KARAKTERISTIK SEMEN BEKU SAPI SIMMENTAL DENGAN METODE *THAWING* YANG BERBEDA

INTISARI

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Inseminasi buatan (IB) merupakan teknologi reproduksi untuk meningkatkan populasi dan kualitas genetik ternak, termasuk sapi Simmental. Keberhasilan IB dipengaruhi oleh beberapa faktor, salah satunya kualitas semen beku, sedangkan kualitas semen beku dipengaruhi oleh metode *thawing*. Suhu *thawing* yang tidak tepat dapat menyebabkan stres termal dan penurunan kualitas spermatozoa. Penelitian ini bertujuan untuk mengevaluasi pengaruh metode *thawing* terhadap kualitas semen beku *post-thawing* sapi Simmental. Penelitian dilaksanakan di Laboratorium Fisiologi dan Reproduksi Ternak Fakultas Peternakan dan Laboratorium Riset Terpadu Fakultas Kedokteran Universitas Gadjah Mada. Sembilan puluh straw semen beku produksi BBIB Singosari Malang, Jawa Timur digunakan dalam penelitian ini. Semen beku dikelompokkan dalam tiga metode *thawing* yang berbeda meliputi suhu 28ºC selama 30 detik (kelompok I), 28ºC selama 45 detik (kelompok II) dan suhu 37ºC selama 15 detik. (kelompok III). Selanjutnya, dilakukan uji kualitas semen meliputi motilitas, viabilitas, abnormalitas spermatozoa, integritas membran plasma dan kerusakan DNA. Uji motilitas dengan melihat pergerakan spermatozoa, viabilitas dan abnormalitas diuji menggunakan pewarna eosin-nigrosin, integritas membran plasma spermatozoa menggunakan *metode hypoosmotic swelling* test (Hos-test) dan kerusakan DNA menggunakan kit Sperm-Bos-Halomax®. Data dianalisis menggunakan analysis of variance (ANOVA) pola searah. Hasil penelitian menunjukkan bahwa Metode *thawing* berpengaruh nyata terhadap motilitas, abnormalitas dan integritas membran plasma (p<0,05). Rerata motilitas pada kelompok I, II dan II masing-masing sebesar 44,03±3,47%; 42,13±2,99%; dan 42,30±2,56%. Rerata abnormalitas pada Kelompok I, II dan II masing-masing sebesar 10,30±2,16%; 12,25±2,85%; dan 12,77±3,14%. Rerata integritas membran plasma pada kelompok I, II dan II adalah 75,70±3,23%; 73,98±4,30%; dan 70,40±3,87%. Namun, metode *thawing* tidak berpengaruh nyata terhadap viabiltas dan kerusakan DNA (p>0,05). Rerata viabilitas dan kerusakan DNA pada kelompok I, II dan II adalah 67,21±4,09%; dan 3,77±2,03%; 65,78±4,22% dan 4,00±2,00%; 66,76±4,01% dan 4,77±1,95%. Dapat disimpulkan bahwa metode *thawing* berpengaruh terhadap kualitas spermatozoa *post-thawing* sapi Simmental yang meliputi motilitas, abnormalitas dan integritas membran plasma spermatozoa. Metode *thawing* terbaik pada suhu 28ºC selama 30 detik.

Kata kunci: sapi Simmental, semen beku, metode *thawing,* kualitas semen, kerusakan DNA spermatozoa.

CHARACTERISTICS OF FROZEN SEMEN SIMMENTAL BULL WITH DIFFERENT THAWING METHODS

ABSTRACT

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Artificial Insemination (AI) is a reproductive technology aimed at increasing livestock populations and enhancing genetic quality, including that of Simmental bull. The success of AI is influenced by several factors, one of which is the quality of frozen semen. The quality of frozen semen, in turn, is affected by the thawing method. Inappropriate thawing temperatures can lead to thermal stress and a reduction in spermatozoa quality. This study aimed to evaluate the effect of thawing methods on the post-thaw quality of frozen Simmental semen. The research was conducted at the Animal Physiology and Reproduction Laboratory of the Faculty of Animal Science and the Integrated Research Laboratory of the Faculty of Medicine at Gadjah Mada University. Ninety straws of frozen semen produced by BBIB Singosari Malang, East Java, were used in this study. The frozen semen was divided into three groups with different thawing methods: 28ºC for 30 seconds (Group I), 28ºC for 45 seconds (Group II), and 37ºC for 15 seconds (Group III). The semen quality tests included assessments of motility, viability, spermatozoa abnormalities, plasma membrane integrity, and DNA damage. Motility was evaluated by observing spermatozoa movement, while viability and abnormalities were tested using eosin-nigrosin staining. Plasma membrane integrity was assessed using the hypoosmotic swelling test (HOST), and DNA damage was evaluated using the Sperm-Bos-Halomax® kit. Data were analyzed using one-way analysis of variance (ANOVA). The results indicated that the thawing method significantly affected motility, abnormalities, and plasma membrane integrity (p>0,05). The average motility in Groups I, II, and III was 44.03±3.47%, 42.13±2.99%, and 42.30±2.56%, respectively. The average abnormalities in Groups I, II, and III were 10.30±2.16%, 12.25±2.85%, and 12.77±3.14%, respectively. The average plasma membrane integrity in Groups I, II, and III was 75.70±3.23%, 73.98±4.30%, and 70.40±3.87%, respectively. However, the thawing method did not significantly affect viability and DNA damage (p>0,05). The average viability and DNA damage in Groups I, II, and III were 67.21±4.09% and 3.77±2.03%; 65.78±4.22% and 4.00±2.00%; 66.76±4.01% and 4.77±1.95%, respectively. It can be concluded that the thawing method affects the post-thaw quality of Simmental spermatozoa, specifically motility, abnormalities, and plasma membrane integrity. The best thawing method was 28ºC for 30 seconds.

Keywords: Simmental bull, frozen semen, *thawing* method, semen quality, sperm DNA damage.