simply by removing the skin from chicken leaving an excellent source of lean protein.

SODIUM

Sodium is an essential nutrient found in many foods and is needed for health. However, most Canadians are consuming more than they need; an estimated 3400 mg per day. Too much sodium may lead to high blood pressure in susceptible individuals which is a risk factor for heart disease and stroke, and high intakes of sodium have been linked to osteoporosis and stomach cancer¹⁴

Fresh meats like chicken are naturally low in sodium and as long as fresh or dried herbs and spices, vinegars, lemon juice and the like are used when cooking chicken, rather than adding salt for flavour, chicken can be part of a healthy lower-sodium diet.

NIACIN (B3)

Niacin (vitamin B1) is a very important nutrient to help the body use the energy that comes from carbohydrates, fats, and protein in our food.¹⁵ It is also important for the digestive system, nervous system and skin health. Niacin, like all of the B vitamins, is water-soluble meaning that it cannot be stored in the body. Because of this, it's important to eat foods rich in B vitamins throughout the day; everyday which includes chicken.

VITAMIN B12

All cuts of chicken, especially dark meat from chicken legs and thighs contain vitamin B12 (also known as cobalamin); a critically important nutrient that supports the nervous system and production of healthy red blood cells.¹⁶ Vitamin B12 helps to make DNA, the genetic material in all cells and is therefore essential for healthy cell reproduction; a vital role in fertility and reproduction. Vitamin B12 is probably best known for its role in preventing pernicious or megaloblastic anemia¹⁶. Animal foods are the best source of this important vitamin.

PYRIDOXINE (B6)

All cuts of chicken contain an important B-vitamin called pyridoxine or vitamin B6, with chicken breasts containing the most compared to legs and thighs. Vitamin B6 is involved in over 100 metabolic pathways, or processes, making this a versatile nutrient. It is extremely important for healthy red blood cell production, helping the immune system function by aiding in antibody production and promoting normal nerve function.¹⁷ Vitamin B6 is also involved in brain development during pregnancy and infancy.

Another important function of Vitamin B6 is protein metabolism. Vitamin B6 helps the body use amino acids to build bodily proteins muscle, skin, blood cells, bone and more; it is also involved in neurotransmitter synthesis; molecules that the body uses to communicate from one part to another and which are involved in mood regulation^{17,18} This means when you eat more protein, you need more Vitamin B6. Fortunately, chicken contains both these nutrients.

PHOSPHORUS

Phosphorus is extremely important for the health of your bones and teeth. Also, it is important for energy metabolism and helps the body use carbohydrates and make protein.¹⁹

Like all protein-rich foods, chicken contains phosphorus. With the exception of chicken wings which are a 'source' of phosphorus, all other cuts are 'high' in this mineral.

ZINC

The dark meat in chicken is where you will find zinc in high amounts. This nutrient is very important for normal growth and development, enzyme function, immune health, reproduction and DNA synthesis.²⁰ Because of its role in growth and development, a person's zinc needs increase during pregnancy, childhood and adolescence.²⁰

THIAMIN (B1)

Thiamin (vitamin B1) helps the body's cells change carbohydrates into energy. The main role of carbohydrates is to provide energy for the body, especially the brain and nervous system. Thiamin also plays a role in muscle contraction and conduction of nerve signals allowing your brain to communicate to all parts of your body²¹. All cuts of chicken have thiamin but legs and thighs have the most.

RIBOFLAVIN (B2)

Riboflavin (vitamin B2) also is needed for body growth, red blood cell production and is involved in energy production from carbohydrates, fats and proteins. Riboflavin works with vitamin A to maintain healthy mucous membranes in the nasal passage, lungs and digestive track²².

Vitamin B2 helps to maintain healthy eyes, nerves, muscles and skin and is needed to convert iron, folic acid and vitamins B1, B3 and B6 into their active forms²². Riboflavin is found in all cuts of chicken with dark meat having the most compared to breasts and wings.

MAGNESIUM

Magnesium is the fourth most abundant mineral in the body and it wears many hats being involved in over 300 different metabolic pathways, or processes including protein synthesis, muscle and nerve function, blood sugar control, blood pressure regulation, energy production, maintaining heart rhythm and muscle contractions²³.

As a dietary mineral, magnesium is one of the more common nutrients that Canadian adult men and women fall short on with respect to meeting the recommended daily intake¹². Magnesium is found in all cuts of chicken with chicken breasts having the most.

