

Factors of Beef Quality and the Role of Beef Intake in Daily Diet

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Abstract. Beef is becoming more and more popular due to its rich nutritional value and unique taste. Feeding conditions, post-processing and storage methods can have a significant impact on beef quality. This paper describes how beef is fed, how it is processed, and how its nutrients affect the human body. The question of how to ensure the nutritional value of beef and at the same time to have an attractive taste still needs to be investigated in depth. The quality of beef varies depending on the feed, and this variation is usually in the nutritional content and the texture of the beef. Post-processing of beef can alter the original meat texture and nutrient structure, and taste and nutrients can be altered. This article provides advice for beef lovers on how to handle the meat and the pros and cons of being aware of the nutrient content of beef for the human body. It provides some reference for future research on how to enhance the taste of beef while maximizing the preservation of nutritional value.

Keywords: Beef; texture; nutritional value.

1. Introduction

Nowadays, with the improvement of people's material conditions, people have higher demands for living quality. Beef contains a lot of high-quality animal protein, high fat, and its unique taste, making it one of the most important foods in the world. Beef has become an indispensable food in people's lives. It is sought after by more and more consumers. There is an increasing demand for beef.

Therefore, when buying beef, customers will pay more attention to the quality of beef and its nutritional content. There are many factors that affect the quality of beef, such as the growing environment and feeding conditions of the cattle, the way the beef is processed after slaughter and the way it is preserved. Feed affects the nutritional composition of beef, for example, supplementing a cow's diet with sunflower seeds helps to optimize the fat composition of beef. Later processing involves environmental factors and human factors. For example, what kind of environment will the raw or cooked beef be placed in, whether to add some food additives to ensure the freshness of the beef and how to cook the beef. Moreover, the age, sex and maturity of the cattle are also factors. Usually, the meat of some younger cattle will be more tender and juicy, and the meat of older cattle will be more chewy. Although breed has an important effect on beef sensory quality, beyond differences in carcass characteristics, breed might explain only a small part of the variability in beef quality or sometimes may not explain it at all. For instance, Conanec et al. observed very few differences in beef sensory quality between beef aged under the same conditions and produced by young bulls from 15 European breeds reared under relatively similar conditions [1].

Beef is a good source of protein for muscle building, so many people neglect their health by eating beef for muscle building. How to consume beef in a healthy way becomes crucial. On the one hand, attention should be paid to the nutrients other than protein that beef contains. On the other hand, the quality of the beef should also be considered, as both feeding conditions and processing and storage can have an impact on the quality of the beef.

The intake and consumption of beef varies from country to country and region to region. The climate, living conditions and human factors in different places affect the growth of cattle. Breed of cattle, processing methods and feeding conditions are the main factors influencing the quality of beef. Beef is rich in nutrients such as vitamins, minerals, and excellent proteins. However, the amount of nutrients that are ultimately consumed by the human body can be affected by many factors. Although it varies slightly depending on the species, the animal's diet, and age, saturated fatty acids (SFA) typically make up almost half of the fat in meat, which accounts for about half of the maximum

recommended intake of SFA [2]. According to survey data, beef contains protein, B vitamins, zinc and iron, which contribute significantly to the nutrients needed in the human diet [3]. However, excessive intake of beef can cause potential health problems to human body.

2. Factors Affecting the Quality of Beef

2.1. Feeding Conditions

The feed a cow eats will indirectly affect its meat quality. Grass is the main food for beef, providing cattle with a large amount of vitamins, antioxidants, omega-3 fatty acids. However, with the development of animal husbandry, the number of livestock is too large, so that cattle can not be completely grass-fed. Otherwise, it will affect the ecosystem and the food source of other animals. On the other hand, grass-fed beef can have a poorer texture and lack fat content. Fat can make beef tender and juicy. Some farmers who are looking for beef quality will use grains as the main food for their cattle, with corn being the most commonly fed grain to cattle. Grain-fed cattle will be fatter, which is the reason why there will be marbling in the beef, and will have a stronger flavor. According to research findings, providing cattle with nutrient-rich feeds helps to improve the meat quality of beef as well as the nutrients it contains [4]. As shown in table 1, the growth of cattle is affected by the feed and different feeds affect the texture of beef. To summarize, grain feeding can make beef richer in fat content compared to grass feeding, but it has the disadvantage of high feeding cost. Therefore, in this aspect of feeding conditions, a mixture of grass and grain can be used for better beef quality.

Table 1. Fatty acids in beef [5]

The variety or cut of beef	Feeding model	Myristoleic	Palmitoleic	Oleic	Vaccenic	MUFA
steak-ribeye,strip,Delmonico (mg/100 g muscle tissue)	Grain	0.038	0.207	2.370	/	46.000
	Grass	0.009	0.058	0.722	/	36.000
Crossbred steers (g/100g lipid)	Grain	/	/	/	0.920	34.990
	Grass	/	/	/	1.350	24.690
Mixed cattle (g/100g lipid)	Grain	/	/	/	0.510	46.200
	Grass	/	/	/	2.950	42.500
Combined average of ribeye, round,chuck (g/100g lipid)	Grain	/	/	/	/	40.700
	Grass	/	/	/	/	33.800
Angus Steers (mg/100 g muscle tissue)	Grain	/	/	/	/	1729.000
	Grass	/	/	/	/	930.000
Crossbred Steers (% of total FA)	Grain	/	/	/	2.800	37.830
	Grass	/	/	/	4.200	34.170

2.2. Post-processing and Storage Methods

The way beef is processed and stored can directly affect the meat quality of beef. In the process of processing beef, too high a temperature will cause the beef to lose fat and become hard. Too low a temperature can cause blood retention, which can be a health hazard. Freezing is the most common storage method. According to research, freezing denatures and oxidizes proteins, oxidizes lipids, and breaks down fats. Oxidation of beef during freezing affects flavor, nutritional value, color and texture [6]. Beef palatability is affected by the way it is cooked and stored, and post-processing of beef is problematic.

