

# Sarford's News

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## Pathogens persist in protozoan hosts

By Dr. Clayton McNeff

This article focuses on the use of SarTec *Yucca*-saponin fortified products and how they can help in the fight against bad protozoa and bad bacterial influences in the digestive system of beef cattle.

Protozoa are microscopic animals that occur in nature as single cells. They comprise a sub-kingdom consisting of single cellular organisms that are the simplest in the animal kingdom. They range in size from submicroscopic to macroscopic and are divided into seven phyla: Sarcostigophora, Labyrinthomorpha, Apicomplexa, Microspora, Ascomycota, Myxozoa, and Ciliophora. Although the first intracellular bacteria in protozoa were discovered over a century ago (Gruby et al., 1843), more research is needed on the interactions between proto-

The *Yucca* plant is a wide-ranging genus, which is part of the Century plant family, Agavaceae. Taxonomically there are 30 species within the *Yucca* genus, *Schidigera* being one. Saponins are natural plant surfactants that occur in over 500 different plant species belonging to some 80 different families (Hostettmann, K. et al., 1991). Recent research conducted by SarTec Corporation has shown that *Yucca Schidigera*-based drenches, **SarStart®**, **SarStart® Pro** and **SarStart® Plus**, are effective agents for the reduction of rumen protozoa populations. It has been well documented in the open literature that saponins have strong antiprotozoal activity. The antiprotozoal action of saponins is believed to be related to their affinity for cell membrane sterols, which are embedded in the lipid bi-layer, particularly cholesterol (Glauert et al., 1962). Saponins form complexes with cholesterol and thereby open holes in

cell membranes (Bangham et al., 1962). The ability of saponins to rupture protozoan membranes, but yet be non-toxic when consumed orally to mammals, makes them an ideal candidate as protozoan eliminators in cattle. Furthermore, saponins have been studied by a number of researchers for the reduction of ruminal protozoa numbers (Lu et al., 1987, Klita, et. al., 1996, and Wang et al., 1998, 2000).

Foodborne bacterial disease associated with the consumption of meat and poultry products is a major health concern in the United States. According to the CDC website, "an estimated 76 million cases of foodborne disease occur each year in the United States. Typically these cases are mild lasting for only a day or two. However, some cases are more serious and the CDC estimates that there are 325,000 hospitalizations and 5,000 annual deaths related to foodborne diseases. The most severe cases tend to oc-

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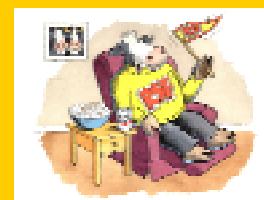
*Inside this issue:*

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SarStart Drench Products Kill Rumen Protozoa	1-2
SarFord's Kitchen	2
Employee Highlight	3

### Special Points of Interest:

- SarTec Products Eliminate Rumen Protozoa which are Known to Harbor Pathogenic Bacteria.
- SarFord's Kitchen - Tangy Beef Tenderloin.
- Employee Feature: Dave Johnston.



## Sar Ford's kitchen

### Tangy Beef Tenderloin:

This is an easy, delicious beef recipe that we modified from the web. Prep Time: approx. 20 Minutes. Cook Time: approx. 2 Hours. It makes approximately 10-12 servings.

#### Ingredients:

2-3 pounds beef tenderloin  
15 gingersnap cookies, crushed  
2 (1 ounce) packages dry onion soup mix

2 cups water  
1 (12 fluid ounce) can of chili sauce  
1 pound baby carrots  
15 small red potatoes, cubed  
1 onion, chopped  
2 cups water

#### Preparation:

- Preheat oven to 350 degrees Fahrenheit.
- Place tenderloin in a 10x15 inch roasting pan. Add the crushed ginger snaps around the tenderloin. In a separate small bowl, combine the onion soup mix with the water. Mix well and pour over

the tenderloin. Then pour the chili sauce over the tenderloin.

- Bake at 350 degrees Fahrenheit for 1 hour. Add the carrots, potatoes and onion to the roasting pan around the tenderloin.
- Bake at 350 degrees Fahrenheit for 1 more hour, adding water as needed when done to thin the sauce in the bottom of the pan.

