

FAQs on cattle tuberculosis

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In Bavaria, an examination of dairy cattle populations by the competent supervisory authorities detected cattle tuberculosis in some populations. Cattle tuberculosis is caused by an infection with mycobacteria. The principal pathogen for tuberculosis in cattle are the *Mycobacterium (M.) bovis* subspecies *bovis* and *M. bovis* subsp. *caprae*. Tuberculous mycobacteria include, among others, *M. tuberculosis*, the pathogen for tuberculosis in humans. Cattle tuberculosis pathogens can also be transmitted to humans and cause illness in the same way that *M. tuberculosis* can be responsible for tuberculosis in cattle. The BfR has compiled frequently asked questions on the health risks posed by foods derived from cattle populations infected with tuberculosis.

What is cattle tuberculosis?

Tuberculosis is a bacterial infectious disease caused by certain mycobacteria. The typical pathogens for cattle tuberculosis are *Mycobacterium bovis* subsp. *bovis* and *Mycobacterium bovis* subsp. *caprae*. *M. tuberculosis*, the pathogen for human tuberculosis can also cause illness in animals.

Once the bacteria have entered the tissue, they initially settle in the lymph nodes as the entry portal. The most common progression of the disease is for infected animals to get pulmonary tuberculosis. The animals are weak, lose weight, suffer from heavy breathing and coughing and show a marked drop in performance. Apart from pulmonary tuberculosis, infections can develop in the intestine, the womb and also in all other organ systems. Symptoms of disease include, for example, colic, diarrhoea and miscarriage. In case of an udder infection, the mycobacteria can be excreted with the milk.

What are the pathways of infection for cattle?

The main pathway is an infection through breathing air containing little droplets and inhalation of dust. Transmission (oral) via feed, through blood and other body fluids and via wound and smear infections is also possible.

How often are cases of cattle tuberculosis detected in Germany?

Cattle tuberculosis is a livestock epidemic which must by law be reported. In Germany, control programmes have been carried out for many years. Since 1997, cattle populations were officially deemed to be free from tuberculosis. However, in recent years, infected animals have sporadically been found during meat inspections which are carried out as part of the slaughtering process.

Can other types of animals become infected with mycobacteria as well?

Mycobacteria are found in many domestic, zoo and wild animals. Mutual transmission between different animal species is possible. Thus red deer, roe deer, wild boars, and badgers are known to be a reservoir for bacteria. These animal species can transmit the disease to farm animals. Aerogenic infection via the breathing air or orally through contaminated animal-derived materials can also occur in pets such as dogs and cats following contact, for example, with cattle. The pets then become ill with tuberculosis.

Are the pathogens for cattle tuberculosis dangerous to humans as well?

Just as mutual transmission of mycobacteria is possible for the various animal species, this also applies to humans. Mycobacteria are zoonosis pathogens. This means that transmission from animals to humans and vice versa and also transmission from human to human is possible. *M. tuberculosis* and *M. bovis*, a pathogen type typical for cattle, can cause tuberculosis in humans. Children and elderly people as well as persons with an immune deficiency are deemed to be especially vulnerable.

The transmission can either occur following direct contact with infected or ill animals or through the alimentary pathway, i.e. by consuming contaminated food.

Can pasteurised milk and dairy products made from pasteurised milk contain cattle tuberculosis pathogens?

Through heat treatment (pasteurisation / high temperature treatment/ ultrahigh pasteurisation) of raw milk the pathogens are killed. Milk treated in such a way no longer constitutes a health risk to humans. This also applies to other dairy products produced from pasteurised milk.

Can consumers contract cattle tuberculosis from the consumption of raw milk and dairy products?

Cows infected with mycobacteria can excrete the pathogens via the milk. That can already be the case before the animals show any symptoms of illness. Also faecal contamination of the milk during the milking process can mean that the raw milk contains the bacteria. It is possible that from animal bacteria-infested populations milk infected with mycobacteria enters the food chain and hence reaches the consumer. In that case, the sale of raw milk (directly from the farm) as well as certified raw milk and raw consumption would mean transmission to the consumer of infectious mycobacteria capable of surviving and thus pose a danger of infection.