3. Impact of Beef on Human Diets

3.1. Nutritional Composition

The nutrient content of beef contributes to human growth and development and reduces the incidence of certain diseases. Beef is a high-protein, high-calorie food, which contributes to muscle development in the human body. Some of the amino acids in beef cannot be synthesized in the human body and these amino acids are a key source of protein. For teenagers, who are in a critical period of growth and development, eating more beef can make them stronger. Beef also contains Omega-3 fatty acids, which can reduce the risk of cardiovascular disease [7]. CLA9 is a group of conjugated linoleic acid isomers with anticancer properties as well as cardiovascular health benefits [8]. Many people will consume beef in excess because of its high nutritional value, while ignoring some health problems.

3.2. Potential Health Problems

Consuming large amounts of beef may cause health problems. Beef is popular among consumers because of its unique taste and rich nutrition. As people consume more and more beef, health problems come with it. Beef is high in fat, which in turn contains trans fatty acids. Trans fatty acids are associated with some cardiovascular diseases, diabetes and obesity time. Due to the effects of trans fatty acids on human health, it is recommended in the UK that no more than 2% of dietary energy intake should come from trans fatty acids [9]. People consume beef in large quantities because it is tasty and nutritious and there are health problems.

4. Selection and Processing of Beef

4.1. Beef Selection

Beef is selected according to personal taste. Meat from grass-fed cattle is usually lean, which is suitable for those who do not like oily food. If you want more juicy beef, you can choose grain-fed cattle. People who are looking for both the look and taste of beef are well suited to choose grain-fed cattle. Grain-fed cattle have rich marbling in their meat, which makes it more tender and juicy to eat. Before purchasing beef you need to pay attention to the type of beef and which part of the cow it comes from.

4.2. Handling Beef

Shorten the freezing time of beef and pay attention to the heat when cooking. Total protein content of beef tends to increase at low temperatures [10]. Therefore, storing at a sufficiently low temperature for a certain period of time preserves the flavor of beef. However, prolonged freezing should also be avoided. The ice crystals produced during freezing can damage muscle fibers and the quality of beef decreases. It is advisable to buy fresh beef as needed for daily living and freeze it at sufficiently low temperatures. Try not to buy beef too soon and freeze it for long periods of time. The heat affects the flavor of the food. Cooking for too long results in loss of fat, less juiciness, and meat that is no longer tender. So make sure the heat is right by poking the beef with a tool from time to time during cooking to feel how tender it is. It is beneficial to eat the beef you buy on the same day and observe the condition of the beef while cooking.

5. Reasonable Way to Eat Beef

5.1. Avoid Excess Nutrition Through Exercise

Exercise outdoors more often to consume excess nutrients. While consuming beef, a lot of fat is left behind in the body. If not consumed in time, the fat will slowly accumulate, increasing the risk

of diabetes and obesity. Therefore, performing exercise such as running, swimming and other forms of exercise can effectively burn fat and keep the body in a healthy state.

5.2. Control Beef Intake

Reduce the intake of beef by eating other foods. Eat more vegetables and grains during meals and fruits after meals. After enhancing the feeling of fullness, you will be less tempted to eat beef. Replacing real beef with beef made from veggies is likewise a way to go. In some vegetarian restaurants, there will be vegetarian dishes that taste almost indistinguishable from beef, which are mainly made of grains. This reduces the intake of beef, and therefore fat, while ensuring nutrition and satisfying the palate. Eating more vegetables and fruits, eating less beef, and controlling the fat intake, can be healthier than eating beef.

6. Conclusion

Beef is an important part of human dietary life. The food that cattle eat while growing affects their muscle mass and determines the firmness of their meat. The amount of nutrients such as protein and fat in beef varies depending on the food eaten. Beef from cattle that are fed primarily on grass will be leaner, lacking in fat content, and will be firmer. Beef from cattle fed primarily on grains will have a higher fat content and be more tender and fatty. When storing beef, prolonged freezing should be avoided, which will minimize damage to the muscle structure from ice crystals that form at low temperatures. When cooking beef, pay attention to the control of the heat, a long period of high temperature will cause a lot of fat loss, the meat will become hard, no longer tender and juicy. Beef is rich in nutrients, can provide the body with a lot of protein and some trace elements. But excessive consumption will have an impact on health, beef contains high calories and trans fatty acids can cause some cardiovascular disease and obesity. Therefore, we should pay attention to moderate consumption in daily life. Many people eat beef to assist in muscle building, this article suggests that while consumers consider the benefits of beef, they should also pay attention to its bad side. This article gives some suggestions on how to handle beef to enhance the flavor and how to eat beef in a healthy way through dietary combinations. Follow-up studies on beef products such as steaks and jerky can refer to this paper for some descriptions and suggestions. In addition, this paper lacks descriptions of different breeds of cattle. The quality of cattle is usually also an important influence on the texture and nutritional value of beef. Finally, it is hoped that future studies will consider the influences on beef quality from more aspects.

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