

Are consumers with food allergies at risk if beef cattle are fed with the food that provokes the consumer's allergy?

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Beef cattle can be fed with various forages, grass or grains and legumes, depending upon the production system that is employed. Feeder cattle are fed grains such as corn, sorghum, distiller's dried grains, and wheat and/or legumes, most commonly soy. Corn and soy in particular, are also common components of the human diet. Soy and, to a much lesser extent, corn are known to provoke allergic reactions in susceptible individuals when consumed as part of the human diet. Consumers with soy and corn allergies occasionally pose questions about whether any allergic risk exists from eating beef from cows fed soy or corn.

Food allergies afflict as many as 15 million Americans. Consumers with food allergies are advised to avoid the offending food(s) in all forms, but would that advice extend to beef from cows fed corn or soy? Allergic reactions to corn are very rarely encountered. Soy allergies are more common but primarily affect infants and young children who frequently outgrow their soy sensitivity. With both corn and soy (and most other allergenic foods), the primary allergen(s) are individual, naturally occurring proteins found in the edible seeds.

Beef cattle are ruminants with a very efficient digestive system (Figure 1). The prevailing scientific opinion is that the animal's digestive system breaks down ingested proteins into amino acids that are absorbed and used to build beef tissue proteins.^{1,2} According to this prevailing scientific expert opinion, the allergens would not survive digestion and are not known to be deposited in beef muscle. What is the scientific evidence that supports this expert opinion?

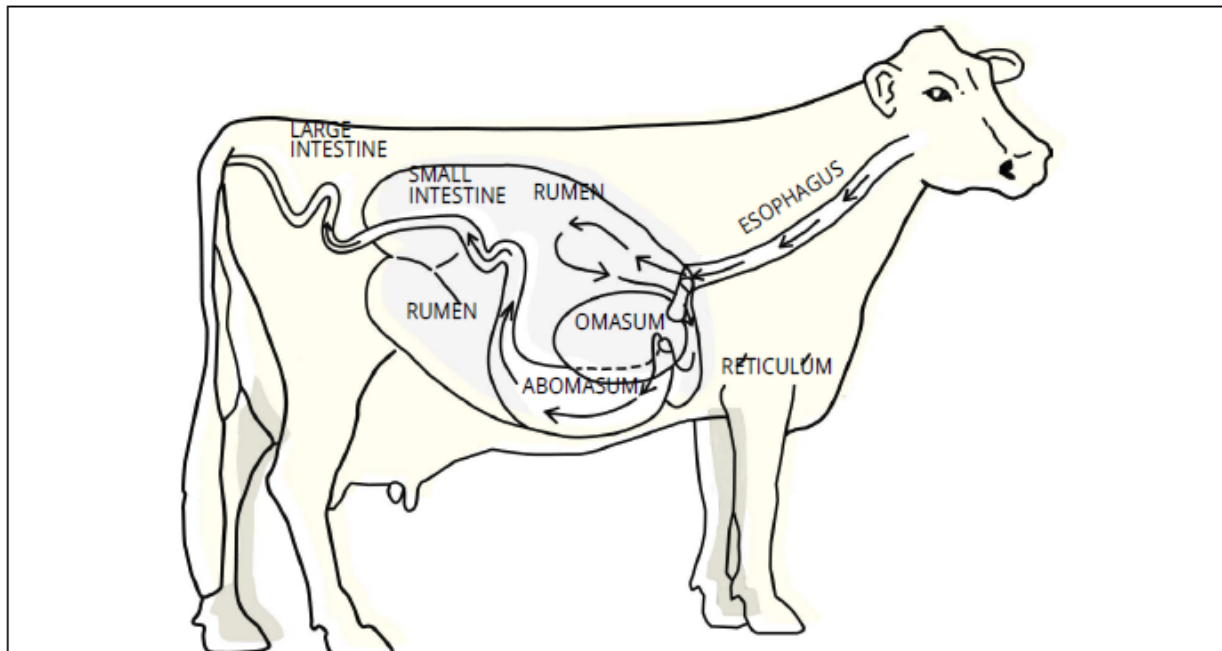


Figure 1. Digestive System of Cattle



Recently, grain-fed beef from cattle fed wheat as part of the ration was shown to contain no detectable gluten protein residues demonstrating that gluten is not absorbed from the diet and accumulated in the muscle tissue.³ Similar studies have not been conducted with corn or soybeans in the feed of cattle. However, considerable research has been carried out to determine if residues of the novel DNA or protein residues in genetically modified crops can be found in cattle fed such crops.^{4,5} With cattle, most of these studies involved attempts to find one of the insect-resistant Bt genes in the DNA, DNA fragments or protein in the beef from cattle fed with corn containing insect-resistant Bt genes. No evidence was found in any of these studies of the transfer of DNA, DNA fragments or protein into the meat of beef cows. Examination of the plasma of cattle fed Bt corn found no detectable Bt protein,⁶ suggesting that this novel protein was digested in the bovine rumen. Additional studies with similar results have been conducted with mono-gastric animals such as pigs, chicken and fish indicating that DNA or proteins from animal diets are not likely to be transferred to meat, milk, or eggs.^{4,5} Due to technical limitations in the methods used to detect protein residues, the results from testing for DNA or DNA fragments is more compelling.⁴

***Bottom Line:* Corn- or soy-allergic consumers can safely eat beef or beef products obtained from beef cattle fed corn or soy. Within the rumen of the beef cow, allergenic proteins found in corn and soy are digested to amino acids that are subsequently absorbed and used to build the muscle and other tissues of the animal. The corn and soy allergens are destroyed and do not get deposited in the edible beef muscle tissues.**

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