The health effects of mycobacteria in the production of cheese from raw milk must be assessed in dependence of the type of cheese concerned. It is to be assumed that mycobacteria can survive longer in raw milk soft cheese and cream cheese than in semi-hard and hard cheese. The longer the maturing phase takes and the higher the degree of dryness of a given type of cheese the higher the probability of mycobacteria being eliminated. The level of salt concentration, the pH development and the use of lactic acid bacteria also impact on pathogens' ability to survive.

The Federal Institute for Risk Assessment therefore sees the risk of a person contracting an infection from the consumption of raw milk-derived hard cheese such as Emmental or Alpine cheese made from milk contaminated with mycobacteria as very low, especially if the cheese was matured for a very long time.

Can cattle tuberculosis be transmitted to humans through the consumption of beef?

Infection of humans with *M. bovis* can also result from the consumption of non-heated meat of animals with tuberculosis. In the unlikely event that the official meat inspection fails to detect the characteristic signs of generalised tuberculosis in the organs and lymph nodes of the musculature or carcasses of healthy animals have come into contact with those of infected animals, this can mean that meat contaminated with *M. bovis* reaches the consumer.

As a general rule, beef is eaten fully cooked. The BfR recommends that when meat is cooked, a temperature of at least 70°C is maintained for 2 minutes. However, products are also made from beef which at least in part are eaten raw: for prime beef cuts in particular it is common as part of certain eating customs to heat them, through frying, only to a degree where the inside is still rare (i.e. bloody). Other examples of specialities eaten raw are steak tartar or minced meat, Carpaccio made from beef and air-dried products such as air-dried beef Grisons style. Beef sausages made in the same way as salami too are raw products which are made without heating at any stage of the production process. The ability of the pathogen depends on the maturation period, the salt content and the PH development of these products.

Are cattle regularly tested for tuberculosis pathogens during carcass and meat inspections?

Cattle tuberculosis is a livestock epidemic which must by law be reported. There are stringent laws governing livestock epidemics and meat hygiene. If the carcass examination, in conjunction with the information on the food chain, provides good reasons to suspect cases of tuberculosis, a slaughtering ban must be imposed.

What happens, if tuberculosis is suspected in cattle?

In cases where animals' reaction to a tuberculin test is either ambivalent or positive or if other reasons for suspecting infection exist such animals must be slaughtered separately from other animals. Also, precautions must be taken in order to avoid contamination of other carcasses, the production line in the abattoir, and slaughterhouse personnel.

If the suspected tuberculosis is confirmed, all meat from animals for which the meat inspection detected localised tuberculosis lesions in several organs and body parts must be declared unfit for consumption. However, if an individual tuberculosis lesion is detected only in the lymph nodes of one organ or body part, only the affected organ or the affected body part and the lymph nodes associated with it must, in accordance with EU law, be declared unfit for consumption.

The tuberculosis directive lays down that if pathological anatomical changes are found which indicate tuberculosis, these must be further investigated by means of laboratory diagnostic tests. The affected carcass must not be removed from the sight of slaughterhouse until the test results have come through.

According to EU law, the carcass and meat inspection of cattle from herds which have not been officially declared free of tuberculosis is the prerogative of the official veterinarian. In the case of tuberculosis outbreaks in cattle populations, the organ parts of slaughtered cattle suspected of being infected with tuberculosis should, as a matter of principle, be tested for mycobacteria in the laboratory by means of PCR. A fitness for consumption assessment of the slaughtered cattle can only be conducted once a negative test result has been received.

Are cattle populations regularly tested for tuberculosis pathogens?

There is no monitoring of cattle populations for tuberculosis in Germany. If a laboratory diagnostic test detects tuberculosis, this finding must be communicated to the authorities responsible for the area from which the population originated. The authority will then impose standards for the transportation of cattle from this population for immediate slaughtering.