IRON

Iron is probably best well known for being part of hemoglobin; a special protein that transports oxygen throughout the body. Iron is also needed for cell growth and cellular differentiation; the process by which cells become what they're destined to be such a bone cells, muscle cells, skin cells etc. Iron helps direct the cells genes for normal human development²⁴.

Iron deficiency anemia is a common type of anemia. When the body's iron stores are low, there isn't enough hemoglobin to carry enough oxygen resulting in fatigue, poor work performance and decreased immunity²⁴.

There are two types of dietary iron: heme and non-heme. Heme iron is the form found in animal foods and is absorbed better than the non-heme form found in plant foods. Eating a source of heme iron, such as chicken, helps to increase the amount of non-heme iron in a plant food like beans when they're eaten together²⁴.

Those who may be at risk for iron deficiency and/or have increased requirements include teenage girls, women of childbearing years, and pregnant women. Chicken legs, thighs and wings are all “sources” of highly absorbable heme iron²⁴.

Protein in Your Diet

As mentioned before, nearly 100% of Canadians are meeting their basic protein requirements according to the results from the Canadian Community Health Survey, cycle 2.2¹² with many Canadians exceeding it. While there is ongoing research and debate as to whether or not protein requirements have been underestimated in the past²⁵, there is promising research that has demonstrated a benefit from eating protein consistently throughout the day, at each meal, versus eating most of it at dinner.

While Canadians are eating enough total protein from day to day, most of it is eaten at lunch and dinner with the majority being consumed at the evening meal. Research continues to support the approach of spreading protein rich foods out over the three main meals as a way to maximize the benefits that protein has to offer with respect to increasing a sense of satiety, and stimulating muscle growth; a key feature for helping to prevent sarcopenia or the gradual loss of muscle tissue associated with aging²⁵.

Timing of protein consumption is also an important consideration for those involved in exercise and training; eating protein rich foods around the time of training helps to maximize protein's effect on muscle repair and growth.

Research suggests that 25-30 g of protein from all sources at each meal is needed to maximally stimulate muscle protein growth regardless of age; consuming adequate amounts of protein throughout the day and over the lifespan is paramount to good health and for helping to maintain functional status or the ability to perform the activities of daily life.

One 75 g, or 2 ½ ounce, Canada Food Guide serving of chicken provides 15 g to 22 g of protein depending on the cut and one 100 g, or 3 ½ ounce serving will provide 21 g to 32 g of protein. Chicken is tasty and an easy way to help Canadians meet their protein requirements.

Conclusions and Future Analysis

Canadians' perception of chicken is that it is among the most nutritious protein options on the market.²⁶ This nutrient analysis report provides merit to this perception by outlining the key nutrients in chicken that support human health. The most notable difference in organic and regular chicken is the fat content, with organic chicken

generally being lower in fat than regular chicken. The micronutrient content between organic chicken and regular chicken is virtually identical and Canadians can confidently choose either knowing that chicken will contribute to their overall nutritional requirements needed for health.

To further this nutrient analysis, comparing the present results to other commodities with which chicken competes (i.e. beef, pork, lamb, and fish) would be valuable. This type of analysis may help drive specific marketing strategies for Chicken Farmers of Canada. Furthermore, identifying “why” consumers perceive chicken to be a healthy option would be useful to strengthen communications surrounding its health benefits and nutritional attributes.

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Appendix A – Information for Nutrient Content Claims

Canadian Food Inspection Agency: Chapter 6: The Elements within the Nutrition Facts Table; Reference Amounts [Schedule M] and Serving Sizes, Table 6-3 (Essential to making a nutrient content claim and preparing a Nutrition Facts Table)

Item	Product Category	Reference Amount ¹	Serving Size ²
92	Cuts of meat and poultry without sauce, and ready-to-cook cuts, with or without breading or batter, including marinated, tenderized and injected cuts	125 g raw, 100 g cooked	80-130 g raw, 50-100 g

Source: <http://www.inspection.gc.ca/english/fssa/labeti/guide/ch6e.shtml>

Canadian Food Inspection Agency: Chapter 7: Nutrient Content Claims

Source: <http://www.inspection.gc.ca/english/fssa/labeti/guide/tab7e.shtml>

Schedule K – Food and Drug Regulations [Reasonable Daily Intake, used to determine nutrient content claim for protein], Table 6-4

Item	Name and Description	Reasonable Daily Intake	Reasonable Daily Intake
40	Poultry Products	3.5 oz	100g

Source: http://www.inspection.gc.ca/english/fssa/labeti/guide/ch6e.shtml#a6_3