

LAPORAN AKHIR
Penelitian Unggulan Perguruan Tinggi (M)



**Pemanfaatan Ekstrak Buah Mengkudu (*Morinda citrifolia*) Untuk
Mempertahankan Kualitas Semen Kambing
Selama Pendinginan dan Pembekuan**

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Untuk Mempertahankan Kualitas Semen Kambing Selama
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ABSTRAK

Mengkudu (*Morinda citrifolia*) adalah buah tanaman tropis yang mengandung alkaloid (xeronin), vitamin A dan C yang merupakan antioksidan yang efektif mencegah dan menetralkan radikal bebas. Penelitian ini dilakukan untuk mengevaluasi suplementasi ekstrak buah mengkudu (EBM) dalam pengencer dasar tris-kuning telur terhadap kualitas semen kualitas semen kambing peranakan etawah setelah pendinginan. Semen dikoleksi dari 4 ekor kambing Peranakan Etawah (PE) jantan dewasa menggunakan metode vagina buatan. Semen segar dievaluasi terhadap warna, pH, volume, konsentrasi, motilitas massa, motilitas individu, spermatozoa hidup dan abnormalitas sperma. Semen diencerkan dengan pengencer dasar tris-kuning telur yang disuplementasi dengan berbagai tingkat EBM (0, 10, 20 dan 30 %) v/v dengan perbandingan 1 semen : 4 pengencer. Semen yang digunakan memiliki motilitas massa 2+ dan motilitas 70%. Segera setelah pengenceran semen disimpan dalam 3-5°C dan motilitas, viabilitas dan abnormalitas sperma diamati pada 0, 24 dan 48 jam setelah pendinginan. Data yang diperoleh dianalisis dengan Analisis Varian (ANOVA) dan Beda Nyata Terkecil. Rancangan penelitian yang digunakan adalah Rancangan Acak Lengkap (RAL) dengan 4 perlakuan dan 10 ulangan. Disimpulkan bahwa level EBM yang terbaik untuk menghasilkan kualitas semen yang optimal adalah 10%.

Kata kunci : AI, antioksidan, pengenceran, ekstrak mengkudu (*Morinda citrifolia*), kualitas semen

ABSTRACT

Noni (*morinda citrifolia*) is the fruit of a tropical plant with content of alkaloids (xeronin), vitamins A and C which are antioxidants that effectively prevent and neutralize free radicals. This study was conducted to evaluate the supplementation of Noni (*morinda citrifolia*) extract in a tris-egg yolk-based diluent on semen quality of crossbreed etawah goat semen after cooling. Semen was collected from 4 male mature bucks using artificial vagina method. Fresh semen evaluated for colour, pH, volume, concentration, mass motility, motility, life sperm and sperm abnormality. Semen was diluted with tris-egg yolk-based extender supplemented with different levels of Noni (*morinda citrifolia*) extract (0, 10, 20 and 30 %) v/v with the ratio of 1 semen : 4 diluter. Semen used had mass motility of 2+ and motility of 70%. Immediately after dilution semen was stored in 3-5°C and sperm motility, viability and abnormality percentage were observed at 0, 24 and 48 h. The obtained data were analyze with Analysis of Variant (ANOVA) and Least Significant Difference were determined. The experiment was designed using completely random design (4 treatments and 10 replications). It can be concluded that the best Noni (*morinda citrifolia*) extract level for resulting optimal semen quality was 10%.

Key words: AI, antioxidant, dilution, Noni (*morinda citrifolia*) extract, semen quality

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Noni (*morinda citrifolia*) is the fruit of a tropical plant with content of alkaloids (xeronin), vitamins A and C which are antioxidants that effectively prevent and neutralize free radicals. This study was conducted to evaluate the supplementation of Noni (*morinda citrifolia*) extract in a tris-egg yolk-based diluent on semen quality of crossbreed etawah goat semen after cooling. Semen was collected from 4 male mature bucks using artificial vagina method. Fresh semen evaluated for colour, pH, volume, concentration, mass motility, motility, life sperm and sperm abnormality. Semen was diluted with tris-egg yolk-based extender supplemented with different levels of Noni (*morinda citrifolia*) extract (0, 10, 20 and 30 %) v/v with the ratio of 1 semen : 4 diluter. Semen used had mass motility of 2+ and motility of 70%. Immediately after dilution semen was stored in 3-5°C and sperm motility, viability and abnormality percentage were observed at 0, 24 and 48 h. The obtained data were analyze with Analysis of Variant (ANOVA) and Least Significant Difference were determined. The experiment was designed using completely random design (4 treatments and 10 replications). It can be concluded that the best Noni (*morinda citrifolia*) extract level for resulting optimal semen quality was 10%.

