# Microbe Helps Evaluate Dietary Fiber

Scientists at the Richard B. Russell Agricultural Research Center in Athens, Georgia, brought in a small, new consultant last summer for an inside job. The assistant was microscopic and lived in people's intestines. It did not shrink from its task: eating indigestible pieces of food. The humble, mild-mannered microbe helped the scientists identify the best foods for a high-fiber diet.

Nutritionists have long preached the gospel of including fiber in the diet. It helps with weight control and may protect the colon from certain cancers. But everyone knows fiber-rich diets can sometimes lead to bloating and gas.

Nutritionists are still debating which fiber will work best with the least discomfort.

Perhaps a bacterium could provide some of the answers, suggested Scott Martin, an anaerobic microbiologist with the University of Georgia at Athens.

He shared his thoughts with Agricultural Research Service microbiologist Danny E. Akin and chemist W. Herbert Morrison at the nearby Russell center.

The trio began designing experiments to use bacteria from the human gut to evaluate fiber quality.

The microbe they picked: *Bacteroides ovatus.* It is one of the few human-dwelling, fiber-digesting bacteria that's been isolated.

The researchers found that *B. ovatus* tore through oat bran, dissolving almost 75 percent of a sample in 3 days. That means the oat bran may not be the best fiber candidate. If fiber breaks down too quickly, it can't provide the bulking and cleaning roles in the gastrointestinal system that nutritionists say are critical to human health.

Maize or corn bran was slowest to break down, with 42 percent digestion over the same period. But slowest breakdown may not be best to avoid the discomfort of intestinal gas.

Wheat bran struck a middle ground.

Finding that balance in digestibility might someday provide fiber supplements for consumers who can't deal with a morning bowl of high-fiber flakes. Researchers said they hope their initial work will be valuable to food producers and nutritionists for this reason.—By **Jill Lee,** ARS.

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# Earlier Castration Reduces Stress

The kindest cut may be the one made at a young age, when it comes to castrating beef cattle.

Scientists in the ARS Livestock Behavior Research Unit at West Lafayette, Indiana, found calves castrated shortly after birth suffered less stress and recovered faster than those castrated around weaning time.

Farmers remove their calves' testicles to reduce aggressiveness in male animals as they mature. It may also improve the taste and texture of beef, says Julie Morrow-Tesch, an ARS animal physiologist/ethologist who heads the research unit. Meat from uncastrated cattle can be tougher and may carry an unpleasant odor.

The West Lafayette lab studies livestock behavior in order to gauge the stress level in animals.

"It's important to understand which management practices can be combined or should be performed independently to reduce stress in livestock," says Morrow-Tesch. "By integrating castration prior to weaning, stress levels may be lower for calves at weaning, thereby improving animal well-being."

Morrow-Tesch used two different methods of castration—surgical and banding—on three separate groups of Angus, Simmental, and crossbred calves: Two groups were castrated and one was not. In banding, a tight rubber band around the animal's scrotum cuts off the blood supply to the testicles. After several days, the scrotum drops off. Cattle producers prefer this method because it's less expensive and not as labor-intensive as surgically removing the testicles.

Calves are usually weaned when they're 36 weeks old. The West Lafayette researchers castrated one group of animals at 36 weeks and the other at 33, which was 3 weeks before weaning. They measured the calves' stress level by checking blood levels of haptaglobin, a protein the liver makes when an animal is injured.

They found that haptaglobin levels were higher in calves castrated at 36 weeks than those castrated at 33 weeks or at birth—indicating a higher level of stress for the older animals. Surgically castrated calves also showed higher levels of haptaglobin, meaning surgical castration was more stressful than banding.—By **Dawn Lyons-Johnson,** ARS.

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