

Beef – Good and Good for You

Rick Machen and Chris Kerth
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Relative to foods, eating habits and US consumer preferences, the spectrum is perhaps broader today than it has ever been. And to meet this array of preferences, the beef industry must offer traditional, natural, grassfed and organically produced products. Beef is a nutrient dense source of protein, essential vitamins and minerals. Though recognized as a low-calorie protein source, beef also contains fat, a dense source of energy that fuels the body.

Beef – 3 Primary Components

Raw beef consists primarily of water, protein and lipids (fat), with water being the largest of the three components. Fat is deposited subcutaneously, abdominally, between muscles and within muscles. Fat content of beef is primarily a function of dietary energy density and days on feed/forage. The fat content of whole muscle beef servings is influenced by primal cut origin (chuck, rib, loin or round), level of trim and in the case of ground product, the intentional level of fat inclusion.

PUFAs

Lipids (fats) are found in both plant and animal tissues. Per unit, fats contain 225% more energy than carbohydrates and both provide 'energy' to fuel body functions. At the cellular level, glucose is the primary carbohydrate fuel whereas fatty acids are the primary fuel from fats. Fatty acids contain carbon (6 to 28 atoms), hydrogen and oxygen.

Fatty acids can be separated into two groups – saturated and unsaturated. Unsaturated fatty acids contain carbon atoms that are 'double bonded' to other carbon atoms; saturated fatty acids have no double bonded carbons. Within the unsaturated fatty acids, those with more than one double bonded carbon group are known as

polyunsaturated fatty acids (PUFAs). The PUFA content of several food ingredients is shown in Table 1. These food sources were chosen to demonstrate the fact that some nuts, seeds and oils are high in PUFA content while meats and dairy products have a much lower PUFA content.

PUFAs may not be equal when it comes to their contribution to health and wellness. Epidemiological, biomedical and nutritional research results published in peer-reviewed journals are inconclusive. Some suggest a benefit (especially for those at risk for and those experiencing coronary heart disease) associated with increasing the

Table 1. Food sources of PUFAs*	
	PUFA g/100 g fat
Cooking Oils	
Corn Oil	59
Shortening	26
Olive Oil	15
Butter	4
Nuts and Seeds	
Sunflower Seeds	66
Flaxseeds	65
Walnuts, dry roasted	63
Peanuts, dry roasted	31
Meats	
Chicken breast	21
Salmon	28
Pork Chop	8
Beef	5
Dairy Products	
Milk, whole	4
Cheese	3
Ice Cream, gourmet	4
*National Nutrient Database for Standard Reference, USDA ARS www.ndb.nal.usda.gov	

dietary level of omega-3 fatty acids. The omega-3 fatty acids are in the essential fatty acid group, meaning the human body cannot make them. The omega-3s of primary interest are alpha-linolenic acid (ALA; found primarily in walnuts, flaxseeds, canola and soybean oils) and two others abbreviated as EPA and DHA (eicosapentaenoic acid and docosahexaenoic acid, respectively). The most concentrated sources of EPA and DHA are fatty fish such as salmon, tuna, mackerel or sardines. The American Heart Association currently recommends eating this type of fish at least twice a week.

The omega-3 content of selected foods and oils is shown in Table 2. Of particular interest is the magnitude of difference in omega-3 fatty acid content between the foods. *Considering the current American Heart Association recommended daily intake of one gram of omega-3 fatty acids, it quickly becomes apparent that beef, regardless of production system, is not a reasonable source of omega-3s.*

Traditional versus Grassfed Beef

Grassfed beef is frequently advertised and promoted as having a higher omega-3 fatty acid content than traditionally produced beef. The data from Auburn University presented in Table 3 supports this claim. In this dissertation project, fall-born crossbred steers were finished on ryegrass, fed varying levels of corn on pasture or fed a grain-based balanced ration in a feedyard.

	Ω-3, g/4 oz. portion
Walnuts, English	10.4
Flaxseed	7.2
Salmon, Atlantic, fresh	1.7
Beef, grassfed**	0.04
Beef, traditional**	0.01
American Heart Association Recommendation, g Ω-3/day	1.0

*from Minnesota Nutrient Data Base 4.04, Tufts University School of Medicine, Boston, MA.
 **from C.W. Rowe. 2010. Carcass, Sensory, Quality and Instrumental Color Characteristics of Serially Harvested Forage-Fed Beef. Dissertation, Auburn University, p.90.

	grain fed, percent of body weight					
	0	0.5%	1.0%	1.5%	2.0%	Feedlot
Omega-3	112 ^a	66 ^b	68 ^b	34 ^b	66 ^b	30 ^b
Daily consumption to achieve AHA recommendation	35 oz.	61 oz.	59 oz.	118 oz.	61 oz.	133 oz.

^{a,b} Means with different letters differ statistically (P<0.05).
 *from K.W. Braden. 2006. Alternative Beef Finishing Strategies: Effects on Animal Performance, Retail Shelf Life, Sensory, Fatty Acid Profile and Lipid Stability. Dissertation. Auburn University, p. 67.

As reflected in Table 3, longissimus muscle from grass finished steers had a significantly higher (P<.05) omega-3 fatty acid content. Perhaps of greater significance are the calculations showing the daily beef consumption required to meet the current American

Heart Association (AHA) recommendations (assuming beef is the only source of omega-3 fatty acids in the diet).

According to USDA data, per capita beef consumption in the US is currently less than 3 ounces per day. Therefore, it is highly unlikely any consumer will meet the AHA recommended daily intake of omega-3 fatty acids through beef consumption alone.

Summary

Beef producers and consumers alike should exercise caution when interpreting data. Statistical significance is not necessarily paralleled by biological importance. As demonstrated in the literature and highlighted herein, grassfed beef is statistically proven to contain a greater amount of the beneficial omega-3 fatty acids. However, when compared to the current AHA recommendation for omega-3 intake, beef alone is an insufficient source of these fatty acids thought to be beneficial for heart health.