

Irvine *et al.* (*loc. cit.*) found mean head area and the manually determined percentage of progressively motile spermatozoa as being significant covariates (Irvine *et al.*, 1994). Other parameters as ALH, VSL, VCL and linearity (LIN) have also been reported to be correlated with fertility (Krause, 1995). Present study indicates that fertility rate had no significant correlation with sperm motion traits, viability and membrane integrity.

### Summary

Sperm motion traits in frozen semen from 20 buffalo bulls were evaluated through computer assisted semen analysis (CASA) and fertility trial was conducted. Present study indicated that fertility rate had no significant correlations with sperm motion traits, viability and membrane integrity.

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## Prevalence of Tuberculosis in Semen Stations

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(Received : 24-03-2015; Accepted : 23-04-2015)

### Abstract

The results of DTH carried out for bTB in two farms in western and northern India for a period of four years is described. Implementation of regular disease testing and implementing strict biosecurity protocols at farm are important interventions in reducing the prevalence rate of

bTB at herd level in India.

**Key words:** Bovine tuberculosis, DTH, semen stations

Bovine tuberculosis (bTB) is caused by an obligate intracellular bacterium *Mycobacterium bovis* and is an Office International des Epizooties listed notifiable disease (OIE 2015). The Minimum Standards for Production (MSP)

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of frozen semen by Department of Animal Husbandry Dairying and Fisheries (DADF), Government of India has stipulated immediate isolation and culling of the positive bTB reactors (DADF 2012) in the semen stations. For screening against bTB, the recommended test by OIE is Delayed Type of Hypersensitivity (DTH) with bovine tuberculin Purified Protein Derivative (PPD).

### Materials and Methods

Two farms, one in western and the other in north India were included in this study for a period of four consecutive years (2010-2014). These farms regularly adopted all biosecurity measures such as quarantine, personnel, material and animal movement control, hygienic practices, isolation of sick animals, culling of disease positive animals and strict health management systems. Animals were regularly screened for diseases such as brucellosis, tuberculosis and infectious bovine rhinotracheitis.

Bovine tuberculin PPD obtained from Indian Veterinary Research Institute (IVRI), Izatnagar, Uttar Pradesh was used to carry out DTH test at approximately six month intervals. The test was conducted as per OIE Terrestrial manual (OIE 2009). In case of any positive

reactors, testing of the whole herd was repeated after two months with the objective of keeping the incidence rate of bTB less than 1 %. All the positive reactors were culled immediately.

### Results and Discussion

During the period of 2010-14, a total of 14 animals were found positive for bTB consisting of 7 Murrah buffaloes, 3 Jersey, 2 cross breed, one HF and Sahiwal each. In the farm located in north India, 11 rounds of testing were conducted from 2010 to 2014. The incidence of bTB was 0.49% and 0.47 % during Jun-11 and Feb-12 respectively (Table I). Breed-wise incidence was found higher in buffaloes followed by crossbreds (Table II a).

In the farm located in western India where the incidence of bTB was found to be relatively higher, 13 rounds of testing were conducted from 2010 to 2014 (Table I). Breed-wise incidence was found relatively higher in indigenous breeds, followed by buffalo and crossbreds. (Table II b) No animal was found positive in the farm in the north India from April-12, and, in the western India farm, from Jan-14.

An overall assessment of the DTH positive animals points to a relatively higher incidence of tuberculosis in the buffaloes as compared to

**Table I.** Nos. of animals in farm and overall incidence rate during 2010-14.

Farm in northern India				Farm in western India			
Year	Testing bulls	Positive reactors	Incidence rate (%)	Year	Testing bulls	Positive reactors	Incidence rate (%)
Jun-10	162	0	0.00	Aug-10	298	2	0.67
Dec-10	197	0	0.00	Nov-10	277	0	0
Jun-11	204	1	0.49	May-11	323	5	1.55
Sep-11	208	0	0.00	Aug-11	360	0	0.00
Feb-12	214	1	0.47	Mar-12	372	3	0.81
Apr-12	218	0	0.00	May-12	364	0	0.00
Aug-12	245	0	0.00	Nov-12	378	1	0.26
Feb-13	257	0	0.00	Jan-13	366	0	0.00
Aug-13	260	0	0.00	May-13	389	0	0.00
Feb-14	286	0	0.00	Nov-13	438	1	0.23
Nov-14	316	0	0.00	Jan-14	421	0	0.00
				July-14	432	0	0.00
				Sept-14	425	0	0.00

