Pengaruh Antioksidan Genistein dan Glutathione terhadap Kualitas Spermatozoa pada Kriopreservasi Semen Ayam Kampung Unggul Badan Penelitian dan Pengembangan Pertanian

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INTISARI

Kriopreservasi semen merupakan teknik penyimpanan semen dalam suhu yang sangat dingin untuk memperpanjang daya hidup spermatozoa. Produksi *reactive oxygen species* (ROS) secara berlebih dapat terjadi selama proses kriopreservasi, yang meningkatkan peroksidasi lipid kemudian menurunkan fungsi sperma dan memicu terjadinya kegagalan fertilisasi. Penggunaan antioksidan dalam kriopreservasi semen sangat penting untuk menekan peroksidasi lipid sehingga menjaga kualitas sperma. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh penambahan antioksidan genistein dan glutathione terhadap kualitas sperma ayam KUB selama kriopreservasi. Materi utama adalah semen yang dikoleksi dari 6 ekor ayam KUB menggunakan metode masase abdominal dua kali seminggu. Semen segar diperiksa secara makroskopis dan mikroskopis kemudian dijadikan satu dan diencerkan dengan pengencer A dalam bentuk 5 perlakuan meliputi ringer laktat kuning telur (RLKT) tanpa antioksidan (kontrol), dengan genistein 5µM ($RLKT_5$), genistein 10µM ($RLKT_{10}$), glutathione 0,2mM ($RLKT_2$), dan glutathione 0,4mM ($RLKT_4$). Semen diekuilibrasi pada suhu 5^{o}C selama 3 jam, kemudian ditambahkan pengencer B dan disimpan dalam straw. Semen dibekukan di atas uap cairan nitrogen selama 10 menit, kemudian dimasukkan ke dalam cairan nitrogen suhu -196^{o}C. *Thawing* semen dilakukan pada air suhu 37^{o}C selama 30 detik. Evaluasi semen dilakukan pada tahap *post dilution, post equilibration,* dan *post thawing*. Evaluasi meliputi motilitas, *recovery rate*, viabilitas, integritas membran dan fragmentasi DNA spermatozoa. Data dianalisis menggunakan metode *one way* ANOVA dan uji lanjut Duncan. Hasil penelitian menunjukkan persentase motilitas, viabilitas, integritas membran dan *recovery rate* pada tahap *post dilution* dan *post equilibration* tidak menunjukkan perbedaan nyata (P>0,05), pada tahap *post thawing* penambahan genistein dan glutathione berpengaruh nyata (P<0,05). Genistein 10µM paling baik mempertahankan kualitas semen beku ayam KUB meliputi motilitas 43,00±1,41%, *recovery rate* 51,19±1,68%, viabilitas 54,75±1,70%, integritas membran 57,50±2,64%, dan fragmentasi DNA spermatozoa 3,25±0,50%. Dapat disimpulkan penambahan genistein dan glutathione dalam RLKT mempertahankan kualitas semen beku, dan genistein 10µM paling baik mempertahankan kualitas semen beku ayam KUB.

Kata kunci: Ayam KUB, Kriopreservasi, Glutathione, Genistein, Kualitas semen beku

Effects of Genistein and Glutathione on the Quality of KUB Chicken (Kampong Chicken) Sperm During Cryopreservation

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ABSTRACT

Semen cryopreservation is the long-term storage of semen method under a cold temperature to lengthen the sperm life-spending. The excessive production of *reactive oxygen species* (ROS) causes the increase of lipid peroxidative in which decreasing sperm functionality and fertility problems. The importance of antioxidants in semen cryopreservation is to hold lipid-peroxidase down, thus the sperm-quality is maintained. This study aims to understand additional antioxidants of genistein and glutathione to the cryopreserved-sperm quality. Semen were being collected by abdominal massage twice a week from 6 samples of KUB chicken. Then, the semen was being examined macroscopic and microscopic and diluted by the solvent action of A to five different treatments, lactate ringer egg yolk (LR-EY) without antioxidant as control, LREY supplemented genistein 5 µM ($LREY_5$), genistein 10 µM ($LREY_{10}$), glutathione 0.2 mM ($LREY_2$), and glutathione 0.4 mM ($LREY_4$). Semen were equilibrated for three hours in 5ºC and were added to the B solution before in long-term storage. Semen was frozen above the liquid nitrogen fumes for ten minutes and put in -196 ºC of liquid nitrogen. Semen thawed in 37 ºC water bath for 30 seconds. The semen evaluation of post-dilution, post-equilibration, and post-thawing were happened. Evaluation rate included sperm motility, recovery rate, viability, membrane integrity, and DNA fragmentation. The results were shown in the post-dilution and post-equilibration phase, percentage of motility, viability, membrane integrity were not significantly affected ($P>0.05$) that the post-thawing result was shown affectively by adding genistein and glutathione ($P<0.05$). The result of 10 µM genistein was able to maintain KUB chicken semen quality, with the percentage of motility 43.00±1.41%, recovery rate 51.19±1.68%, viability 54.75±1.70%, membrane integrity 57.50±2.64%, and DNA fragmentation 3.25±0.50%. These concluded by adding the concentration of 10 µM genistein can preserve the semen quality of KUB chicken.

Keywords: Cryopreservation, Genistein, Glutathione, KUB chicken, Semen quality