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RINGKASAN

Penyimpanan semen bisa dilakukan dengan pendinginan. Aktivitas metabolisme dan pendinginan menyebabkan stres oksidatif. Setelah penyimpanan kualitas semen akan menurun. Untuk dapat mempertahankan kualitas semen selama penyimpanan diperlukan bahan pengencer yang tepat. Pengencer dasar Tris biasa digunakan sebagai pengencer semen kambing untuk keperluan Inseminasi Buatan (IB). Ekstrak buah mengkudu (EBM) merupakan antioksidan nabati yang mampu menangkal radikal bebas bagi spermatozoa selama penyimpanan karena dalam EBM mengandung vitamin C, sehingga diharapkan dapat mempertahankan kualitas spermatozoa selama pendinginan. Masalah dalam penelitian ini adalah bagaimanakah ekstrak buah mengkudu pada level yang berbeda dalam pengencer dasar tris mampu mempertahankan kualitas semen kambing selama pendinginan ? Tujuan jangka panjang penelitian adalah untuk meningkatkan produktivitas kambing melalui teknologi IB dengan menggunakan semen setelah pendinginan. Target khusus penelitian adalah mendapatkan level optimum ekstrak buah mengkudu dalam pengencer dasar tris yang mampu mempertahankan kualitas spermatozoa kambing selama pendinginan. Metode penelitian adalah percobaan laboratorium dan lapang. Pada Tahun I ini akan dilakukan penelitian: a). Pengaruh berbagai level suplementasi Ekstrak Buah Mengkudu (EBM) dalam pengencer dasar Tris terhadap kualitas semen kambing setelah pendinginan; b). Aplikasi IB dengan semen cair (setelah pendinginan) dengan berbagai level EBM dalam pengencer dasar Tris. Sampel semen ditampung dengan metode vagina buatan dari 5 ekor kambing Peranakan Etawah (PE) jantan dewasa, umur antara 2-4 tahun, berat badan > 40 kg. Level EBM yang dicobakan: 0, 10, 20 dan 30% . Pengamatan penyimpanan suhu dingin pada jam ke: 0, 24 dan 48 setelah penyimpanan. Parameter yang diamati: motilitas individu, viabilitas, abnormalitas spermatozoa, kadar SOD dan MDA. IB dilakukan pada masing-masing kelompok induk kambing PE. Parameter: angka kebuntingan. Pada akhir kegiatan diharapkan didapatkan level optimum EBM dalam pengencer dasar Tris dalam mempertahankan kualitas spermatozoa kambing selama pendinginan. Hasil penelitian menunjukkan bahwa level EBM dalam pengencer dasar berpengaruh nyata terhadap kualitas spermatozoa (motilitas individu, viabilitas dan abnormalitas) selama pendinginan. Disimpulkan bahwa 10% EBM dalam

pengencer dasar tris adalah optimal dalam mempertahankan kualitas spermatozoa kambing PE selama pendinginan. Disarankan untuk melanjutkan penelitian tentang pengaruh level EBM terhadap kualitas spermatozoa semen kambing PE selama pembekuan.

Kata kunci : AI, antioksidan, pengenceran, ekstrak mengkudu (*Morinda citrifolia*), kualitas semen

SUMMARY

Storage can be done by semen cooling. Metabolic activity and cooling causes oxidative stress. After storage of semen quality will decline. In order to maintain quality during storage of semen required appropriate diluents. Tris base diluents commonly used as a diluent goat semen for purposes of artificial insemination (AI) . Noni fruit extract (NFE) is a plant-based antioxidant that can counteract free radicals for spermatozoa during storage because the NFE contains vitamin C, which is expected to maintain the quality of spermatozoa during cooling. The problem in this research is how NFE at different levels in the base tris diluent able to maintain the quality of goat semen during cooling ? The long term goal of research is to : increase productivity through technology goat AI using liquid semen after cooling . The specific target is to get the optimum level of NFE in tris-based diluent are able to maintain the quality of goat spermatozoa during cooling. The research method was laboratory and field experiments. In this first year of research will be carried out : a) . Effect of various levels of supplementation of NFE in tris-based diluent of the quality of goat semen after cooling, b) . AI applications with liquid semen (after cooling) with various levels of NFE in tris-based diluent. Semen samples collected by the artificial vagina method of 5 Etawah Crossbreed bucks, aged between 2-4 years , weight > 40 kg . NFE level was tested : 0 , 10 , 20 and 30 % . Observations of cold temperature storage at all : 0 , 24 and 48 after storage . Parameters were observed : individual motility , viability, sperm abnormalities, SOD and MDA. AI performed on each group holding goat. Parameters : number of pregnancy. At the end of the activity is expected to obtain the optimum level of NFE in tris-based diluent in maintaining the quality of goat spermatozoa during cooling. The results showed that the level of NFE in a basic diluent significantly affect sperm quality (individual motility, viability and abnormality) during cooling. It was concluded that 10 % of NFE in tris-based diluent is optimal in maintaining the quality of goat spermatozoa during cooling. It is recommended to continue research on the effect of the level of NFE on semen quality goat spermatozoa during freezing.

Key words: AI, antioxidant, dilution, Noni (*morinda citrifolia*) extract, semen quality

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