**Table II.** Breed wise distribution of Tuberculosis**a. Farm in northern India**

Year	Jun-10		Dec-10		Jun-11		Sep-11		Feb-12		Apr-12		Aug-12		Feb-13		Aug-13		Feb-14		Nov-14	
	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P
Pure exotic	55	0	65	0	73	0	70	0	69	0	71	0	73	0	88	0	86	0	94	0	101	0
Indigenous	21	0	29	0	27	0	28	0	29	0	29	0	34	0	31	0	31	0	31	0	37	0
Cross Bred	46	0	49	0	50	0	47	0	55	1	53	0	68	0	66	0	66	0	71	0	72	0
Buffalo	40	0	54	0	54	1	63	0	61	0	65	0	70	0	72	0	77	0	90	0	106	0
Total	162	0	197	0	204	1	208	0	214	1	218	0	245	0	257	0	260	0	286	0	316	0

T = Total animal tested; P = Positive reactor

**b. Farm in western India**

Year	Aug-10		Nov-10		May-11		Aug-11		Mar-12		May-12		Nov-12		Jan-13		May-13		Nov-13		Jan-14		Jul-14		Sep-14	
	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P
Pure exotic	58	0	54	0	59	1	65	0	79	1	76	0	78	1	74	0	79	0	87	1	81	0	80	0	83	0
Indigenous	34	0	35	0	36	1	43	0	45	0	42	0	45	0	43	0	44	0	48	0	45	0	50	0	51	0
Cross Bred	103	0	92	0	124	1	141	0	131	0	129	0	137	0	132	0	138	0	154	0	148	0	142	0	152	0
Buffalo	103	2	96	0	104	2	111	0	117	2	117	0	118	0	117	0	128	0	149	0	147	0	160	0	139	0
Total	298	2	277	0	323	5	360	0	372	3	364	0	378	1	366	0	389	0	438	1	421	0	432	0	425	0

T = Total animal tested; P = Positive reactor

cattle. Mullick (1994) also found prevalence of bTB higher in buffaloes (3-25%) than in cattle (1.6-16%) in India. In the farm located in north India, incidence was found in buffaloes and crossbreds only; whereas in the farm in western India, a relatively higher incidence was seen in indigenous cattle, followed by buffalo, pure exotic and crossbreds, in descending order of frequency. Higher incidence of reactors in native breeds of cattle compared to exotic and cross bred cattle was reported by Sisodia *et al.* (1995). Thakur *et al.* (2010) in contrast reported high incidence of tuberculosis in cross bred cattle as compared to native breeds of cattle. Different workers reported varying incidence of tuberculin reactors namely 14.31% in the State of Himachal (Thakur *et al.*, *loc. cit*) and 9.09% in Ludhiana, Punjab (Singh *et al.*, 2004).

In the present study, it was observed that bTB is present in both the herds with low incidence rate ranging between 0-1.55 percent. The practice of performing DTH bi-annually in both the farms with regular culling practices has

helped in lowering the number of positive reactors in the farms. The sensitivity and specificity of the DTH have been calculated to be between 68–95% and 96–99%, respectively (Monaghan *et al.*, 1994). According to OIE 2009, as DTH has a sensitivity of less than 100 %, eradication of bTB from a herd may not be possible solely by regular DTH test and culling of positives.

Implementation of strict biosecurity measures, regular disease monitoring and herd management protocol at farm are some of the key disease control interventions in achieving low prevalence rate of bTB at herd level in India.

**Summary**

In the present work, it was observed that bTB is present in both the herds with low incidence rate. The practice of performing regular DTH and culling has helped in lowering the number of positive reactors in these farms.

**Acknowledgement**

The authors are grateful to the farm officials on

both farms where the study took place and to the National Dairy Development Board in Anand for providing the facilities to carry out this work.

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## Study on Antibiotics Resistance of *Staphylococcus Aureus* Isolated from Bovine Raw Milk\*

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(Received : 05-01-2015; Accepted : 21-04-2015)

### Abstract

*Staphylococcus aureus* (*S. aureus*) is one of the major mastitis causing pathogen and presence of it in raw milk can cause a potential health hazard to consumer.

A total of 113 raw milk samples were screened for the presence of *S. aureus*, out of which 92 samples (81.41%) were found positive. Six commonly used antibiotics namely methicillin, penicillin, oxytetracycline, streptomycin, ciprofloxacin and gentamycin were used against the positive isolates and the results were recorded. Results suggest the possibility of transmission of MRSA to the humans through milk consumption from infected animals.

**Key words:** Milk, *Staphylococcus aureus*, Antibiotic sensitivity.

India rank first in milk production in the world with an estimated 133 million tonnes in 2012-13, but still as compared to the cattle population in India the milk production is very low. This is mainly because of the bovine mastitis and *Staphylococcus aureus* is a leading cause of mastitis and one of the most difficult udder pathogens to control.

Antibiotic-resistant *S. aureus* especially methicillin resistant (MRSA) isolates pose a severe challenge to both veterinary and dairy cattle producers because they have a negative impact on therapy (Sears and McCarthy, 2003; Brouillette and Malouin, 2005). Determination of levels of *S. aureus* and an evaluation of the antibiotic resistance of the isolates could serve as a tool for determining the hygiene standards implemented during milking.

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