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## Effect of HS & BQ vaccination on seminal attributes in Murrah buffalo

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### Abstract

Present study was undertaken to know the effect of HS & BQ vaccination on seminal parameters at BAIF Semen station, Uruli Kanchan. Dist. Pune, India. 85 Murrah buffalo breeding bulls were selected and quality seminal parameters were evaluated. The bulls included in this study were maintained on same feeding & management practices. For each bull Ejaculates were collected and evaluated one week of pre vaccination and one week of post vaccination of HS & BQ Vaccine (Raksha HS+BQ vaccine of Indian immunological Ltd) were included in the trial. Seminal Quality parameters like Ejaculate volume, sperm concentration, total sperm output, mass activity and initial motility were evaluated for all ejaculates. Data of ejaculates were analyzed by least square method. Results were found that HS & BQ vaccination had significant effect on ( $p<0.05$ ) ejaculate volume, sperm concentration and total sperm output whereas non significant effect on initial motility and mass activity.

**Keywords:** Murrah buffalo, HS & BQ vaccination, sperm output, post thaw motility, ejaculates

### Introduction

Out of many infectious diseases, Hemorrhagic Septicemia (HS) and Black Quarter (BQ) diseases are acute in nature and mostly outbreak occurs in monsoon season. Both diseases having high mortality rate in large ruminants, therefore vaccination of HS and BQ is a routine prophylactic measure for breeding bulls and strictly followed in all semen stations once in a year (Mathur *et al.*, 2003; Bhakat *et al.*, 2008; Bhakat *et al.*, 2010; Bhakat *et al.*, 2011)<sup>[9, 2, 3, 4]</sup>. Sperms are usually affected by different internal and external factors including genetics, handling processing and management particularly the general health condition of bulls since infection could lead to decrease the quality of sperms and seminal plasma.

The adverse effect of vaccination cannot be avoided as fertility of the bull semen gets reduced, but individual variation is there (Mukesh Bhakat *et al.* 2016)<sup>[15]</sup>. The impact of vaccination is more when temperature persists and varies from individual to individual animal. The increase in body temperature has direct and indirect effect on semen quality parameters. It directly affects process of sperm formation (Venkatareddy *et al.*, 1991)<sup>[15]</sup>. The increase in testicular temperature leads to testicular degeneration and results in derangement in spermatogenesis process which subsequently leads to increase in number of abnormal spermatozoa (Bhakat *et al.*, 2015; Perumal *et al.*, 2013; Bhakat *et al.*, 2010; Anderson, 2001)<sup>[16, 10, 3, 1]</sup>. The aim of the study was to know the vaccine stress on the bulls with the evaluation of different seminal quality parameters. Therefore, the current study was designed to observe the adverse effect of HS & BQ vaccination on seminal attributes in Murrah buffaloes.

### Materials and Methods

Present study was conducted at BAIF semen Station, Uruli Kanchan, Pune India during May 2022. Eighty five Murrah bulls age between 3 and 5years were maintained in bull station with same feeding & management practices during the study. Semen was collected with artificial vagina method and given to semen laboratory for evaluation of quality parameters. Total 85 ejaculates of pre vaccination of the same bulls were collected. All bulls were vaccinated by HS & BQ vaccine of Indian Immunological Ltd. by subcutaneous route early in morning. Ejaculates were taken three days before and three days after vaccination. All pre and post vaccination ejaculates were evaluated for semen volume. Ejaculates above 1.0 ml volume was processed, volume was recorded in graduated semen collection tube. Concentration for the semen was determined by using validated photometer and above 500 million/ml concentration

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ejaculates were evaluated and recorded. Sperm output was determined simply by multiplying ejaculate volume with per ml concentration of same ejaculate. Semen initial motility and mass activity was evaluated using phase contrast microscope. Ejaculates were processed by extending in glycerolated egg yolk tris dilutor and freeze by using bio freezer. After 24 hrs each ejaculates were evaluated for post thaw motility after thawing at 37 °C for 30 sec on glass slide using coverslip under phase contrast microscope. The data of pre and post vaccination were collected, recorded and analyzed by using least square analysis using R software version 4.1.2.

## Result and Discussion

The all findings of total 85 bulls ejaculate one week pre & post vaccination is presented in table 1. In general after vaccination there was decline trend observed in majority of parameters. Vaccination had non-significant effect on initial motility & Mass activity ( $p>0.05$ ) and significant effect on ejaculate volume, total sperm output and sperm concentration ( $p<0.05$ ). There was decline in ejaculate volume similar findings were reported by Tripathi and Saxena (1976) [14],

Kammar and Gangadhar (1998) [6], Mangurkar *et al.* (2000) [7], Singh *et al.* (2003) [12], Bhakat *et al.* (2010) [3], Bhakat *et al.* (2011) [4], Shu-er *et al.* (2011) [13], Dhia and Ali (2012) [5] and Perumal (2013) [10] while Mahuva das Gupta *et al.* (2017) [8] found non-significant effect of vaccination on Ejaculate volume.

Decrease in average sperm concentration from  $1608\pm0.5$  Million/ml to  $1420\pm0.5$  Million/ml ( $p<0.05$ ) was observed and similarly Total sperm output from  $9476\pm0.3$  million to  $7101\pm0.3$  million was observed. These findings are similar to the earlier reports (Mathur *et al.*, 2003; Bhakat *et al.*, 2011) [9, 4] and found in contrast with Mahuva das Gupta *et al.* (2017) [8] & Kammar and Gnagadhar (1998) [6]. The decreased sperm concentration may be due to an increase in resorption of abnormal and dead spermatozoa in the epididymal sperm reserves due adverse effect of increase in testicular temperature followed by testicular degeneration and epididymal dysfunction. The initial motility and mass activity found non-significant finding which is similar with Mahuva das Gupta *et al.* (2017) [8] but found controversy with the Singh *et al.* (2003) [12], Dhia and Ali (2012) [5].

**Table 1:** Least-square means with standard error of Ejaculate volume, Total sperm output, Sperm concentration, initial motility and mass activity of Murrah buffalo bulls

Sr. No.	Parameters	Pre-vaccination	Post-vaccination	Significant level ( $p<0.05$ )
		LSM $\pm$ SE		
1	Ejaculate Volume (ml)	$6.05\pm0.17$	$5.06\pm0.17$	S
2	Total sperm output in Million	$9476\pm0.3$	$7101\pm0.3$	S
3	Sperm Concentration (Million/ml)	$1608\pm0.5$	$1420\pm0.5$	S
4	Initial Motility (%)	$73.6\pm1.13$	$71.4\pm1.17$	NS
5	Mass Activity (0-5 scale)	$2.84\pm0.07$	$2.94\pm0.07$	NS

(\*S- significant, \*NS – Non significant)

## Conclusion

From the current study it can be concluded that HS and BQ vaccination has adverse effect on the most of the seminal parameters in Murrah breeding buffalo bulls due to febrile reaction lead to increase in testicular temperature resulted into altered spermatogenesis process. The performance of bull declines for some period which depend upon how long febrile reaction present in the body.

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