

Nutrient Content of Bison Meat from Grass- and Grain-Finished Bulls

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Consumers are eating bison meat as an alternative meat. Approximately 300,000 bison (*Bison bison*) are being raised for meat production in North America according to Sam Albrecht, Executive Director of the National Bison Association. Bison meat does provide nutrients to meet some of the nutritional needs of humans. Some controversy exists regarding the nutritive quality of grass- and grain-finished bison. The data which exist as to the nutrient content of meat from grass- and grain-finished bison are given in this paper. More detailed descriptions of the research from which these data are derived have been published.¹⁻⁴

Shoulder clod (*Triceps brachii*), ribeye (*Longissimus thoracis*), top round (*semimembranosus*), and top sirloin (*Gluteus medius*) cuts were obtained from bulls. These cuts came from 31 grass-finished (average age = 32 months) and 100 grain-finished (average age = 24 months) bulls that were raised in various regions of the United States and Canada (Table 1). This should be representative of the bison meat that is available to consumers. Few differences in nutrient content were observed between the four cuts from grass-finished bulls;⁴ the same was true for the grain-finished.¹⁻³ Therefore, the nutrient content of these four cuts were averaged.

The macronutrient and food energy content of meat from grass- and grain-finished bison bulls is given in Table 2. Comments regarding the nutritional content⁵⁻¹² of this meat are also listed in Table 2. The functions of these macronutrients and food energy are discussed in detail elsewhere.¹²

The vitamin and mineral (micronutrients) content of meat from grass- and grain-finished bison bulls is given in Table 3. Comments regarding the nutritional content^{5-7,9,10,12-15} of this meat are also listed in Table 3. The functions of these micronutrients are discussed in detail elsewhere.¹²

All of these nutrient content assays were done on raw or uncooked meat. This is the usual method for presenting such data in that consumers cook their meats in different ways and to different degrees of doneness. Moisture is lost during cooking, thus increasing the concentrations of minerals and protein in the cooked meat. The vitamin content of meat is decreased following cooking, with water-soluble vitamins, such as thiamin, vitamin B₆, and vitamin B₁₂, being about two-thirds retained and fat-soluble vitamins, such as vitamin E, about three-fourths retained.¹⁶ This same pattern has been observed in the cooking of meat from other species such as beef.¹⁶

The information given in the tables may be useful for nutritional labeling, though labeling is not required for fresh meat. Utilizing these data, producers can provide consumers with Nutrition Fact information. Based on current research only minimal differences exist in the nutrient content of meat from bison that have been finished on grass and those finished on grain. However, more research is needed, especially controlled feeding studies. It is important that the industry speak with one voice to consumers about the nutrient content of bison meat. Consumers frequently are more interested in how bison meat compares with meat from beef, pork, or poultry, and it compares well. Research indicates that bison meat contains many nutrients which are essential to human life and health.

References

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TABLE 1. ORIGIN OF GRASS- AND GRAIN-FINISHED BISON

State/Province	Grass	Grain
Alberta	-	24
British Columbia	-	6
California	-	6
Colorado	1	3
Delaware	-	1
Kansas	8	17
Manitoba	-	6
Michigan	-	3
Missouri	-	3
Nebraska	5	-
North Dakota	2	14
South Dakota	5	15
Texas	3	-
Wisconsin	7	-
Wyoming	-	4
Total	31	100

TABLE 2. COMPARISON OF MACRONUTRIENT AND ENERGY CONTENT OF RAW SEPARABLE LEAN FROM GRASS- VS. GRAIN-FINISHED BISON

Nutrient	Percentage		Nutritional Comments ^a
	Grass	Grain	
Protein (%)	21.5	21.7	Excellent source of protein
Moisture (%)	75.9	74.6	Typical of most meats
Fat (%)	1.7	2.2	Low in fat Low intakes associated with decreased incidence of heart disease & cancer Diet should contain <30% of calories from fats
Saturated Fat	47.4	42.5	Low intakes associated with (% of fat) incidence of heart disease & cancer
Monounsaturated Fat	35.4	46.5	Higher proportion associated with (% of fat) decreased incidence of heart disease & cancer
Oleic acid	34.0	42.7	Higher proportion perhaps associated (% of fat) with decreased incidence of heart disease
Polyunsaturated Fat	17.2	11.0	Higher proportion associated with (% of fat) decreased incidence of heart disease & cancer
Linoleic Acid	13.8	10.5	Recommended omega-6:omega-3 intake is (% of fat) 4-10:1 (omega-6)
Linolenic Acid	3.4	0.5	(omega-3) (% of fat)
Ash (%)	1.2	1.2	Reflective of total mineral content
Cholesterol	65	66	Lean meat (mg/100g) Low intakes associated with decreased incidence of heart disease & cancer
Food Energy	133	141	Relatively low in calories (kcal/100 g)

Note: Recommended ratio of saturated:monounsaturated:polyunsaturated fats is 1:1:1 with <10% of calories from each

^a References 5-12.

TABLE 3. Comparison of the Vitamin and Mineral Content of Raw Separable Lean from Grass- vs. Grain-Finished Bison

Mineral	Grass	Grain	Nutritional Comments ^a	Mean % Daily Value ^b	
				Grass	Grain
Calcium (mg/100g)	5.5	4.9	Not good source	<1 ^c	<1
Copper (Fg/100 g)	160	142	Some samples may contain 10+% and thus be a good source	8	7
Iron (mg/100g)	2.8	2.9	Both are good sources	16	16
Magnesium (mg/100g)	25.8	24.2	Some samples may contain 10+% and thus be a good source	6	6
Manganese (µg/100g)	11.5	13.4	If use % lower estimated safe and adequate daily dietary intake as is no daily value	<1	<1
Phosphorus (mg/100g)	181	198	Grass-finished is good source while grain-finished is excellent source	18	20
Zinc (mg/100g)	3.3	3.8	Both are excellent sources	22	25
Sodium (mg/100g)	44.7	52.2	Both are low in sodium Recommended intake is <2400 mg daily. High sodium intakes are associated with increased incidence of hypertension.	- ^d	-
Potassium (mg/100g)	305	336	2000 mg is estimated minimum requirement	-	-
Selenium (µg/100g)	105	26	If use recommended dietary allowance as is no daily value	191	47
Vitamin A (µg/100g)	-	0.8	Not a good source	-	<1
β-Carotene	-	nd	Moderate intake levels may be associated with decreased incidence of heart disease and cancer	-	-
Vitamin C (mg/100g)	-	nd	Not a good source	-	<1
Thiamin (mg/100g)	-	0.043	Not a good source	-	3
Riboflavin (mg/100g)	-	0.940	Some samples may contain 10+% and thus be a good source	-	6
Niacin (mg/100g)	-	1.910	Good source	-	10

Vitamin B ₆ (mg/100g)	-	0.240	Good source	-	12
Vitamin B ₁₂ (µg/100g)	-	2.565	Excellent source	-	43
Vitamin E (mg α-TE)	-	0.048	Not a good source	1	<1

^a References 5-7,9,10,12-15. These vitamins and minerals perform many functions in the body which are detailed elsewhere (reference 12). Low intakes of several of these nutrients have been associated with increased incidence of heart disease, while excessive consumption of a few of these may also result in effects detrimental to human health.

^b Daily Value (given as a percentage) is an expression of recommended intake per serving that is utilized in the nutritional labeling (as Nutrition Facts) according to Food and Drug Administration regulations (reference 5).

^c Contains less than 1% of the Daily Value.

^d No Daily Value exists/data have not been published.