



IUFoST Scientific Information Bulletin  
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## **BOVINE SPONGIFORM ENCEPHALOPATHY (BSE)**

The United States is the 24th country to identify a case of bovine spongiform encephalopathy (BSE, “mad cow disease”) within its borders. The investigation of a single BSE case in the USA, and the case reported in Canada earlier in 2003 has continued to keep the issue of “mad cow disease” in the headlines worldwide.

The need for countries to strengthen and consistently apply their BSE control measures is reinforced by this latest discovery. BSE is a relatively new disease; the first cases in cattle reported in the United Kingdom in 1986 were the start of a major epidemic with around 180,000 BSE cases to date, reaching a peak of 36,682 new cases in 1992. There are hundreds of new cases each year in the rest of Europe. In 1996 another new disease, variant Creutzfeldt-Jakob Disease (vCJD), was detected in humans and linked to the BSE epidemic in cattle. Consumption of contaminated meat and other food products from cattle is presumed to be the cause of vCJD. Both diseases are invariably fatal.

Extensive research has shown the infective agent to be a “prion”, a misfolded protein molecule that causes normally folded prion protein molecules (found mainly in the brain cell membrane) to misfold. Prions do not obey conventional rules of microbiology or of toxicology; they replicate with no DNA or RNA; they are protease resistant and resistant to heat (as in conventional heat processing or cooking of food), irradiation and practicable chemical treatments.

There are still difficult scientific challenges:

- there is no treatment or cure for BSE or vCJD;
- the exact mechanisms of transmission of infectivity to the central nervous system are insufficiently understood;
- there is no rapid ante-mortem diagnostic test for BSE or vCJD;
- it is not known at what stage of incubation BSE-incubating cattle would give positive results in an ante-mortem test if one existed;
- it is not known yet whether beef muscle meat or milk from infected cattle carry infectivity at too low a level to be measured or detected by existing methods;
- it is not known whether BSE exists in the sheep flock;
- assuming a causal relationship between vCJD and oral consumption of BSE infectivity, it is not known what is the infective dose, or whether it is a single dose or cumulative.

It is uncertain whether the origin of BSE was the feeding of rendered scrapie-infected sheep to cattle or whether it was from a one-in-a-million case of sporadic BSE infection in a cow which was rendered and recycled. However a great deal of research has provided knowledge about how it spreads, the tissues most dangerous to consume and the likely reasons for the appearance of a related disease in humans. Research backed by practical experience has defined a series of measures that countries can use to keep the causative agent out of the food and animal feed chains. These measures to minimize human

exposure must be fully implemented and controlled.<sup>1</sup> Surveillance, control and testing are the principal ingredients needed to ensure the safety of the food supply. These measures must continue to be enforced.

The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) make the following recommendations:

“All countries should continue to check for the disease and apply precautionary measures, even where BSE has never been found.”

“Keeping the material out of the food chain and not amplifying risk through feeding it back to animals are the principal factors to ensure against the survival of BSE in a country. “

In a statement issued on 12 January 2004 under the heading "BSE controls in many countries are still not sufficient", sub-headed "FAO urges countries to strictly apply preventive measures", FAO urged governments and industry to carry out a proper risk assessment and to keep risk animals and materials out of the food chain and to strictly apply the following preventive measures:

- \* ban the feeding of meat-and-bone-meal to farm animals, at least to ruminants;
- \* strictly avoid cross contamination in feed mills;
- \* remove and destroy SRMs (Specified Risk Materials: brain and spinal cord, etc.) from cattle over 30 months;
- \* ensure safe practices in the rendering industry, i.e. treatment of the material at 133°C under 3 bar pressure for 20 minutes;
- \* apply active surveillance measures within the cattle population and accurate identification of animals and traceability throughout production, processing and marketing;
- \* ban the use of mechanically removed meat.

In the third bullet point above, the “etc” is imprecise. SRM in cattle are defined as skull, brain, trigeminal ganglia (nerves attached to the brain), eyes, tonsils, spinal cord and dorsal root ganglia (nerves attached to the spinal cord) of cattle aged 30 months or older, and the distal ileum (portion of the small intestine) of cattle of all ages. In sheep and goats they are defined in the EU as skull including the brains and eyes, tonsils, spinal cord of animals aged over 12 months or that have a permanent incisor erupted through the gum, and spleen of all animals.

The International Union of Food Science and Technology (IUFoST), recognising its Adhering Bodies' need for quick access to scientific based information, has compiled a list of authoritative scientific sources that have been reviewed and approved by the IUFoST Scientific Council for the latest information on BSE.

#### **IUFoST-Approved Authoritative Scientific Websites:**

The risk of BSE material in the food chain is extremely low with the above control measures in place. (Reference: FAO Bulletin, 12 January 2004, (<http://www.fao.org/english/newsroom/news/2003/26999-en.html>)).

However, implementation of these strict rules and attention to detail are needed to ensure that the meat is safe.

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<sup>1</sup> WHO, Eight questions consumers should ask on the threat of mad cow disease, 30 January 2003

- On 23 December 2003, the US Department of Agriculture (USDA) reported a single BSE case in Washington State. By 6 January 2004 investigation established by DNA that the cow, born in 1997, originated from a dairy farm in Alberta, Canada. Investigations are ongoing in both USA and Canada. USA is instituting enhanced measures and controls. Full details and updates may be accessed at:  
<http://www.aphis.usda.gov/lpa/issues/bse/bse.html>  
<http://www.fda.gov/oc/opacom/hottopics/bse.html>
- On 28 October 2003, the Office International des Epizooties (OIE), the world organisation for animal health, issued a statement cautioning countries not to implement unwarranted trade restrictions against trading partners that have detected BSE. Of reference is the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) of the World Trade Organization (WTO). The OIE is one of the three international standard-setting bodies recognised under the SPS Agreement.  
[http://www.oie.int/eng/press/en\\_040109.htm](http://www.oie.int/eng/press/en_040109.htm)
- On 2 July 2003, the Canadian Food Inspection Agency (CFIA) released its report on a detailed, scientific examination of Canada 's BSE investigation and the significance of a case of BSE in Canada. The report is posted at:  
<http://www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/evale.shtml>
- In January 2003, the WHO publication "Understanding the BSE Threat", was published. This document provides consumers, governments and others involved in consumer protection with background information and how to prevent its spread. The WHO statement is entitled "8 questions consumers should ask on threat of mad cow disease."  
(<http://www.who.int/mediacentre/releases/2003/pr5/en/print.htm>).
- FAO recommended measures to ensure "good practices" re BSE can be obtained through the joint WHO/FAO/OIE Technical Consultation on BSE: Public Health, Animal Health and Trade, June 2001. (Reference: [http://www.oie.int/eng/publicat/press/a\\_010614.htm](http://www.oie.int/eng/publicat/press/a_010614.htm)). In addition, training programs have been expanded to assist countries in Eastern Europe, Africa, Latin America and South East Asia.
- European Union (EU) BSE Scientific Advice Web pages  
[http://europa.eu.int/comm/food/food/biosafety/bse/index\\_en.htm](http://europa.eu.int/comm/food/food/biosafety/bse/index_en.htm)
- United Kingdom (UK) Department of Environment, Food and Rural Affairs (DEFRA) BSE Information home page <http://www.defra.gov.uk/animalh/bse/index.html>
- UK CJD Surveillance Unit <http://www.cjd.ed.ac.uk/>

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The International Union of Food Science and Technology (IUFoST) is the global scientific organisation representing over 200,000 food scientists and technologists from more than 60 countries. It is a voluntary, non-profit association of national food science organisations linking the world's food scientists and technologists.  
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