Indian Veterinary Magazine
a monthly Magazine
of the people, by the people, for the people
Vol 1 Issue 4 September 2025, 104-106

Tuberculin Skin Testing for diagnosis of Bovine Tuberculosis

Pallvi Slathia, Sakshi Sharma, Riya Abrol

Bovine tuberculosis (bTB) continues to be a major infectious disease of cattle worldwide, posing threats to livestock productivity, animal welfare, and public health. Early diagnosis remains the cornerstone of any successful control and eradication programme. Among the available diagnostic tools, the **Tuberculin Skin Test (TST)** remains the most widely used field-level screening method due to its simplicity, cost-effectiveness, and reliability (Shamim et al., 2012).

Principle of the Test

The TST is based on a **delayed-type hypersensitivity (DTH) reaction**, where cattle previously sensitized to *Mycobacterium bovis* exhibit a localized immune response when exposed to purified protein derivative (PPD) tuberculins. This cell-mediated immune reaction, characterized by swelling at the injection site, forms the basis for detecting infected animals (Mahdi and Haque, 2018).

Types of Tuberculin Skin Tests

Two major formats are used globally:

1. Single Intradermal Test (SIT)

- Involves injecting bovine PPD into the mid-neck region.
- Recommended for routine screening in areas with low prevalence.
- Sensitivity varies between 55–85%, while specificity typically exceeds 95% (Shamim et al., 2012).

2. Single Intradermal Comparative Cervical Test (SICCT)

- Utilizes both **bovine PPD** and **avian PPD**, injected at separate cervical sites.
- Helps distinguish *M. bovis* infection from sensitization by environmental mycobacteria.
- Preferred in regions where cross-reactivity is common due to environmental exposure.

Testing Procedure

The standard steps include:

1. **Initial Examination:** The selected site is palpated and clipped.

2. **Injection:** 0.1 ml of PPD tuberculin is injected intradermally using a specialized syringe.
3. **Measurement:** The skin thickness is measured using calipers both before and exactly 72 hours after injection.
4. **Interpretation:** An increase in skin thickness beyond prescribed cut-off values classifies the animal as positive.

Accurate application and reading are essential for minimizing false results (Mahdi and Haque, 2018).

Challenges and Limitations

Despite its wide use, the TST has certain limitations:

- False positives can occur due to non-tuberculous mycobacteria.
- False negatives may result from early infection, immunosuppression, or advanced disease.
- Requires trained personnel and strict adherence to protocols.

Nevertheless, its field applicability and affordability keep it central to global bTB control strategies.

Role in Control and Eradication Programs

Globally, TST is a core component of "**test-and-cull**" or "**test-and-segregate**" programmes. When combined with abattoir surveillance, movement control, and farmer awareness campaigns, the test significantly reduces the prevalence of bTB in endemic regions (Shamim et al., 2012).

Future Perspectives

Advancements such as interferon-gamma assays, molecular diagnostics, and next-generation biomarkers are emerging, yet none have replaced the TST for routine field diagnosis. Continued refinement of tuberculin quality and improved training for veterinarians will further enhance diagnostic accuracy.

References

MacCarthy, D. S., Vlek, P. L. G., and Fosu-Mensah, B. Y. (2012). The response of maize to N fertilization in a sub-humid region of Ghana: Understanding the processes using a crop simulation model. In *Improving soil fertility recommendations in Africa using the Decision Support System for Agro--technology Transfer (DSSAT)* (pp. 61–75). Springer Netherlands.

Mahdi, S. S., and Haque, M. (2018). Calibration and Validation of CERES-Wheat (DSSAT v4.6) Model for Wheat under Irrigated Conditions: Model Evaluation and Application. *Indian Journal of Ecology*, 45(3), 555–559.