

Nutrient Composition for Retail Cuts of Bison

By: **Larissa Helbig, M.Sc.**; Elk/Bison Specialist, Alberta Agriculture, Food and Rural Development

Jayson Galbraith, M.Sc., P.Ag.; Elk/Bison Specialist, Alberta Agriculture, Food and Rural Development

Consumers are continuing to become more aware and educated about the food they eat. They want to know the nutritional content of their food products including single ingredient foods such as retail cuts of meat, including bison. A limited amount of nutritional information on bison meat already exists in the United States Department of Agriculture's (USDA) Nutrient Data Laboratory and the Canadian Nutrient File 2001b, from Health Canada. These databases contain valuable information but are somewhat outdated and very limited in their information. Feeding practices have changed greatly and become more standardized in the recent past and as well bison heifers have entered the meat market. Information in the existing databases does not take into account these industry developments, nor do they account for specific feeding strategies developed in western Canada.

A project initiated by the Diversified Livestock Branch of Alberta Agriculture, Food and Rural Development examined whether or not there are real differences in the nutrient content between various retail bison cuts and if there are differences between cuts from bulls and heifers. The Industry Development Sector's *New Initiatives Fund* provided funding for this project and industry participation came in the form of meat samples purchased from XL Fine Foods, Bouvry Exports Calgary Ltd. and Valleyview Buffalo Co.

A total of 137 bison meat samples were collected at a federally inspected, commercial slaughter facility (Northwest Foods Inc.) during the month of March 2004. All bison from which samples were collected were finished a diet made up of a combination of grain and forage, consistent with current industry practices. Bulls all came from one producer and the heifers all from another. Eight different muscle cuts from bulls (blade, bottom roll, clod, eye of round, rib-eye, sirloin tip, sirloin and tenderloin) and 2 cuts from heifers (clod and sirloin) were sent to Enviro-Test Laboratories in Edmonton for the analysis of 28 different nutrients. Of the 28 nutrients analyzed, statistical analysis was performed on calories, protein, total fat, saturated fat, mono- and poly-unsaturated fat, trans fatty acid, cholesterol, iron, calcium, sodium, moisture and Vitamin A. All results are based on 100g of lean raw meat and are presented in the following tables.

Results from this project reveal that there are significant differences between certain muscle cuts for bison, especially the bulls. Not enough cuts were sampled from the heifers to make the same conclusions. The purpose for the two cuts sampled from heifers was to determine if any gender differences exist. Significant differences due to gender were found in the clod for cholesterol and in the sirloin for levels of iron, sodium, poly-unsaturated fats and trans fatty acid. However, more samples need to be examined from a variety of different cuts from heifers to say with confidence that there are or are no gender difference between bulls and heifers for nutrient

content. Ground meat samples were also collected but the variation between samples was too great for any analysis to be accurate and reliable.

Table 1: Amount of calories, protein, cholesterol, iron, Vitamin A, calcium, sodium and moisture of various muscle cuts for bison bulls and bison heifers.

Cut	Calories (cal/100g)	Protein (g/100g)	Cholesterol (mg/100g)	Iron (mg/100g)	Vitamin A (RE/100g)	Calcium (mg/100g)	Sodium (mg/100g)	Moisture (%)
Bull								
Blade	120.55 ^a	21.55 ^b	45.60 ^c	2.96 ^{bc}	2.09 ^a	6.06 ^b	51.75 ^{bc}	73.20 ^d
Bottom roll	104.48 ^b	22.30 ^a	44.35 ^{bc}	2.68 ^{ac}	2.09 ^a	5.05 ^{bd}	60.09 ^a	73.56 ^{acd}
Clod	104.48 ^b	22.30 ^a	45.60 ^c	3.02 ^b	2.09 ^a	4.68 ^{cd}	43.78 ^{ef}	73.71 ^{ac}
Eye of round	105.64 ^{bd}	22.30 ^a	47.27 ^b	2.63 ^a	2.09 ^a	5.05 ^{bd}	50.12 ^{cd}	73.56 ^{acd}
Rib-eye	107.88 ^{ad}	21.55 ^b	46.33 ^{cd}	3.02 ^b	2.09 ^a	10.9 ^a	45.65 ^{de}	73.56 ^{acd}
Sirloin tip	104.48 ^b	22.07 ^{ab}	47.27 ^b	2.63 ^a	2.09 ^a	4.68 ^{cd}	42.99 ^{efg}	73.98 ^a
Sirloin	104.48 ^b	22.30 ^a	n/a	3.02 ^b	2.09 ^a	4.68 ^{cd}	42.21 ^{fg}	73.39 ^{cd}
Tenderloin	105.64 ^{bd}	22.30 ^a	45.60 ^c	3.02 ^b	2.09 ^a	4.68 ^{cd}	39.00 ^{gh}	73.71 ^{ac}
Heifer								
Clod	105.64 ^{bd}	22.30 ^a	48.95 ^d	3.02 ^b	2.09 ^a	5.27 ^{bc}	43.78 ^{ef}	73.56 ^{acd}
Sirloin	105.68 ^{bd}	22.07 ^{ab}	44.35 ^{bc}	2.63 ^a	2.09 ^a	5.3 ^d	34.67 ^h	73.39 ^{cd}

