Effect of Using Oestrus or Non-Oestrus Teaser Cows on Ejaculation Time and Cortisol Level in Blood of Madura Bulls During Semen Collection

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Effect of Using Oestrus or Non-Oestrus Teaser Cows on Ejaculation Time and Cortisol Level in Blood of Madura Bulls During Semen Collection

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Abstract

Ejaculation time was measured when semen collection was done and blood samples were estimated using Indirect ELISA for determining the effect of using oestrus and non oestrus teaser cow on ejaculation time and blood cortisol levels as an indicator of stress of Madura bulls in Madura, Indonesia. The ejaculation time differed significantly ($p < 0.05$) between using teaser cow in oestrus (1.975 ± 0.499 minutes) and non-oestrus (2.994 ± 0.528 minutes). There was no significant difference between cortisol level of bulls when using teaser cow in oestrus (11.920 ± 4.169 ng/ml) and non-oestrus (9.803 ± 4.989 ng/ml) during semen collection.

Key words: Madura bull, oestrus cow, ejaculation time, cortisol

Bulls with superior semen quality is one of the important keys of successful breeding program. Proper semen collection process including the use of teaser cow is expected to influence the quality of the semen. Handling procedures for farm animals were presumed to be related to stress (Borell, 2001). During this time, stress in animals can be known by measuring levels of cortisol in blood, urine, saliva, hair, faeces, and milk (Chen *et al*, 2015).

Materials and Methods

Eight Madura bulls of Technical Implementation Unit of Livestock Breeding and Forage of Animal Feed in Madura (UPT Madura), East Java Livestock Services, Indonesia were used for sample collection. The stages of the estrous of teaser cows were determined by rectal palpation. The animals were fed with usual diet and water was available *ad libitum*.

Ejaculation time was measured from the time bulls began sniffing until ejaculation occurred. Blood samples were collected from jugular vein of bulls, 15 minutes after ejaculation. Serum was stored in the freezer at -20 °C, until assay of the sample was done by Indirect ELISA Technique.

Results and Discussion

Based on the test result by using independent t-test, there was a significant difference ($P < 0.05$) between the usage of oestrus and non-oestrus teaser cows. It can be seen that ejaculation time using oestrus cows was shorter than using non-oestrus cow (Table I).

The oestrus females release pheromones which in cows, signalling is seen in pre-oestrus and oestrus phases. Pheromones in the form of trimethylamine, acetic acid, phenol 4-propyl and propionic acid present in cattle saliva will provide a special signal for the bulls (Sankar *et al*., 2007). Bioassay of faeces sample showed that acetic acid, propionic acid and 1-iodo undec-

Table I. Independent t-test for ejaculation time

	Group	Mean	SE	t	p
Ejaculation Time	Oestrus Teaser Cow	1.975[a]	0.499	-3.96	0.001
	Non Oestrus Teaser Cow	2.994[b]	0.528		

Values with different superscripts differ significantly (P<0.05).

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Table II. Independent t-test for blood cortisol level

	Group	Mean	SE	t	p
Blood Cortisol Level	Oestrus Teaser Cow	11.920	4.169	0.921	0.373
	Non Oestrus Teaser Cow	9.803	4.989		

ane were present in the oestrus phase, while the compounds of butanoic acid, 2-propenyl ester, carboxylic acid and pentanoic acid were found only in pre-oestrus. In addition, 3-hexanol, butane, 2,2-dimethyl and phosphonic acid were found exclusively in post-oestrus phase (Sankar and Archuman, 2008), while 1-iodo undecane is a pheromone that could be found in the urine of oestrus cow (Archunan and Rameshkumar, 2012).

Bulls may mark the oestrus cows with stimulation through two chemosensory systems. The main olfactory system (MOS) and the vomeronasal system (VNS) are responsible for the perception of odorants in mammals. The MOS is considered to be responsible for recognizing the conventional volatile odorant molecules, whereas the VNS is thought to be tuned for sensing pheromones. Both chemosensory systems, together with additional olfactory organs, are involved in pheromone detection (Mucignat-Caretta *et al*., 2012 ;Tirindelli *et al*., 2009). The teaser oestrus cow makes attractive response for mating and shorten the ejaculation time of the bull. As in this study it was proved that the use of oestrus teaser cow will shorten the ejaculation time.

Based on independent t-test, there was no significant difference ($P < 0.05$) between the different teaser cows. It can be seen that the levels of cortisol in the blood as an indication of stress did not show differences when using teaser cow with oestrus and non-oestrus cows during semen collection process (Table II).

Cortisol levels in normal condition of animals are regulated and limited by a negative feedback system in the hypothalamus. Feedback system does not occur in stress condition. Corticotropic Releasing Factor (CRF) or Corticotropic Releasing Hormone (CRH) is the main hormone that regulates animal response to stress. All forms of stress, whether physical, chemical, temperature, microbial and other factors have a profound effect that stimulates the hypothalamus secreting CRH which will disrupt the diurnal and nocturnal rhythms in the regulation of cortisol levels (Martin and Crump, 2003). Normal levels of plasma cortisol in healthy cows are 6.74 to 56.30 nmol / L or 2.44 to 20.38 ng / ml (Proverbio *et al*., 2013). Cortisol levels will peak in 15-20 minutes after stress and will return to basal concentrations after 1 hour (Lay *et al*., 1998).

Summary

The results of this study indicated that there was no increase in cortisol levels when teaser cow with oestrus and non-oestrus were used for semen collection process of Madura bulls. The process of semen collection did not induce stress in Madura bulls. This is in accordance with the indication that Madura cattle are more resistant to stress.

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