THE SCIENCE WORLD
A Monthly e Magazine
Popular Article
ISSN:2583-2212
January, 2023; 3(01), 13-15

Tuberculin Skin Testing for diagnosis of Bovine Tuberculosis

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https://doi.org/10.5281/zenodo.7512858

Mycobacterium bovis is the causative agent of the infectious, widespread disease known as bovine tuberculosis (TB), which can affect both animals and humans. Although it typically has a slow-progressing, chronic nature, it occasionally can take an acute form. Nearly all species of vertebrates are afflicted by the common zoonosis known as tuberculosis (TB). Direct contact, inhalation of droplets released from infected lungs and intake of contaminated feed or milk are the three main ways that disease is conveyed. the tuberculin skin test (TST) also known as single intradermal comparative cervical tuberculin test (SICCT) is the main screening procedure for TB in cattle and buffaloes in field is used to check for TB in cattle, buffalo and other animals around the world. It serves as the globally recognised reference for identifying *M. bovis* infection in live animals. The conventional procedure involves measuring skin thickness after injecting PPD (Purified Protein Derivative) intradermally with bovine tuberculin into the caudal skin folds on neck and monitoring any swelling that develops at the injection site, 7 days later.

The SCIT test compares the response against bovine PPD and avian PPD in the cervical region with the goal of increasing the specificity, whereas the SIT test measures the cell-mediated delayed type hypersensitivity against bovine PPD injected in the mid-cervical region or in the caudal skin fold (Good et al 2011).

Procedure

Single Intradermal Test (SIT)

Bovine tuberculinPPD can be injected on caudal folds or on cervical neck region**.** The hair on neck should also be trimmed and area should be cleaned. The thickness of the skin folds should then be measured using a calliper before injecting bovine PPD. Using tuberculin syringes, the tuberculin can be

injected intradermally. The cervical location should receive an injection with a maximum volume of 0.1 ml and a minimum of 2,000 IU of bovine PPD. The correction of the injection can be confirmed by palpation of a small pea- like swelling at the site. Inflammatory responses are recorded 72 hours post injection (Table 1) and were given positive and negative based on the swelling on the injection site (Good et al 2011).

Table 1: Interpretation of SIT

Thickness	Interpretation
0 – 2 mm	Negative
2 – 4 mm	Doubtful
>4 mm	Positive

Comparative Intradermal Tuberculin Testing (CITT)

In CITT both bovine PD and avium PPD are injected in the same animal. When both avian and bovine PPDs are injected in the same animal, the site for injection of avian PPD shall be about 10 cm apart from the site of the injection of bovine PPD. The zero-day skin thickness is measured with the help of a vernier calliper and bovine and the avian tuberculin PPD (0.1ml each) injected intradermally. The correction of the injection is confirmed by palpation of a small pea- like swelling at the site. Inflammatory responses are recorded 72 hours post injection.

Interpretation of results

- Animals are considered positive for CITT if the increase in skin thickness at the bovine site of injection was equal to or more than 4 mm greater than the reaction shown at the site of the avian injection.
- The reaction was recorded as negative, if no or <2 mm difference in the increase in skin fold thickness was observed.

Limitations of the intradermal tuberculin test

1. False-negative reactions: Cutaneous anergy, recent TB infection (within 8-10 weeks of exposure), Incorrect method of TST administration (Humblet et al 2011).
2. False-positive reactions: due to Infection with non-tuberculosis mycobacteria, previous BCG vaccination.

3. When results of intradermal tests are inconclusive, it is necessary to wait at least 60 days.

4. Interference of NTM reactions on CITT

Advantages of the intradermal tuberculin test

- Recognised as the primary screening test for detection of tuberculosis in cattle (OIE).
- Low cost.

Reference

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