BCRC Beef Science Cluster
Research Facts
IN PROGRESS

Can composting destroy BSE prions? SRM.01.09

Project Title: Defining the Fate of Prions During Composting of Specific Risk Material

Researchers: Dr. Tim McAllister, AAFC Lethbridge, Dr. Stephanie Czub, CFIA Lethbridge, Dr. Kim Stanford, ARD Lethbridge, Dr. Doug Inglis, AAFC Lethbridge, Dr. Aru Balanchandran, CFIA Ottawa and Dr. Brent Sellinger, University of Lethbridge

Background: Biodegradative processes during composting could serve as a practical means for disposing of specified risk material (SRM) in Canada. Bovine tissues including bovine DNA and resistant proteins such as keratin are extensively degraded during the composting process. These researchers have successfully identified and characterized a new bacterial species that effectively breaks down keratin and appears to be the an important proteolytic microbe during composting. Information on the fate of prions during composting has been a regulatory impediment to the adoption of composting as a method of SRM disposal. This team has developed a method to measure prions in compost and has shown that up to 40 per cent of scrapie prions (which are more resistant than the BSE prion) were degraded during a single large scale composting cycle.

Objective: Determine the extent to which repeated compost cycles result in additional reduction in BSE prions during composting, if composting conditions can be improved to increase prion degradation; and (d) the extent to which Actinomadura keratinolytica bacteria can degrade prions.

These researchers will conduct composting studies within the level 3 containment area at the CFIA Lethbridge laboratory. Fresh feedlot manure will serve as the substrate for all composting studies. Both healthy and infected brain samples will be obtained from the CFIA BSE reference laboratory, immobilized onto membranes and incubated at three different levels within each composter. At the end of the composting period, the membranes will be recovered from the composters and remaining BSE prions will be estimated using quantitative IQ-PCR. Subsamples will be used to see if the remaining brain material can infect BSE-susceptible mice. Additional samples will be collected for microbial ecology studies to investigate the specific microorganisms involved in the prion degradation process.

Implications: Developing effective, economical, and environmentally acceptable means of destroying SRM will reduce costs associated with SRM and carcass disposal.

The Beef Research Cluster is funded by the Canadian Cattlemen's Association and Agriculture and Agri-Food Canada to advance research and technology transfer supporting the Canadian beef industry's vision to be recognized as a preferred supplier of healthy, high quality beef, cattle and genetics.

Proudly funded by:

Growing Forward
Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada
BCRC Beef Cattle Research Council
A division of the Canadian Cattlemen's Association
Canadian Beef Cattle Check-Off