* Values in a column sharing similar superscript letters are not statistically different between cuts.

* Values are reported as the average of least squared means for cuts not statistically different from each other.

Table 2: Amount of total fat, saturated fat, monounsaturated fat, polyunsaturated fat, and trans fatty acid of various muscle cuts for bison bulls and bison heifers.

Cut	Total Fat (g/100g)	Saturated Fat (g/100g)	Mono-unsaturated fat (g/100g)	Poly-unsaturated fat (g/100g)	Trans-fatty acid (g/100g)
Bull					
Blade	3.95 ^b	1.22 ^b	1.28 ^b	0.19 ^d	0.02 ^a
Bottom roll	1.79 ^a	0.45 ^a	0.54 ^a	0.16 ^{ce}	0 ^b
Clod	1.79 ^a	0.45 ^a	0.54 ^a	0.16 ^{ce}	0 ^b
Eye of round	1.79 ^a	0.45 ^a	0.54 ^a	0.11 ^b	0 ^b
Rib-eye	3.95 ^b	1.22 ^b	1.28 ^b	0.17 ^c	0.02 ^a
Sirloin tip	1.79 ^a	0.45 ^a	0.54 ^a	0.16 ^{ce}	0 ^b
Sirloin	1.79 ^a	0.45 ^a	0.54 ^a	0.11 ^b	0 ^b
Tenderloin	1.79 ^a	0.45 ^a	0.54 ^a	0.14 ^{bc}	0.02 ^a
Heifer					
Clod	1.79 ^a	0.45 ^a	0.54 ^a	0.18 ^{cd}	0 ^b
Sirloin	1.79 ^a	0.45 ^a	0.54 ^a	0.18 ^{cd}	0.02 ^a

* Values in a column sharing similar superscript letters are not statistically different between cuts.

* Values are reported as the average of least squared means for cuts not statistically different from each other.

Consumers are very concerned and aware of their intake of fat and cholesterol. Our study did not show great variation in the fat content between muscle cuts sampled except for the blade and rib-eye from bulls. These two cuts were significantly higher in total fat, saturated fat and monounsaturated fat than all other cuts sampled. The blade has been shown previously to have

higher fat levels than other cuts so this could be of particular interest to consumers monitoring their intake of fat. Cholesterol levels in this study were lower than what has been previously reported; however, this may be due to method used to determine the amount of cholesterol. As well, results of this study were obtained from a limited number of animals from only a limited number of producers. Therefore, the level of cholesterol reported here should be used with the knowledge that previously reported levels are not incorrect but may be higher because of the method used to determine them. Cholesterol was more variable between cuts (25.70 mg/100g to 48.95 mg/100g) than fat, as were the amounts of calories (104.48 cal/100g to 120.55 cal/100g). Protein showed little variation (21.08% to 22.72%) with the blade and rib-eye again being different from most of the other cuts. These values for protein are similar to what has been reported previously for bison meat. For the muscle cuts the greatest significant variation between cuts was seen in Vitamin A, Sodium, and Calcium. Iron also showed some variation between the different cuts but not as great as the other minerals and levels in this study are similar to previous analyses.

One of the main objects of this project was to provide producers and bison meat marketers with values for labelling individual muscle cuts. Results presented in Table 1 and Table 2 can be used by marketers to label specific whole muscle cuts. When values for specific nutrients were not statistically different between cuts the same value was reported for all. Therefore some cuts can be labelled with the same value for certain nutrients. With the exception of cholesterol, results from this study were similar to what others have found previously and have added to the growing amount of information on the nutritional content of bison meat. Based on our findings, a generic nutrient label for bison meat may not be accurate. There may be a need to start adjusting for specific muscle cuts. Recognizing that there are differences between cuts will allow marketers to better market their product to the consumer.