*Hope you enjoy it. We sure did!  
- thanks, SarFord.*

## Pathogens persist in protozoan hosts (continued from page 1)

young, those who have an illness already that reduces their immune system function, and in healthy people exposed to a very high dose of an organism." There are a variety of techniques used and under study for the decontamination of meats including poultry, swine and beef from bacterial pathogens that cause both serious illness and death in both the U.S. and the world. Despite the existence of a plethora of technologies for eliminating bacterial pathogens from livestock meats, the problem persists, and new technologies such as the drench products that SarTec manufactures, are needed.

The link between protozoa and bad bacteria in the rumen is that protozoa act as "sub-reservoirs" for bacteria which can exist both within other animals or in the environment ("free living") itself. This relationship helps to explain how pathogenic bacteria have been able to persist through the ages and may help to explain why it is so difficult to completely eradicate these pathogens from the human food chain with antibiotics or bacte-

Rasmussen et al. (August, 2004), has clearly shown the ability of protozoa to harbor and genetically alter *Salmonella* strains of bacteria and to increase their virulence. Dr. Rasmussen and co-workers have shown that *Salmonella* strain DT104 becomes hyperinvasive after engulfment and later release from ruminal protozoa. In fact, the virulence of the protozoan-harbored *Salmonella* bacteria was found to be nearly 8-times as invasive as unexposed *Salmonella* strains DT104 and SL1344, and were almost as invasive as EE419 strains, which are known to be hyperinvasive as well as antibiotic resistant. Initially, ruminal protozoa were assumed to be important for the welfare of their host ruminants. In point of fact, protozoa can make up to 50% of the biomass of a rumen. However, the current view of ruminal protozoa has shifted dramatically from the initial view of an innocuous symbiont to a serious disease-carrying threat. Recent research has shown that indeed some types of protozoa and amoebae can harbor pathogenic bacteria. For instance, the isolation of amoebae harboring *Legionella* from water sources has been shown to be the causative agent of Legionnaires' disease (Pontiac fever) outbreaks (Fliermans et al., 1981, Dowling et

al., 1992, Fields, 1996). Besides providing sanctuary from harsh conditions, protozoa may also increase the virulence of engulfed pathogenic bacteria. In a recent mini-review paper (Harb, et al., 2000), the authors describe a shift in the paradigm of the relationship between bacteria and protozoa: "Protozoa appear to play a central role in the transition of bacteria from the environment to mammals. In essence, protozoa may be viewed as a 'biological gym', within which intracellular bacterial pathogens train for their encounters with the more evolved mammalian cells."

In summary, new research has definitively shown that rumen protozoa can harbor pathogenic bacteria. SarTec *Yucca Schidigera* formulated products can help rid cattle of protozoa and their associated bad bacterial naturally. In fact, customer observations suggest that indeed there are many benefits to the inclusion of these products to the overall feeding regimen. *Yucca Schidigera* extracts are approved for use in animal feeds as listed in the official publication of the Association of American Feed Control Officials, Inc. (IFN 8-19-700, reg 172.510).

***For more information call SarTec (1-800-472-7832) today!***

## SARTEC® CORPORATION

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# SarTec®

## SARTEC Employee highlight Dave Johnston

This issue's employee highlight focuses on Dave Johnston who has been at SarTec for four years. Dave was recently promoted to manager of SarTec's newly formed fertigation division. He invites you to look at the new automatic lawn fertilizer system on SarTec's web site. Just look for SarGreen the Gecko. He has also been instrumental in supporting the computerized grain conditioning systems installed at customer locations throughout the country. Dave embodies the SarTec creed that the customer is

always first at SarTec. He will always go the extra mile to make sure that a job is done right. Dave is an A-1 aviation mechanic and is responsible for maintenance on the three planes that SarTec owns, which help assure that SarTec can meet customer needs whenever and wherever the call arises. Dave is the proud father of two children, Keenan (9) and Madeline (5) and enjoys fishing, boating, snowmobiling, hunting and shooting trap. Thanks Dave, for making sure that the customer always comes first at SarTec!



SarTec Highlight of Dave Johnston. Above is a recent picture of Dave at SarTec Headquarters in Anoka, Minnesota.

# See inside: How Yucca Saponins Can Help Rid Your Cattle of Protozoa, and a Great New SarFord Tangy Beef Tenderloin Recipe.

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- SarFord